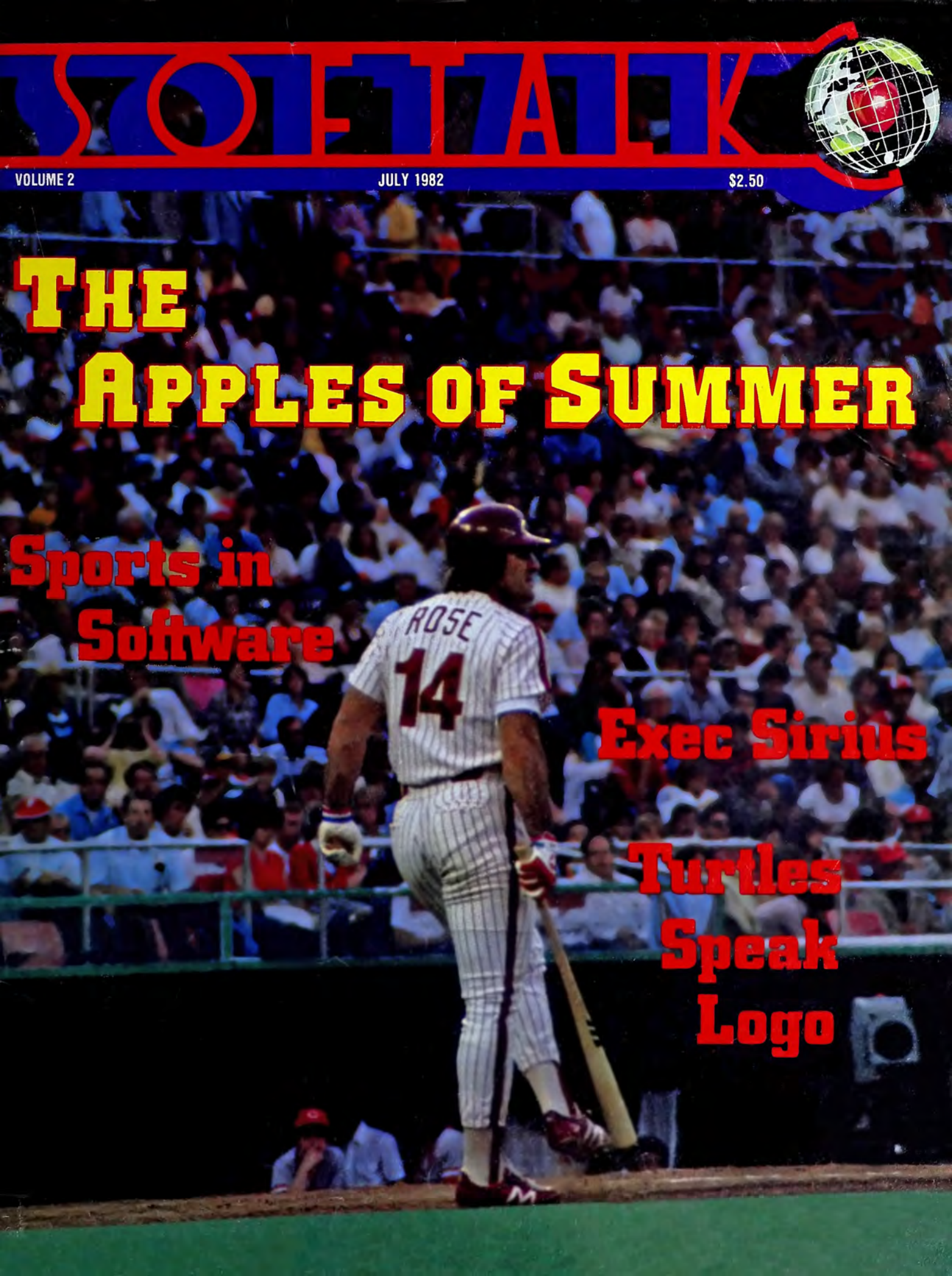
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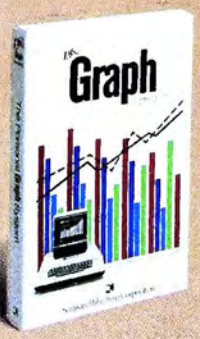
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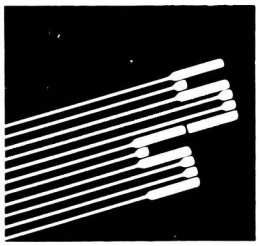
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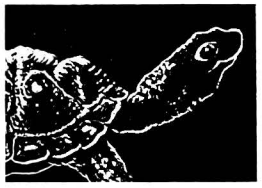
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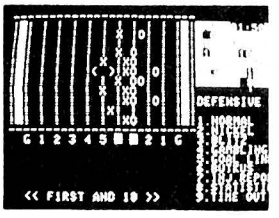
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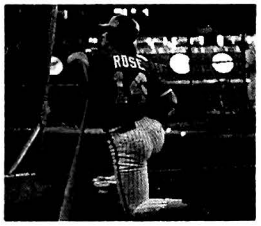
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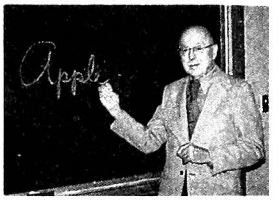
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CONTEST: APPLE ETYMOLOGY

Ever wonder how gruds and gleepnoks got their names? Or where Oo-Topos is located? Or what the derivation of Snoggle is? We don't know, but we do know that there are a lot of words and names in Appledom whose geneses are obscured by our immediate association of them with our microcomputers. Some of their origins lie in history; some are as close as your pocket dictionary.

For example, more often than not, when someone says "integer," we think first of a high-level language rather than of the numbers, −1, 0, 1, 2, and so on, just as "novation" conjures images of modem hardware, rather than the legal substitution of contracts or agreements.

This month's contest will help you remember (or teach you, if you don't already know) where some of these Apple-associated names came from. Below are twenty riddles. The object is to figure out the word or words referred to by the clues. Some of the answers are the names of software products, some are the names of companies related to Apples, and others are simply Apple-related proper names.

Some of the clues are definitions of the answers; others are definitions of words that themselves are clues to the answers. So if you think you have solved the given clue but it just doesn't make sense, then push on further.

Each puzzle is worth at least two points; one for the answer to the clue, and one for the name of the product, company, or proper name it refers to. Answers that require two clues being solved are worth three points. Make sure you give complete names in your final answer, and that they're spelled correctly. Incomplete or misspelled answers won't count.

Example:

a) Henry Ford's and assembler.

Answers: assembly line, *Assembly Lines: The Book* (2 points). "Assembly lines," or "Assembly Line," as a final answer would not be acceptable.

b) Spike and Snoopy.

Answers: beagle brothers, Beagle Bros (2 points). As a final answer, "Beagle Brothers" wouldn't count, as the correct spelling is "Bros."

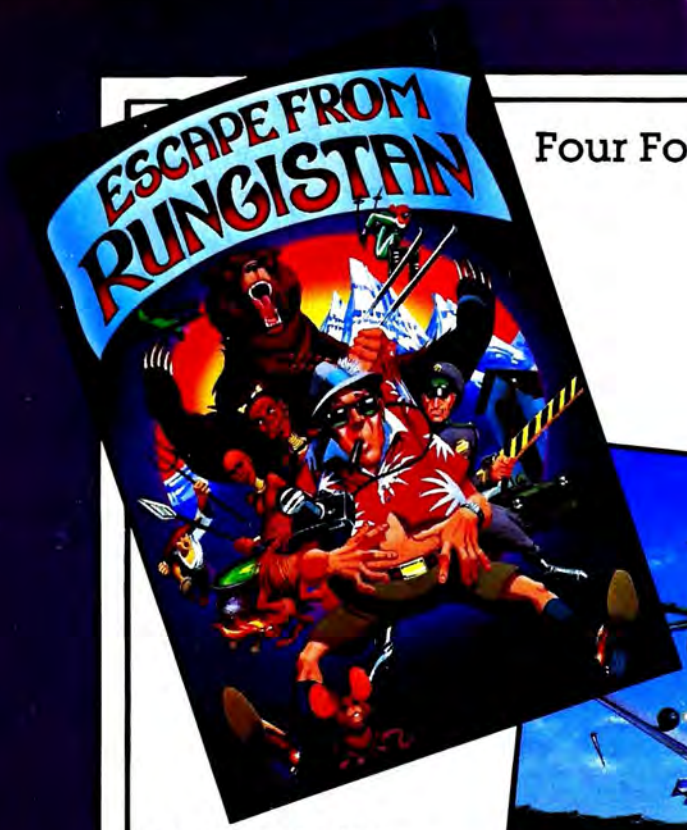
The winner will receive $100 in goods from *Softalk* advertisers. In case of a tie, contestants will be churned through Apple's random number generator. The lone survivor will be the winner.

A prize worth $50 will be awarded if someone makes an equally good case for an alternate answer or answers to those intended; in the event of more than one such entry, that deemed cleverest and most reasonable by *Softalk*'s contest staff will take this consolation prize.

1) Imagine flying in your spacecraft through some saw-toothed mountains.
2) The Romans worshipped her at cockcrow. Sleepytime girl?
3) These sentries are definitely ahead of their time.
4) A pattern of horizontal lines that form on a television screen when no signal is received. Especially visible if one tilts slightly.
5) This Titan stole fire from the heavens and gave it to mankind. I read it in a chain letter.
6) A large keyboard instrument with steam whistles, found in most carnivals and amusement parks.
7) Hi! I'm Peggy. Fly me to Coarsegold.
8) Computer gaming, in Brazzaville?
9) Lassie was one. So is Benji.
10) The air defense in North America neither takes nor adds to its power.
11) Having lived alone in the Arabian desert for over five hundred years, this creature burned itself, only to rise again—but in Illinois?
12) German sausage? We're stalking to kill about two thousand pounds' worth.
13) Like 1+1=3, for example.
14) In the valley, carries twice the weight as N.
15) Five shillings for a hard day's work.
16) A remarkable historic period. Like the era of the confused pharaoh.
17) In theory, what protons are made of. Just ask Richard Benjamin or Chris Jochumson.
18) Describes an alien creature that is intelligent, feeling, aware. Even if he's half 'n' half.
19) When translated into Greek, the name of the main character in an adventure game becomes the name of the main character in a Greek literary work—the title of which is the name of another adventure. Whew!
20) You can get stoned with this woman of serpentine hair, but don't get carried away. ■

Mail to Softalk Etymology, 11021 Magnolia Boulevard, North Hollywood, CA 91601, by August 15, 1982.

My point total: _____
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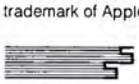




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Contest Winners: Crossword Rings a Bell

Man in the Moon: Wayne Lux, of Omaha, Nebraska, came up the winner of the April contest.

Lux, like many other entrants, didn't complete the crossword after identifying the missing quotation, "Mr. Watson, come here, I want you." He and 126 other entrants correctly identified the quote, the speaker as Alexander Graham Bell, the situation in which Bell spilled acid and yelled for help from his assistant who heard Bell's voice through the instrument, and the statement's significance as the first intelligible, if accidental, telephone communication. The random number generator plucked Lux's name from the pile of correct entries, and the Nebraskan will receive one hundred dollars' worth of software through his local dealer, Computer Works of Bellevue, Nebraska. He plans to purchase *DOS Tool Kit* and *Hi-Res Computer Golf.*

Another fifteen entrants correctly unpuzzled our spacey anagram and pun crossword and were eligible to win copies of *Crossword Magic,* the program that made it all possible. The random number generator went round and round again and came up with five bonus prize winners: Mike Leggett (Madison, WI); Ernest Sams (Bellingham, WA); Ethan Starr (Amherst, MA); and Deidre Yacich (New Orleans, LA). Tony Jeffries of Denver, Colorado, told us he already had a copy of *Crossword Magic,* so he'll receive another program through his dealer, Computer Land of South Denver, instead.

For those still puzzled over the crossword, here's the complete solution:

Across

1. **One small step.** End, "for man," is end of quote representing progress in space program. Major progress for babies.
4. **Soyuz.** Definition, charade: *soy*beans, *Duz.*
9. **Voyager.** "Now, Bette Davis," represents well-known Davis movie about love affair that begins on a boat, *Now, Voyager;* name of probe around Mars.
12. **Gemini.** Charade: "bejeweled" gives *gem, in, I* for Iceland; definition: twins.
14. **Tour.** Nixon cancelled the Grand Tour of the Planets, the conditions for which won't occur again for about 170 years.
15. **Shuttle.** Manhattanites had the advantage—the subway between Times Square and Grand Central Station is known as the Shuttle; definition; saves NASA money because it's reusable.
16. **Skylab.** First non-Earth office; it dropped debris in Australia when it reentered the atmosphere.
20. **Mariner.** Literary reference to Coleridge's "Rhyme of the Ancient Mariner"; anagram ("ram in rerun," *cut* run).
22. **Armstrong.** Anagram ("gran's mort"); distinction: first man to walk on moon.
26. **Pioneer.** Definition; anagram ("person, i.e.," without s(nake)).
27. **Grissom.** Anagram ("smog, sir"); distinction.
28. **USA.** Distinction; hidden word: "in end by *Sousa.*"
30. **Cooper.** Homonym anagram: recoup, couper, cooper; definition.
33. **Early bird.** Anagram ("rabid rely"); definition by reference to adage.
35. **Why.** Description; cryptic definitions.
36. **Shepard.** Distinction: first American in space; hidden word: "*she pard*oned."
38. **Vanguard.** Charade: semi equals *van,* watchman equals *guard*; definition.

Down

1. **One giant leap.** Charade hint: Nureyev is known for "giant" leaps; anagram ("I go; Anne pleat").
2. **Aldrin.** Twisted distinction: Aldrin was the second man on the moon; hidden word: "*bald ring*master."
3. **LEM.** Three men named Mel, backward; definition (lunar excursion module).
4. **Star.** Anagram ("Raster"); metaphoric definition.
5. **Zero gravity.** Charade: *ought* is synonym for *zero, weight* for *gravity*; synonym.
6. **Bean.** Anagram ("bane"); first names and distinction.
7. **Glenn.** "A Ford" is Glenn Ford; "Faith" was the name of John Glenn's spaceship; Glenn is now a senator.
8. **EVA.** Example: riding on running board was also extravehicular activity, sort of; Fifth Ave. reversed; a Peron is Eva.
10. **Explorer.** Anagram ("... ex ... P ... Lorre"); examples.
11. **Moon.** Circles from Woody between ends of *man*; "Looney" comes from luna, meaning moon.
13. **Sun.** Description, sometimes; hidden word: "that's *un*called"; synonym.
17. **Apollo.** Pun: "a polo"; description of myth.
18. **Ranger.** Reference to famous ranger; role requiring aloneness; anagram (Garner").
19. **Viking.** Anagram ("King Henry VI" minus Henry); definition.
21. **Discoverer.** Pun definition; example.
23. **Mercury.** Description (Lincoln-Mercury cars); reference to mythological character who had wings on his heels; description of element.
24. **NASA.** Anagram ("As an"); descriptions.
25. **Spacelab.** Anagram ("Pascal be"); definition.
29. **Mars.** Pun definition: "plan it" equals *planet*; anagram definition: RAMs; references to Mars brand candy bars.
31. **Echo.** Reference to old sons, "Little Sir Echo"; anagram: "*hoc* eminently."
32. **Plants.** Two examples, sunflower and pothus; anagram: "plat no," calling for smaller *no* meaning to drop the o.
34. **ATV.** Description of all terrain vehicle; semianagram in shortening "*avatar*" and rearranging.
37. **E. W.** Definition; clue to seek only initials; distinction: White was first American to walk outside the spaceship; further explanation, Soviets got there first. ■

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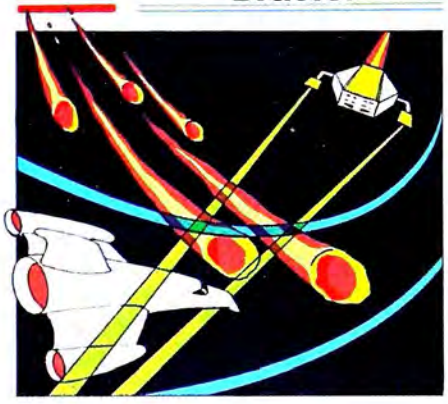
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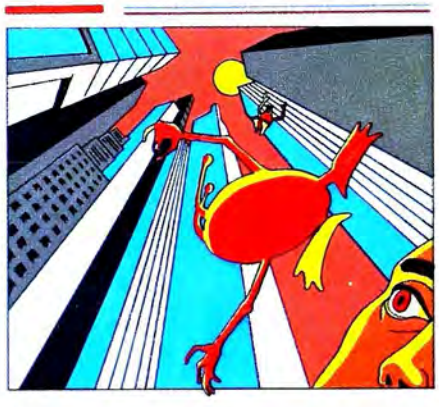
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Fastalk is your quick guide to popular, specialized, or classic software. Programs appearing in Fastalk must meet one or more of the following criteria: (1) equal or surpass in sales the least-selling program to appear on any of the current bestseller lists; (2) relate to a specialized subject area and be in general distribution (more specialized packages and areas will be included as Fastalk matures); (3) be new and of professional quality (such programs will be carried for one month only—after that, they must meet other criteria for inclusion); (4) stand out as extraordinary.

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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.

Creature Venture. Hi-res search of the depths of an old mansion to find a treasure. Some animation. Highlands Computer, 14422 S.E. 132nd St., Renton, WA 98056. $24.95. *4/81.*

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 food and power; 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.*

Deadline. Blank/Lebling. Episode one in a projected series of murder mysteries by the authors of *Zork.* Interrogate, accuse, make transcripts. Includes inspector's casebook, lab report. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95.

Hi-Res Adventure #0: Mission Asteroid. Blast off to save Earth from destruction. Twenty-one color graphics; for beginning adventurers. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $19.95. *1/81.*

● **Hi-Res Adventure #1: Mystery House.** Williams. Whodunit in a Victorian mansion. First adventure with pictures. More than 300 word vocabulary. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $24.95.

Hi-Res Adventure #2: The Wizard and the Princess. Williams/Williams. Attempt to rescue princess from vengeful wizard features 250 illustrations in full color. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $32.95. *11/80.*

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, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $34.95. *9/81.*

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. *12/81.*

Kabul Spy. Wilson. Cold war espionage adventure in which you must slip into Afghanistan to rescue a physicist before the commies make him talk. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $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. Excellent computer fare; nothing else like it. 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. "Microepic" hi-res adventure featuring ten periods from past and future history all over world and universe on eight double-sided disks. Good puzzles, many dangers. 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* comes into its own in sequence. 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.

Apple Plot. Converts numerical data into graphs; stores on hi-res page or prints out. *VisiCalc* interface. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $70.

Asset Manager. Calculates depreciation using current balance; chooses depreciation representing greatest savings. Handles up to 999 assets. Micro Lab, 2310 Skokie Valley Rd., Highland Park, IL 60035. $200.

BPI Accounts Receivable. Ferguson. Operates as open item or balance forward system for statement preparation, aging reports, and extensive credit analysis. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $395.

BPI General Ledger. Accounting system for small businesses automates posting of ledgers, financial statements 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. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $395.

Creative Financing. Evaluates loans and investments, provides R-O-I projections, payment tables and objective decisions. Howard Software, 8008 Girard Ave., Suite 310, La Jolla, CA 92037. $195.

Datadex. General purpose database manager able to perform specific applications. File generation and report utilities allow definition of file structure and appearance of reports. Information Unlimited Software, 281 Arlington Ave., Berkeley, CA 94707. $150. *9/81.*

The Data Factory. Passauer. Database management system allows listing files, getting file statistics, selecting another file, transferring records to new database, and adding fields to update forms. Disk swapping required; excellent product overall. Several compatible products available. Micro Lab, 3218 Skokie Valley Rd., Highland Park, IL 60035. $150. *8/81.*

Data Reporter. Allows plotting of data in various charts and graphs; stores data segmented by up to thirty-five fields. Machine language search and sort. Synergistic Software, 830 N. Riverside Dr., Renton, WA 98055. $220.

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. $229. *10/81.*

Financial Management System II. Jarvis. Keeps numerous accounts against a common budget; uses macro codes to abbreviate budget categories and transaction recipients or sources. Six-field format and lots of editing capability. Computer Management Systems, 1039 Cadiz Dr., Simi, CA 93065. $89.95. *5/81.*

General Ledger. Automatic double entry, complete audit trails. Menu drive. Continental Software, 11223 S. Hindry Ave., Los Angeles, CA 90045. $175.

General Manager. Database program that allows economic projections, search and select options, and screen formatting for data entry. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $99.95.

Information Master. Database managment program that can keep records sorted in five separate orders simultaneously. High Tech-

nology, Box S-14665, Oklahoma City, OK 73113. $150.

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 columnar reports. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94043. $95. *10/81.*

VC-Manager. Chapman. *VisiCalc* utility enabling performance of arithmetic operations on up to fifteen models at once and addition of one model to another. Micro Decision Systems, Box 1392, Pittsburgh, PA 15219. $65.

● **VisiCalc.** Bricklin/Frankston. Electronic worksheet for any problem involving numbers, rows, and columns. No programming necessary. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $250. *10/80.*

VisiFile. Creative Computer/Jameson/Herman. Database management system for organization and retrieval of information, allowing sort and modification of records. VisiCorp., 2895 Zanker Road, San Jose, CA 95134. $250.

VisiPlot. Kapor. Hi-res plotting and graphics package. VisiCorp, 2895 Zanker Road, San Jose, CA 95134. $179.95. *7/81.*

VisiTrend/VisiPlot. Kapor. Combines *VisiPlot* graphics with time-series manipulation, trend forecasting, and descriptive statistics. VisiCorp, 2895 Zanker Road, San Jose, CA 95134. $259.95. *7/81.*

VisiSchedule. Critical path PERT schedule planner. VisiCorp, 2895 Zanker Road, San Jose, CA 95134. $300.

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.*

Data Capture 4.0. Copiable/modifiable smart terminal program; compatible with Apple III and most lower-case adapters. Southeastern Software, 6414 Derbyshire Dr., New Orleans, LA 70126. $65.

VisiTerm. Well-planned, comprehensive. Hi-res sixty-character display; wide range of protocols for sending text. VisiCorp, 2895 Zanker Road, San Jose, CA 95134. $129. *9/81.*

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

Fantasy

Akalabeth. Lord British. Dungeon game of considerable depth and challenge. No save function. California Pacific, 7700 Edgewater Dr., Oakland, CA 94621. $34.95. *1/81.*

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. *6/82.*

● **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.*

Hellfire Warrior. Freeman/Johnson. Part two of *Temple of Apshai;* faster, with more options and specific goal. Automated Simulations, 1901 Old Middlefield, Mountain View, CA 94043. $29.95. *12/80.*

Knight of Diamonds. Second scenario of *Wizardry*, requiring thirteenth-level characters from the original. Individual quests on each of six dungeon levels. Great. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $34.95.

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, 830 N. Riverside Dr., Renton, WA 98055. $30. *10/80.*

● **Temple of Apshai.** Lead title in Dunjonquest series, winner 1981 Academy of Adventure Gaming Arts and Design "Computer Game of the Year" award. Automated Simulations, Box 4247, Mountain View, CA 94040. $39.95.

Trailblazer. Metagaming. Multiplayer adaptation of the space exploration and commerce game. Good lesson in resource management. Zeta Systems, 1725 Adelaide Blvd., Akron OH 44305. $29.95.

Ultima. British. Hi-res color adventure, progressing from Middle Ages to beyond the space age. A masterpiece. California Pacific, 1615 Fifth St., Davis, CA 95616. $39.95. *6/81.*

Upper Reaches of Apshai. The next four levels of the *Temple of Apshai*. Automated Simulations, Box 4247, Mountain View, CA 94040. $19.95.

● **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, 830 N. Riverside Dr., Renton, WA 98055. $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

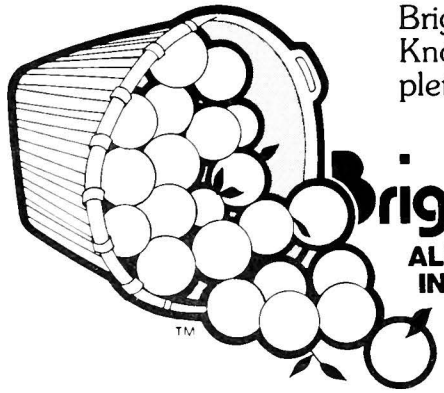
Apple World. Projects and rotates 3-D color images on screen in true perspective, drawing up to 65,000 points per side. Includes screen-oriented text editor for image formation. United Software of America, 750 Third Ave., New York, NY 10017. $59.95.

Bill Budge's 3-D Graphics System. Budge. Interactive graphics system allowing game programmers to add 2-D or 3-D animation to their programs. California Pacific, 1615 Fifth

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St., Davis, CA 95616. $39.95.

The Complete Graphics System II. 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, 830 Fourth Ave., Geneva, IL 60134. $9.95. *7/81.*

E-Z Draw 3.3. Rewrite of original, including Higher Text character generator. Any fonts and parts of screen can be expanded and compressed; flipped, slanted, rotated, or mirrored in combination. Twenty type styles. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $49.95.

GraFORTH. Lutus. A graphics language rewritten for maximum speed. Plotting, line, text display, character image, and high speed 3-D graphics, with variety of colors and drawing options. Includes music synthesizer. Insoft, 10175 SW Barbur Blvd., Suite 202B, Portland, OR 97219. $75.

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.

The Graphics Magician. Jochumson/Lubar/Pelczarski. Outstanding animation package consisting of a picture editor and shape table extender designed to allow programmers to design and store graphics files. Comes with utility program to transfer binary files. Penguin Software, 830 Fourth Ave., Geneva, IL 60134. $59.95. *5/82.*

Hi-Res Secrets. Fudge. Complete graphics tutorial covering all hi-res graphics subjects except 3-D animation. Background in Basic and assembly language assumed; good starting point for aspiring game programmers. Avant-Garde, Box 30160, Eugene, OR 97403. $125. *4/82.*

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

ABM. Warner. Fast-moving earthbound-invader game featuring multiple warhead missiles attacking six U.S. cities. Muse, 330 N. Charles St., Baltimore, MD 21201. $24.95. *2/81.*

- **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.*

A2-PB1 Pinball: Night Mission. Artwick. Fantastically realistic and competitive ten-mode pinball simulation, allowing user modification and definition of virtually every aspect of play. SubLogic, 713 Edgebrook Dr., Champaign, IL 61820. $29.95. *5/82.*

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.*

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Bandits. Ngo. Fight off waves of multiple menaces intent on killing you and stealing your supplies. Delirious non-stop action, animated to the hilt. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $34.95.

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, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95. *1/82.*

Bez Man. Besnard. Move faster than your adversaries in this improvement on classic eat-the-dots games. Three hi-res mazes, speed increases with each cleared screen. Bez, 4790 Irvine Blvd., Box 19633, Irvine, CA 92714. $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 med-flies, 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.*

Cannonball Blitz. In the cold light of *dawn*, you must find the *key* to victory, no matter how in*cong*ruous. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $34.95.

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.*

Choplifter. Gorlin. Fly your chopper into the Bungeling Empire to rescue the sixty-four hostages, avoiding interceptor jets, homing mines, and tanks. Challenging, realistic, and playful. Broderbund, 1938 4th St., San Rafael, CA 94901. $34.95.

Congo. Berlyn/Wilker. River search and rescue, with funky graphics, and emphasis on avoidance of obstacles. Sentient Software, Box 4929, Aspen, CO 81612. $34.95. *5/82.*

County Fair. Illowsky. Shooting gallery with hungry ducks and multiplying rabbits. DataMost, 19273 Kenya St., Northridge, CA 91326. $29.95.

Cricketeer. Nelsen. Help mister cricket safely across the highway and over the river to his home. Be chivalrous to lady crickets; hazards of hungry birds and unstable floating popsicle sticks. Software Farm, 3901 S. Elkhart St., Aurora, CO 80014. $29.95.

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.*

Cyclod. Hancock. Snakes versus eyeballs, using bricks for weaponry. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95.

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.*

Dogfight. Basham. Elaborate sixteen-level air battle against up to seven jets and helicopters. Up to eight players. Micro Lab, 2310 Skokie Valley Rd., Highland Park, IL 60035. $29.95. *1/81.*

Dueling Digits. Competitive math teaching program, creating equations arcade-style. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $29.95.

The Eliminator. Anderson. Pitting your hi-res space fighter against numerous adversaries. Adventure International, Box 3435, Longwood, FL 32750. $29.95.

Epoch. Miller. Straightforward space battle with refueling bases and time warps. Speed and steering response controls. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $34.95. *10/81.*

Falcons. Varsanyi/Ball. A hypnotically good 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.*

Gold Rush. Berlyn/Wilker. Transport the gold from the train through the forest to waiting hoppers; avoiding bears, Indians, bandits, and random troublemakers. Sentient Software, Box 4929, Aspen, CO 81612. $34.95. *6/82.*

Gorgon. Nasir. Fly over planet shooting and dodging invaders and saving kidnapped inhabitants. Outstanding hi-res graphics, challenging refueling sequence, if you can get that far. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $39.95. *8/81.*

Guardian. Tom & Jerry. Blast your way out of six levels of mazes surrounded by famous hostile-alien types. Normal and expert play. Continental Software, 11223 S. Hindry Ave., Los Angeles, CA 90045. $29.95.

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

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

Jellyfish. Burek. You attempt to retrieve deadly nuclear waste from the ocean floor, torpedoing all marine life that gets in your way. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95.

Juggler. Nice little circus game requiring Pong-type skills. IDSI, Box 1658, Las Cruces, NM 88004. $29.95. *5/82.*

Labyrinth. Schram. Eat-the-dots, *Crossfire*-style, in a constantly shifting maze pattern. Broderbund, 1938 4th St., San Rafael, CA 94901. $29.95. *6/82.*

Laf Pak. Chuckles. Four-game variety disk by Lord British's roommate: *Creepy Corridors, Apple Zap, Space Race,* and *Mine Sweep.* On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $34.95.

Lemmings. Thompson. Round up and detain mass-reproducing rodents, detaining non-breeding pairs, before they migrate into the sea. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95. *6/82.*

Meteoroids (Asteroids) in Space. Wallace. Making little asteroids out of big ones, plus occasional hostile alien ships. Hyperspace, autobrake, autofire. Quality Software, 6660 Reseda Blvd., Suite 105, Reseda, CA 91335. $19.95.

Microwave. Nitchals. Brightly colored, highly addictive maze game featuring continuous looney-tunes musical accompaniment. Cavalier Computer, Box 2032, Del Mar, CA 92014. $34.95. *5/82.*

Minotaur. Miller. Incorporates adventure elements and thirty-two four-level mazes. Surprises. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $34.95 *5/82.*

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. $29.95. *6/81.*

Peeping Tom. Livesay. Difficult, blind-firing shoot-'em-up requiring estimation of foe's position behind shuttered windows. Micro Lab, 2310 Skokie Valley Rd., Highland Park, IL 60035. $34.95. *5/82.*

Pegasus II. Lubeck. Fighter/bomber game featuring an option to create your own terrain. Dragons, flying saucers, eagles. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $29.95. *10/81.*

Pigpen. TMQ. Latest wrinkle in drop-the-dots, featuring hi-res swine and instant hams. DataMost, 9748 Cozycroft Ave., Chatsworth, CA 91311. $29.95.

Pool 1.5. Hoffman/St. Germain/Morock. Makes 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.*

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.*

Ricochet. Abstract action strategy game, a combination of chess and snooker. Five variants and four skill levels. Automated Simulations, Box 4247, Mountain View, CA 94040. $19.95.

Russki Duck. Knopp/Merrell. You attempt to recover stolen missile plans hidden in a fake duck while dispatching enemy agents who try to stop you. Fairly easy. Gebelli Software, 1771 Tribute Rd., Suite A, Sacramento, CA 95816. $34.95.

Sabotage. Allen. Your gun emplacement must shoot down enemy bombers and helicopters; parachuting saboteurs can amass on the ground and knock out your battle station. On-Line, 36575 Mudge Ranch Road, Coarsegold, CA 93614. $24.95. *7/81.*

Snack Attack. Illowsky. A three-maze eat-'em-up; starts at any of five speed levels. Non-fattening. 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 shoot-'em-up, 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



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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 Blaster. Mines, fireballs, space tunnels, general obstructions, and unfriendlies waylay your starship. Piccadilly, 89 Summit Ave., Summit, NJ 07901. $29.95.

Star Blazer. Suzuki. Bomb-run 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, 1615 Fifth St., Davis, CA 95616, and Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950. $19.95.

Swashbuckler. Stephenson. Hi-res sword-fighting with realistic pirates, snakes, rats, and other scum. DataMost, 9748 Cozycroft Ave., Chatsworth, CA 91311. $34.95.

Thief. Flanagan. Shoot robots before they shoot you in hi-res scrolling rooms. 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. Frustratingly small fuel supply. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $39.95. *12/81.*

Track Attack. Jochumson. Three-level train robbery chase game requiring considerable dexterity. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $29.95. *4/82.*

Tumble Bugs. Bishop. Very silly, enjoyably frustrating eating game with excellent graphics and animation. Magnifying glass enlarges where you are, blocks part around you. Datasoft, 19519 Business Center Dr., Northridge, CA 91324. $29.95. *5/82.*

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.

Voyage of the Valkyrie. Black and white shoot-'em-up with eleven levels and an impressive Wagnerian score. Advanced Operating Systems, 450 St. John Rd., Michigan City, IN 46360. $29.95.

Home/Hobby

The Accountant. Forman. Double-entry finance system features seven integrated files and a set of automatic transactions. Decision Support, 1438 Ironwood Dr., McLean, VA 22101. $89.95.

Alpha Plot. Kersey/Cassidy. Hi-res graphics and text utility with optional *xdraw* cursor and proportional spacing. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $39.50.

Apple-Cillin. Hardware diagnostic tests for all RAM and ROM, plug-in cards, cp registers, disks; nine video test patterns. XPS, 323 York Rd., Carlisle, PA 17013. $49.95.

Apple Spice. Koak/Fox. Powerful Applesoft expansion utility using *&* and *usr* functions. Easily incorporated programming routines. Adventure International, Box 3435, Longwood, FL 32750. $29.95. *5/82.*

Bag of Tricks. Worth/Lechner. Four utility programs for dumping and examining a raw track, sector editing, reformatting tracks, and repairing damaged disk catalogs. Quality Software, 6660 Reseda Blvd., Suite 105, Reseda, CA 91335. $39.95.

Cashbook 2.0. Very friendly personal and small business single-entry accounting system. Zofarry Enterprises, 35 Northcote St., Haberfield, N.S.W., Australia. $149. *5/82.*

Ceemac. Boering. Visual composition language. Compose-execute-compose swapping by single key commands. Interpreter releases as *Fire Organ.* Vagabondo Enterprises, 1300 E. Algonquin, Suite 36, Schaumburg, IL 60195. $75.

Data Perfect. Assembly language database companion to *Letter Perfect;* compatible with lower case in 40-column, most 80-column boards. Lay out, revise own screen, record design. Excellent built-in editor besides ability to be edited by word processor. Searches, sorts, generates reports. LJK, Box 10827, St. Louis, MO 63129. $99.95.

Dietician. Assembles dietary menus from diet formula you decide on, using foods of your own choice in developing nutritional program. Daily menu variation. Dietware, Box 503, Spring, Texas 77373. $59.95.

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.*

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.*

Electric Duet. Lutus. Two-voice music without hardware. Insoft, 10175 Barbur Blvd., Portland, OR 97219. $29.95.

Expediter II. Einstein/Goodrow. Applesoft compiler translates Basic programs into machine language. Will display or print a running list of source program lines and compiled addresses; memory compression option reduces compiled program size up to 50 percent. No stop on fatal errors. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $99.95. *9/81.*

File Whiz. Goss. Quickly learned database management program with six command modes. Files generated are accessible from Basic programs. Fast, easy, and convenient for home uses and users. SoftHouse, Box 6383, Rochester, MN 55903. $59. *12/81.*

Financial Management System II. Home finance management; maintains multiple accounts, generates complete audit reports, and stores unlimited files. Computerized Management Systems, 1039-S Cadiz Dr., Simi, CA 93065. $64.95.

First Class Mail. Schoenburg/Pollack. Fantastically user friendly program for specialized database applications. Twelve fields, ability to sort and filter on any field or combination. $74.95. *6/82.*

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.

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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.*

The Inspector. Sefton. Fast, flexible utility for examination of disk sectors, directory, and track/sector lists. Salvage blown disks, change data, delete DOS. Omega, 222 S. Riverside Plaza, Chicago, IL 60606. $49.95. *11/81.*

LISA 2.5. Hyde. Long-time popular assembler with extended mnemonics and more than thirty op-codes. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $79.95.

Mastertype. Zweig. Learn to type by playing a game; simple and ingenious. Lightning, Box 11725, Palo Alto, CA 94306. $39.95. *4/81.*

Menu Generator. Compiles inputs and writes menu programs in Basic. Involves filling in several forms on screen. Excellent documentation. Crane Software, 16835 Algonquin, Suite 611, Huntington Beach, CA 92649. $39.95. *1/82.*

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.*

Nutrichec. Thurman/Parkey. Diet analysis program compares nutritional value of your diet with RDA for a person of your physical characteristics and habits; suggested intake, nutrient sources. WIMS, 6723 E. 66th Pl., Tulsa, OK 74133. $59.95.

Personal Finance Manager. Gold/Software Dimensions. Handles up to 200 entries a month from maximum of fourteen separate accounts. Search/sort/edit routine. Apple/Special Delivery, 10260 Bandley Dr., Cupertino, CA 95014. $75. *11/81.*

●**Program Line Editor.** Program development and modification program with more than eleven editing commands, listing control, lower case, and programmable cursor control. Synergistic Software, 830 N. Riverside Dr., Renton, WA 98055. $40.

Psort. Long. Pascal utility for programmers permitting (slow) alphabetic sorting and merging of files. Source codes can be recompiled and usually must be for program to run. Apple/Special Delivery, 10260 Bandley Dr., Cupertino, CA 95014. $85. *5/82.*

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 and file/agenda program for spontaneous or structured information entry. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $199.95.

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

Strategy

Air Sim-1. 3-D machine language flight simulator with six landing fields and optional instrument flying mode. Mind Systems, Box 506, Northampton, MA 01061. $40.

Battle of Shiloh. Landry/Kroegel. Fast, simple game (as these go) with adjustable risk levels, strategy types, and army ratings to reflect players' abilities. Save option. Strategic Simulations, 465 Fairchild Dr., Mountain View, CA 94043. $39.95.

Castle Wolfenstein. Warner. First game to fuse successfully best elements of home-arcade and adventure. With naught but a

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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.*

Computer Baseball. Merrow/Avery. Remarkable programming feat, simulating individual player abilities from the teams of thirteen famous World Series. Can enter and play teams of your own creation. Strategic Simulations Inc., 465 Fairchild Dr., Mountain View, CA 94043. $39.95. *9/81.*

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.

Flight Simulator. Artwick. Utilizes aerodynamic equations and airfoil characteristics for realistic simulation of take-off, flight, and landing. Dynacomp, 1427 Monroe Ave., Rochester, NY 14618. $21.95.

Gin Rummy. Carpet. Play against computer. Hi-res cards can change position in hand; your entire hand visible. Space bar allows you to change your mind when discarding. DataMost, 9748 Cozycroft Ave., Chatsworth, CA 91311. $29.95. *6/82.*

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. *2/82.*

Hi-Res Cribbage. Schwader. One-peg type; discarding to crib and playing to peg. Spiral board, skunking, automatic counting. Solid, challenging game. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $24.95. *4/81.*

Hi-Res Football. Sullivan/Williams. Make play decisions in coach and quarterback positions. Players and field in hi-res animated graphics. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $39.95.

Microgammon II. Competition program for learning, practice, and improvement of backgammon skills. Tournament play. Softape, 10432 Burbank Blvd., North Hollywood, CA 91601. $19.95. *2/81.*

Pursuit of the Graf Spee. The 1939 engagements of the German pocket battleship off South America. Visibility and sighting system; separate ranges for each gun turret. Strategic Simulations, 465 Fairchild Dr., Mountain View, CA 94043. $59.95.

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., Suite 108, Mountain View, CA 94043. $59.95.

Warp Factor. Space war game featuring twelve starship designs representing five galactic empires, with possible scenarios ranging from skirmishes to galactic war. Extremely challenging. Strategic Simulations, 465 Fairchild Dr., Suite 108, Mountain View, CA 94043. $59.95. *7/81.*

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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.*

Apple Writer Extended Features. Malachowski/Cooper. Enables production of multiple copies of *Apple Writer* files and insertion of variables; converts Applesoft programs to *Apple Writer* and vice versa. Brillig Systems, 10270 Fern Pool Ct., Burke, VA 22015. $34.95. *7/81.*

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.

Apple Writer II. Lutus/Finstead. Written in word processing language. Additional editing features and functions menu; continuous readout of character count and length. Apple/Special Delivery, 10260 Bandley Dr., Cupertino, CA 95014. $150.

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

Executive Secretary. Editing, printing, and form letters, plus mail-merge and electronic mail system. SofSys, 4306 Upton Ave. S., Minneapolis, MN 55410. $250.

Format II. Single-drive machine code program; incorporate and edit files from other programs, create DOS text files for any communications program, any printer. Kensington Microware, 300 E. 54th St., New York, NY 10022. $375.

Gutenberg. Wagner. User definable character set, split-screen hi-res and lo-res text editing for text, program files. Performs text block moves and deletes; paint program produces large illustrations integrated with text. Micromation, Yorkdale Place, 1 Yorkdale Rd., Suite 406, Toronto, Ont., Canada M6A3A1. $315.

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

Magic Window. Word processing program simulates standard typewriter; 80-column text scrolls across 40-column screen. Three modes of disk file storage. Softape, 10432 Burbank Blvd., North Hollywood, CA 91601. $99.95.

Magic Words. Proofreads files of word processors which use standard DOS and no character encryption techniques for saving files. 14,000-word dictionary. Artsci, 10432 Burbank Blvd., North Hollywood, CA 91691. $69.95.

Screenwriter II. Kidwell/Schmoyer. Formerly *Superscribe II*. No extra hardware for 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; letter documentation, footnotes and headers, expandable math mode. Muse, 330 N. Charles St., Baltimore, MD 21201. $175.

Word Handler. Elekman. Wonderfully simple program with straightforward documentation. Allows folded paper printout for two-sided printing. Silicon Valley Software, 652 Bair Island Rd., Redwood City, CA 94063. $249. *10/81.*

WordStar. Screen-oriented, integrated word processing system in CP/M. Requires Z-80 card. 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.*

Apple III

Access III. Communications program for time sharing and stand-alone tasks; accesses remote information services, minis, and mainframes. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $150.

Apple Business Basic. High-level structured programming language for the III. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $125.

Apple III Business Graphics. Converts numerical information into charts and graphs; only graphics program to take advantage of the III's capabilities. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $175.

Apple Writer III. Lutus. Uses WPL (Word Processing Language) to automate the process of text manipulation and document creation. Adjusts print format during printing, translates from typewriter shorthand to English or other language and back again. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $225.

Hardisk Accounting System. *General Ledger, Accounts Receivable,* and *Accounts Payable* each handle up to 9,999 customers or accounts; *Inventory* features five methods of evaluation. Also *Payroll, Fixed Asset Management,* and *Mailing Labels*. Great Plains Software, 113 Broadway, Fargo, ND 58102. $395 to $595 per module.

Mail List Manager. Generates, stores, sorts, edits, and prints database files. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $150.

Personal Filing System. Page. Form-oriented information management system allows storage and retrieval of up to 32,000 entries. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94043. $145.

PFS: Report. Page. Generates reports; performs functions that require sorting, calculating, and manipulating data filed with *PFS*. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94043. $125.

VisiCalc III. Software Arts/Bricklin/Franksston. Just like it sounds: expanded memory, upper and lower case, eighty columns. Four-way cursor movement. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $250.

Word Juggler. Gill. Word processor makes use of upper/lower case keyboard, eighty-column display, and expanded memory. Printout can be reviewed on screen prior to printing; multiple copies printed of selected pages. Quark Engineering, 1433 Williams, Suite 1102, Denver, CO 80218. $295.

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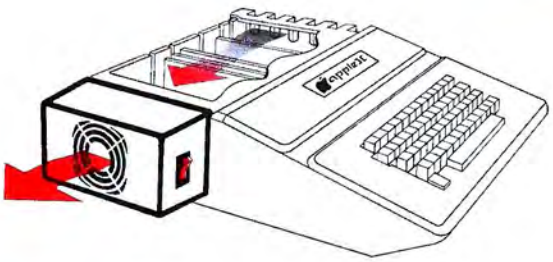


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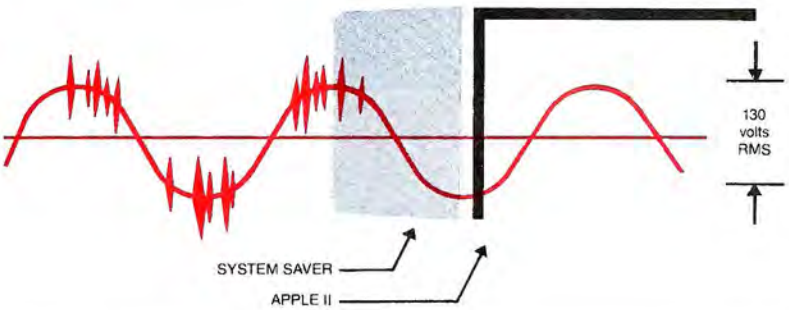
SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.



For Line Surge Suppression

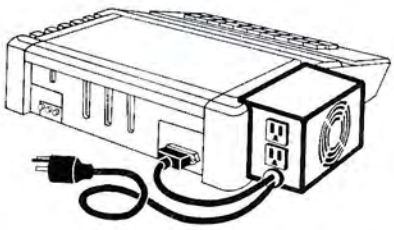
The SYSTEM SAVER provides essential protection to hardware and data from dangerous, power surges and spikes.

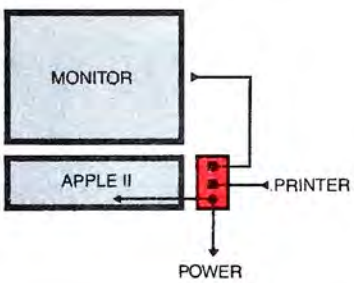
By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 volt RMS level. 2) High frequency noise is smoothed out before reaching the Apple II.



For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. As shown in the diagram, the SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer. The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again!





$89.95 at your local dealer or order direct by phone or mail from:

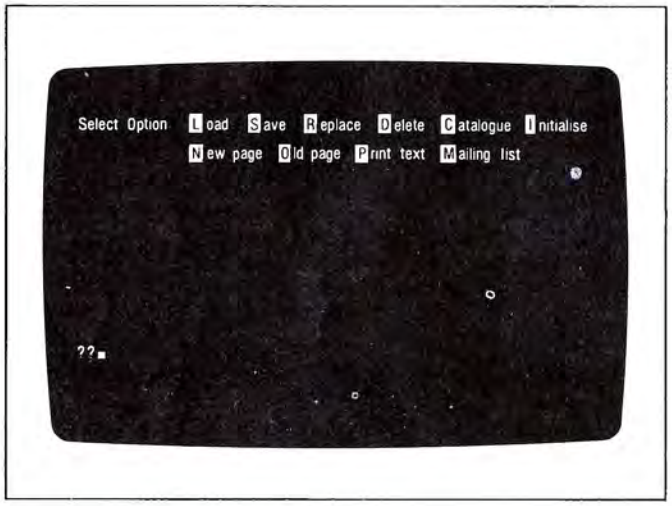
Kensington Microware Ltd.
300 East 54 Street, Suite 3L
New York, NY 10022
(212) 490-7691

When ordering by mail include payment of $89.95 plus $2 50 for handling New York State residents add 6¼% sales tax.
By phone payment can be charged to VISA or MASTERCARD.

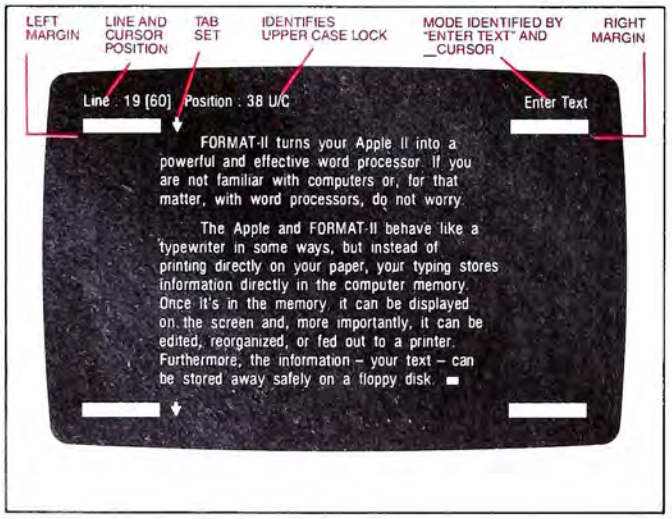
Dealer inquiries invited.

KENSINGTON MICROWARE





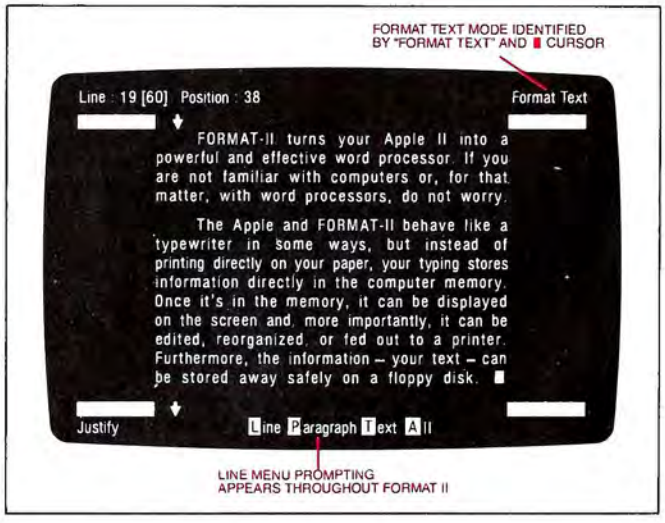
The Main Menu. Commands for the Main Menu, as in all modes of the system, are mnemonic. For example, to create a *New Page*, just touch [N]. To *Print Text* touch [P]. Touch [M] and move immediately into the mailing list. There is no chaining to disk!



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 smarter 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.

Effortless Formatting



Touch the [ESC] key and you're in "Format Text" mode to edit and manipulate. Again, all commands are mnemonic and are brought up with one key stroke. No complicated CTRL functions! For example:

[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 appears exactly as it will print out. Format II is a "what you see is what you get" word processor.

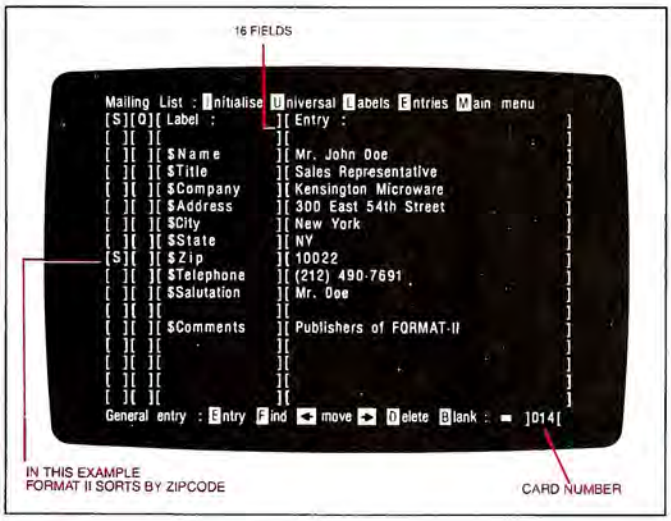
Format-II Knocks Wordstar Right off The Apple®

Format-II gives you everything that Wordstar® offers, and it does more! It does it faster! It does it simpler! All at a lower cost!

Format-II is a machine code program. An immediate benefit is speed—response to commands is instantaneous. Also, Format-II loads entirely at once including the Mailing List. Remove the program disk, you won't need it anymore. Only one disk drive is required!

The Mailing List: Powerful, Versatile

Format-II's sophisticated Mailing List rivals the best database management systems. Entries are in a card file format. Each entry reserves a 16 field card, and 442 cards fit on each Mailing List disk. You can add new entries, flip through entries, find particular entries, alter existing entries, and much more.



Maintain your lists in any order you like. In this example the entries have been sorted by zip code.

Format-II's powerful logic allows you to target entries from your list to be merged with specified letters. To send a letter to all "Program City" stores listed except those in California, set Format-II's logic for "Program City" ANDNOT "California". With the logic set for "lawyers"OR"accountants"AND"California", Format-II will print a letter to only those lawyers and accountants who live in California.

A complete range of selections in your hands.

Other Knockout Features:

- ☐ Format-II works with any printer that connects to the Apple. It performs proportional space justification with Diablo®, Qume® and NEC® printers.
- ☐ For transmission of text over the telephone, Format-II will create DOS 3.3 Text files for all available communications programs.
- ☐ Use Format-II to incorporate and edit files created with other programs such as Visicalc® spread sheets.
- ☐ A Quick Guide manual that will have you running most features in two hours, and a full Reference Manual for that weekend to explore all the championship qualities of Format-II Word Processing.

THE SCORECARD

	Format-II	Wordstar
Basic Program	$375	$375
CP/M®	Not required	399 (Softcard®)
Mailing List	Included	125 (Mailmerge®)
Sorting Program	Included	200 (Supersort®)

Prices shown are list.

Go with the best. Ask for a complete demonstration of Format-II at your local dealer. You too will be a winner.

FORMAT-II®



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OPEN DISCUSSION

Discovery of a Menacing Message
When I came into work this morning, I found the following letter to *Softalk* lying upon my desk. My years of surveillance of The Island and its rulers for my expose *The Prisoner* allow me to say with confidence that this message was indeed written by The Caretaker.

This is the second time that he has left me such a message, once again somehow getting past the locked doors and alarm systems of Edu-Ware's offices. In the interests of keeping the public aware of this menace, I release his letter to you for publication.
David Mullich, Vice President,
Edu-Ware Software Development,
Agoura, CA

The Message
As caretaker of The Island in *The Prisoner*, I have a particular fondness for ambiguities. Therefore, I was highly amused by your April issue in which a letter appeared that was written by one of our islanders, Number 24 (Victor De Grande).

Number 24 lamented in his letter over the twenty-four bugs that had infested Crystalware's *Sands of Mars*. "But," he wrote, "since I had just played *The Prisoner*, I was prepared for anything."

It is gratifying to know that we did such a good job of preparing Number 24. Did he mean that he also found bugs in *The Prisoner?* Or did he mean that our brainwashing techniques have conditioned him to always be prepared for frustration and disappointment? A little knowledge is *such* a dangerous thing. Well, it seems that the only way to have your readers' minds cleared on this matter is to have them pay a little visit to our facilities. I assure you that we can do as well for them as we did for Number 24.

Allow me to take this opportunity to make two announcements. First, we have elected a new recruitment director: Number 24. And second, we are renovating our facilities. Everything is getting a new paint job in thirty-two hires colors, and new locks are being put on the doors. I dare say you will never want to leave.
The Caretaker for The Master

The Winning Answer
I want to take this opportunity to thank Sirius Software for sponsoring their Chet and David *Softalk* contest. As you may suspect, I was one of the winners. My prize arrived today and I have enjoyed playing *Kabul Spy*. The graphics are excellent and the program responds very fast to commands. I hope your magazine will continue such contests and other software manufacturers will participate.
George R. Wright, Oceanport, NJ

Enhanced and Supported
Now I've just got to put in a good word for Videx. Having purchased and installed a Videoterm eighty-column board and a Keyboard and Display Enhancer, I found that the enhancer did not work. I also found that the the keyboard encoder chip in my revision four Apple was apparently in the IC socket when it was originally soldered to the encoder circuit board. I had to buy a whole new "piggyback" keyboard and my Videx Enhancer was not the proper one for my newer keyboard. The good folks at Videx took pity on me, I guess, because they sent me one of their just-hit-the-market Enhancer IIs. They also sent me a small board with a chip on it that would work in my half new, half old Apple. None of it cost me a penny more than I had paid for the original Enhancer. If that isn't support, I don't know what is! Their technical service people are also very knowledgeable and helpful, and the Enhancer II is fantastic!
Warren Michelsen, Page, AZ

Amazing Mail Order
Unfortunately, our industry seems to be a seller's market. Almost anyone can set up a small business, and stay afloat long enough to lure several of us (often more than a few) into sending money to order a product mail order. All of us have heard what can happen to that money. It might disappear entirely, or, at best take weeks or months before the product is received. Service, support, and quality seem to be words (and concepts) forgotten by altogether too many of the companies we do business with.

Because of this dim record, I almost always buy from a local dealer whom I can deal with face to face if I have any questions or problems. Recently, I departed from this rule of thumb to purchase ribbon cartridge refills for my Epson MX-80 printer. As the company that I ordered from, Data Systems in Fern Park, Florida, is about as far away from my Washington address as you can get within the U.S., I expected a long wait for crisp, dark listings. Amazingly, I received my order eight days after I mailed it! This company is truly a gem. If only the larger companies would follow their example. Not only are they incredibly fast, but I can buy six refills for the price of one new cartridge here in the Seattle area.

I will surely do business with Data Systems again, and heartily recommend them to anyone else contemplating "rolling their own" Epson ribbon refills.
Terry Owen Permenter, Seattle, WA

Counting on the Accountant
Since I first heard about my program *The Accountant* by Decision Support Software in your publication, I thought you might be interested in my use and subsequent comments. I wanted a system that would allow me to keep track of my personal affairs. It was also planned that this software would enable me to function as treasurer of one church, and assist the treasurer of a second church in keeping track of expenses. I didn't expect it to keep books for a large or medium-sized business; it only had to perform the functions of a general ledger. I preferred a double-entry system.

The Accountant is great and meets all of my needs. I'm keeping my personal accounts and checking, and managing the budget without problems. I am also keeping books for the churches without difficulty, and since the system interfaces with *VisiCalc*, I can use it with budget projections. It has also turned out to be suitable for keeping the books of a fairly substantial AM-FM radio station—something more than I bargained for. A few minor glitches in the manual were promptly cleared up by strong author support. Best of all was the price. The little one hundred dollars system (plus twenty dollars for the *VisiCalc* interface) does what programs costing much more say they will do.
Frank D. Maglione, Ph.D.,
Champaign, IL

Calling for a Recount
I have just purchased the *Home Accountant* as potential replacement for the *Personal Finance Manager* which, with its predecessor, I have been using for several years both for home use and for support of a small business. I have been looking for several improvements in *Home Accountant* as it seemed to be the ideal next step. However, it has several shortcomings which would seem to preclude it from being valuable for serious users. Unfortunately I did not know of them before purchase.

First, *Home Accountant* does not provide deletion ability. This means that mistaken entries may only be edited, zeroed, and/or designated "no category." They will always show up in searches and are each counted as a

transaction.

Second, I discovered during the trial run that the transaction entry mode accepts data only for the month listed at the screen top. Even entries I used with different month numbers were stored in the same record. This means that if an incorrect entry was sought in the entry month it might not be found.

Third, when a month is closed, no further transaction entries are allowed in that month. While the reason given was that it was felt that inexperienced users would be less likely to make mistakes, it would seem to me that it takes more knowledge and experience to bypass this problem than to provide full editing capabilities for correcting errors. The method suggested was to add several "ghost" entries each month which could be used later if needed. Too bad this was not mentioned in the manual.

Fourth, I have not been able to establish the correct codes to send to my Microline 82 printer. I notice that Continental Software disclaims support to other than specific interface cards and printers. Unfortunately, purchase is necessary to discover this note.

Overall, these limitations would seem to prohibit the serious use of the program. I tried to imagine the rationale which would lead to such a design. Accountants used to use ink so that a page could not be altered. Of course that didn't stop page replacement and duplicate sets of books. One of the great powers of the computer is not to eliminate errors, but to allow recalculation or correction so rapidly that the net result is much greater efficiency. This is the basis for editing capabilities in word processors and data base management systems. This hardly seemed a justification for the system design.

I feel that Continental Software did not evaluate the competition well. *Personal Finance Manager*, for example, is very nearly error proof and friendly. It includes complete editing capability (even to prior months) except during reconcilation. I must conclude that *Home Accountant* must be revised to allow full utilization of its really powerful features. I feel it has been misrepresented in its capabilities and has inadequate documentation to support either the novice or the small-business user. It is too bad that reviewers have overlooked these shortcomings. I have returned the software for a refund.
Norman J. Wood, Saratoga, CA

Market Balk
I have a few complaints for the major software producers.

Broderbund: How dare you advertise a product for seven months in advance and then tell us that it will be available in April. I have yet to see it in any stores. Also, here's a trick for those of you who have *Red Alert*. While the logo is loading in, press and hold the reset button until you get the text screen. Very, very tricky.

On-Line and Sir-tech: Releasing a product with so many bugs as to force a recall is just unbearable. We pay a large enough price—we should get quality. Hey, On-Line, how about including a write-protect or bugging diskette with no notch cut. All you have to do is lower the write-protect arm.

And lastly, not a complaint but a compliment to Sirius Software. I commend you on your efforts to write software and then advertise it only when you are sure it is done. It is for this that I and many other software consumers are grateful.
Tom Borjon, Anchorage, AK

A Couple of Disgruntled Partners
I have just completed reading a letter regarding Denver Software and their *Financial Partner* program in Open Discussion of May 1982. We are a systems house dealer, using the *Financial Partner* and have had difficulty with Denver Software. We had sent several letters to no avail. We requested a new disk to make backups and in trying the procedure could not complete the process and go on to the next year.

How is a dealer to help the potential customer if Denver Software will not help the dealer?

We are, of course, sorry that Mr. Abrams had difficulties, but at the same time glad to hear that someone else was having the same difficulties with the company that we did.
Paul A. Huard, Jr., Mountain Center, CA

A letter appeared in your May 1982 issue signed by Stephen Abrams of San Diego. I would like to echo his letter since I have had an almost identical experience. The fact only one set of books can be run with the *Financial Partner* from Denver Software is a very poor way to supply a product. I think it is unrealistic to expect someone with no accounting experience to set up a set of books properly the first time. I think there must be some provision to start over after the first few unsuccessful tries, especially in a program that is advertised as being suitable for people with no accounting experience. I believe their advertisements even imply that this program is a suitable tool for learning accounting principles.

I was interested by Mr. Abrams's fourth comment that the company implied that it was the dealer's responsibility to inform the prospective customer of the program's limitations. I ordered this product straight from the company, paid full retail price, and was given no such information. In summary, I would join Mr. Abrams in strongly recommending that your readers not purchase this product.
Alexander Kleider, M.D., Sioux City, IA

Just a Moment
Like so many novice computer owners I have made a number of mistakes in the purchase of software. Advertisements are very nice but often misleading. Editorials are helpful, but often misleading. So the only way to find out actually what you have is to use it. I have two Apple computers, one for a small business and one for home use. I would like to share my experience with a software program.

Every Apple owner is given a program called *File Cabinet* which is soon outgrown. My first attempt at a *database* system was *CCA Data Base Management* by the maker of *VisiCalc*. Since *VisiCalc* is so good I thought *CCA Data Base Management* had to be good. Well, it wasn't. When you burn one hundred dollars you tend to be more careful, so I investigated a number of popular, highly advertised programs and found each of them lacking. Then I heard of a program by Software Technology for Computers out of Massachusetts. I discussed the program with their sales people and was told if I liked *File Cabinet* I would love the *IFO* (Information File Organizer). So I ordered it, and, as promised, I loved *IFO*.

Again, let me repeat that I am not a computer expert. I run a small business so I know how to read, write, and count; beyond that, difficulties arise. Very soon I wanted to expand my data base to do other neat things but didn't know how to do it. So a quick call to Gary Haffer, a few phone conversations, and I had a system customized to my industry and my unique needs.

I am writing this with the hope that

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Certified Diskettes
1 Year Perf. Warranty
Hub Rings, Write Protect
Stickers, Labels, Heavy
Jackets, Envelopes and Box

Computer	1-9 Boxes	Multiples of 10 Boxes
Apple II	$21.95/Box	$20.95/Box
TRS-80 MOD I/III	$23.95/Box	$22.95/Box
IBM Personal	$23.95/Box	$22.95/Box
TRS-80 MOD II	$33.95/Box	$31.95/Box

Others available on request.
Send Certified Check or Money Order
If personal check allow 2 weeks
Add $1.50 Post & Handling per order
Illinois Residents add Sales Tax

Send to:
Com-Pute Services
P.O. Box 3361
Oak Park, IL 60303

other users will take just a moment to write to say if a program is good or bad for their needs. I would be willing to answer any inquiries as to what I liked or disliked about the program and would hope that the thousands of other Apple users will begin to do the same. I would encourage your magazine to open such a forum for publication. In this way we can enhance the use of the computers for our business and personal lives and remove some of the expenses and frustrations that are naturally inherent to such a technical field.
G.R. Prasch, Huntington, IN

Docu-Drama
While I am in sympathy with D. J. Goudy and his unfortunate experience with inadequate dealer documentation, the fact is that until consumers insist on complete documentation *before* purchase, vendors will continue to rely on advertisements. I have written to several software vendors requesting a complete functional description of a particular package and have yet to receive information which is sufficiently complete for me to evaluate the package. As long as vendors can sell their products through advertisements and charge the buyer in advance for adequate documentation, they will continue to do so. When prospective buyers *insist* on adequate documentation before purchase, they'll get it.
F. Michael Hugo, Arlington, VA

A Notion To Trust
I would like to thank the readers of *Softalk* and other magazines for the very positive response to Penguin Software's policy change with regard to protected software.

I'm certain that we made a good decision, and so far the move has had no negative effect on our sales. This doesn't mean that every publisher should go out and remove their protection immediately; that's a decision that has to be made with time. It takes a certain amount of trust in your customers to take such a step. I happen to think that it's helpful for any customer to have working backups of software that they purchase, as long as they keep the copies themselves. I also occasionally have this silly notion that everyone is honest if you treat them as such. I like to think that 99 percent are.

Mr. J. Barry Smith's letters in the May *Softalk*, and other people's various letters and comments elsewhere in the world, lead me to believe that in order not to be dishonest people, they twist their morals with rationalizations in which they try to keep themselves honest in their own minds. To quote Mr. Smith, "Piracy is a biased word, it implies theft." Sorry. It doesn't imply theft. It *is* theft. There are no two ways about it. When you take something that doesn't belong to you, it's got a simple one-word definition: stealing.

"But," you say, "it's so expensive." Sorry again. Yes, selling Apple software is mass marketing as far as computers go, but it's not really that huge of a marketplace. Would it surprise you to know that advertising costs us about $6,000 per month? Or that most publishers are paid only forty percent of the retail price after distributors and dealers get their cut? What about packaging, people to take and ship orders, customer service, office space and supplies? Dale Archibald was an order of magnitude or so off when he jokingly said that we're so small that it takes weeks for our distribution to reach double figures (*Softalk*, May); but even so, it doesn't take a mathematical wizard to compute rough sales figures to see how much money actually finds its way to the publisher and author. For the most part, software packages are priced close to what they have to be. Sorry.

So Barry, your excuse is your wallet. Do you buy gasoline without paying? Do you leave restaurants without paying the check? Do you stuff your pockets in the supermarket? It doesn't make any difference who you steal from, it's still stealing. If that's the definition of a pirate, then yes, you're a thief. And if you steal because you can't afford the software then you had no business buying a computer in the first place.

To the 99.9 percent of you who are honest, thank you for your kind words and support.
P.S. Despite the column bio, I taught at Northern Illinois U. in DeKalb, home of the famous flying ears of corn. Is there an arcade game in that somewhere?
Mark Pelczarski, Penguin Software, Geneva, IL

Thunderstorm
I have just received my new copy of *Softalk* for May 1982, and noticed the Thunderware advertisement. I read a similar ad last year and received one of their clocks as a Christmas present, purchased through ComputerLand. After working many hours and driving many miles back and forth to ComputerLand, I still have a useless clock.

I have written Thunderware previously and they assured me that if I would go back to the seller that they could contact the company and it would work. This has been done and they have shipped me a disk with instructions to make it work. I have installed the driver as instructed, but the disk will still not boot. I have been back to ComputerLand and they tell me that they are sorry, but they don't know what to do with it. They have been more than helpful in trying to solve the problem, but there appears to be no solution.

I am sorry, but I feel that I have been ripped off with this product. I feel that anyone who reads the advertisement in *Softalk* has a right to expect a product that will do what is stated. I find no reference to the fact that the product will

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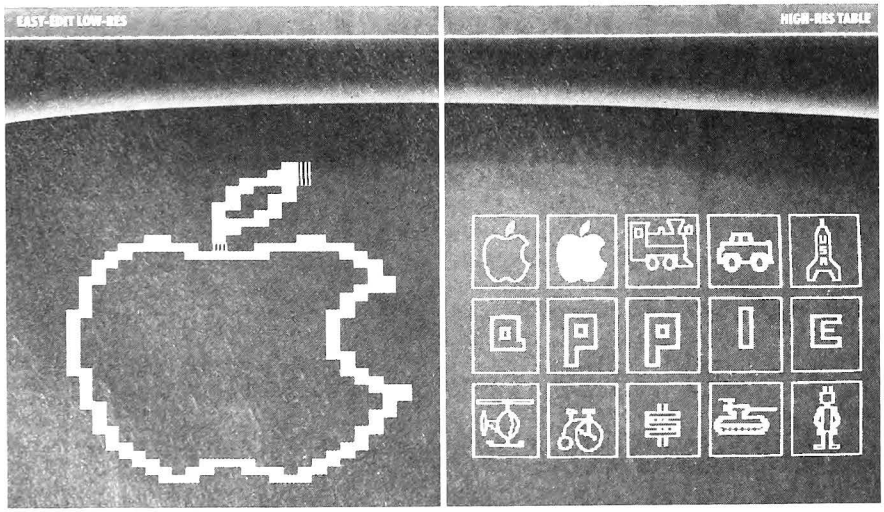
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- Single-step through your BASIC program
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not work in an Apple III, and feel that it should be made to work—or a full refund should be in order. I had made arrangements for a second clock from BMI in Oklahoma City, but they have been kind enough to inform me that they do not work.
John Florence, M.D., Oklahoma City, OK

Mad Scientist
I have an applications problem with *VisiCalc*. I am a scientist and I purchased *VisiCalc* for scientific, not business, applications. That is, I wish to use it as a report generator for presenting experimental data.

VisiCalc drops trailing zeroes. For example, 3.210 becomes 3.21. To a scientist those numbers are not identical. The extra zero indicates the level of experimental precision. *VisiCalc* does not line up decimals. This can make a column of figures look ludicrous and totally unacceptable for a final report. All columns must be the same width. This makes it awkward to use row titles. I can circumvent this problem by using two columns for a title, but it is inconvenient. *VisiCalc* doesn't have a problem with keeping trailing zeroes or even adding them in the money format field. If I have either more than two or less than two decimal places, I'm out of luck.

I understand that their main competitor, *SuperCalc*, has solved all of these problems. What has happened to *VisiCalc?* They seem to be quite smug about their success and could care less about their past customers. I called them recently asking if they had any plans on coming out with an eighty-column update and they said no. With my forty-column display, I frequently am frustrated by not seeing enough of my sheet. I am aware that *VC-Expand/80* is on the market, but I am reluctant to buy until my previously mentioned problems are solved.
David W. Nehrkorn, San Mateo, CA

Teenage Turnabout
DOStalk—Wow! When I saw your new feature was written by one of my favorite authors, Bert Kersey, I knew that your already great magazine would become even greater. As expected, the April 1982 issue of DOStalk taught me many things which I did not know. These things added to what Bert Kersey had already taught me when I bought *DOS Boss*.

You may not know it, but I am a teenager who cannot afford many programs. The truth is that I cannot even afford a few programs. Coincidentally, the last program that I have bought is *DOS Boss*, and that was in November 1981!

To my surprise, instead of new ideas such as in the April issue, the May issue ripped me off. Four of the utilities on the *DOS Boss* disk, that I had paid for with my hard earned money, were fully explained and listed in the May issue of DOStalk. Never again will I buy a program from Bert Kersey, the man who, at least in my eyes, has gone from a prince to a pooper!
Robert Zitko, Downers Grove, IL

Issues and Answers
I might be able to help with some Open Discussion problems.

For both inserting names and underlining with *Apple Writer* get *Apple Writer Extended Features*, Brillig Systems, 10270 Fern Pool Court, Burke, VA 22015. It is great for underlining, making exec files, modifying text files, adding printer controls in the text, and other things that I don't use. The author is most helpful when you have a question. This item was reviewed in your pages several issues ago.

Regarding bypassing the UHF of a Heath Television, considering all the problems I've had with my Heath, the problem is probably in the set. I would contact ATV Research, Thirteenth and Broadway, Dakota City, NE 68731, to see if they could help. I use their Micro-verter and get a sharper picture than with Super-Mod. Micro-verter is for UHF, but perhaps the company has a suggestion.

I still think you should put all the porn ads on one page. It could readily be ripped out by those (like me) who would rather not have it in the magazine.

To Mr. Robbins in Open Discussion, probably either *Disk Fixer* (from Image Computer Products) or *Bag of Tricks* (from Quality Software) will straighten out his directory. I had somebody who knows more than I do fix a blown disk for me using *Disk Fixer*. I now have the program, but a lot of it is over my head.

Why, when reading a long data file, does my Apple occasionally just sit there and seem to do nothing? This seems to be most apt to happen with *File Cabinet*, but I have had it happen on other programs that I don't use as much.

Finally, a request: How about another review of data storage programs like *VisiCalc*?
Raymond J. Shuerger, D.V.M., Pittsburgh, PA

Second Opinion
I would like to share my opinions on the letter titled "Ten Hours" in Open Discussion, April *Softalk*. Mr. Behrens handed the secret to the copy protection of *Wizardry* on a silver platter to all *Softalk* readers. I'm not upset that Mr. Behrens discovered how to copy *Wizardry*, but the fact that *Softalk* printed it in their magazine destroys a quite effective copy protection.

I've played *Wizardry* since it was put out, and I haven't had the slightest problem. I have used the utility options and not only found them useful, but they've always worked fine. I think Mr. Behren's problem might have been a faulty system or misuse.

The real issue to me is whether or not *Softalk* has the right to give away information on copy protection. May I sug-

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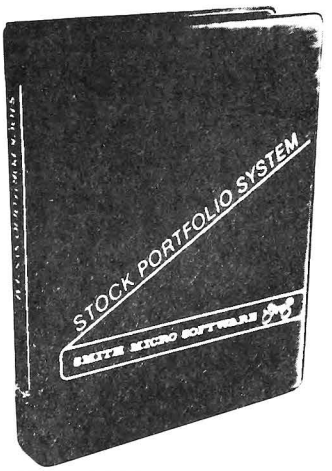
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gest getting the proper permission next time? I would like to close with a note to the *Wizardry* authors: Keep those great scenarios coming!
Virginia E. Drake, E. Bloomfield, NY

Piece of the Pie
In the May issue of *Softalk* you had a letter from Marlys Dannenberg stating that the various print codes for the MX-80 printer could be entered from within the word processor *Apple PIE*. I have looked at the *Apple PIE* manual and do not see where I can access these codes. Can you tell me how to accomplish this?
Norman Massey, Tucson, AZ

Poking Punctuation
I really enjoy your magazine and would like to tell you to keep up the good work. I especially enjoy the reviews of software and the tutorials. I have been reading your publication since the first issue (saving them too), and have been awaiting the chance to contribute something to your outstanding effort.

I am one of the "young people" mentioned by Albert E. Hoffman in his letter to Open Discussion in April (I am fourteen years old), and I hope this routine will help many people, young and old alike, who enjoy *Softalk*.

This routine will allow input of quotes, commas, and colons in Applesoft. It *pokes* a small machine language program into memory from 768–805 ($300–$325). It was originally published in the October 1979 issue of *Contact*. I have modified the routine to correct a serious error that existed in the original routine. (The ASCII values of the inputted characters were all 128 too high.)

In the revised routine, line 10 defines a string variable at a known memory location (the name may be anything you wish). Lines 90–190 *poke* a short machine language routine into your Apple's memory pointer to point to the input buffer ($200). Line 240 calls the new input routine, and the *mid$* function moves a copy of the new string into main memory (so it isn't erased by the next input).

This routine works for Applesoft input as well as for input from a disk. In order to read the third field of each record of a random access text file, the syntax would be:

```
CALL 768: CALL 768: CALL 768: IN$=MID$(IN$,1)
```

The first two calls are dummy inputs, but unlike the normal *input in$* command, they perform no string handling. This stops "garbage collection" as a side benefit. Have fun!

```
10 LET IN$ = "X"
20 REM
30 REM THE FIRST VARIABLE
40 REM DEFINED MUST BE A STRING
50 REM THIS STRING WILL REC'VE
60 REM INPUT FROM THE CALL
70 REM
80 TEXT : HOME
90 FOR J = 768 TO 805
100 READ I
110 POKE J,I
120 NEXT J
130 DATA 162,0,32,117,253,160,2
140 DATA 138,145,105,200,169,0
150 DATA 145,105,200,169,2,145
160 DATA 105,160,0,132,1,169
170 DATA 2,133,2,177,1,233
180 DATA 128,145,1,200,208,247
190 DATA 96
200 REM
210 REM IT'S DEMO TIME!
220 REM
230 PRINT "TYPE ANY STRING: ";
240 CALL 768:IN$ = MID$ (IN$,1)
250 PRINT : PRINT "HERE IS EXACTLY WHAT YOU
    TYPED: "
260 PRINT IN$
270 PRINT
280 PRINT "LOOK AT THE PRETTY QUOTES,"
290 PRINT "COLONS, AND COMMAS THAT"
300 PRINT "SURVIVED THE INPUT!!!"
310 END
```

Steve Townsend, Grand Rapids, MI

Six Times *Time*
I recently purchased *Time Zone* and found only six disks instead of the eight disks that were mentioned in one of your reviews. A quick call to On-Line Systems relieved my anxiety. There are only six disks (both sides) to the game. Just thought you might want to save your readers a long distance call.
Mike Elias, Goodland, KS

Good for Something
Can anyone tell me what the program in the April Basic Solution is supposed to do? I read Wm. V.R. Smith's description and couldn't understand it, but it sounded like he was talking about something useful. I entered the program in my Apple and ran it. (I substituted a right parenthesis for a right bracket in line twenty-nine, as I didn't know about shift M. My son told me later.) I can't see any point to the output I got.

Perhaps Mr. Smith could put a few more minutes' time into writing his next column. For one thing, in lines fourteen and ninety the print instruction can be replaced by the much simpler *PR#* instructions used directly.
Seymour Haber, Silver Spring, MD

Escaping in Two Directions
Here is the information Mr. Stokes requested regarding bidirectional printing on the NEC Model 5515 printer. The first reference is NEC document number 10003-01 entitled *Terminal Operators Guide*. See Appendix B, page B1: escape-5 = forward print, escape-6 = reverse print. The second reference is NEC document number 10005, second revision February 1980, entitled *Terminals Product Description*. See page 4-10, paragraph 4.6.1.8: reverse print = escape-6, forward print = escape-5 or a carriage return. A carriage return will cancel reverse print, so escape-5 is not really required if the line printed right to left ends in a carriage return.

It also should be obvious that each line to be printed right to left must be preceded by an escape-6. The 5515 printer does not have the capability to automatically reverse the line of characters to be printed. The user is responsible for this task plus any pad spaces to suit margins.
Chuck Welman, Santa Ana, CA

Stumped by a Stop
To Jim Merritt: I have a problem using Apple Pascal that I have been unable to solve. After a program has been assembled and starts to execute, it halts and displays the following:

```
Value Range Error
S#1, P#6, I#8
```

The only way I can re-enter Apple Pascal is re-initializing by hitting reset. The only reference I can find to this type of error message is in the *Apple Pascal Operating System Reference Manual* on page 278, and it doesn't really say much of anything about it. I have no idea what this error message means, what the problem is, or how to solve it. Would you please help me with this?
E.R. Miller, Rancho Palos Verdes, CA

Wondering About Renumbering
When programming in Apple III Business Basic, I miss having an editor feature that is available in large computer editors: the *renum* function for renumbering program lines and references to line numbers (by branching statements). Neither the simple Basic editor, nor the more powerful Pascal editor provided by Apple have *renum*. I feel that when writing long, complex programs this is a necessary feature. Any suggestions?
Paul D. Hass, Anaheim Hills, CA

Repaying a Debt with Checksum
I have taken a great deal of enjoyment in reading your magazine for the past few years. I feel that I owe you a debt for all that I have learned from your pages. When a letter arrives in my post office box requesting a few dollars to extend my subscription, I will joyfully send off a check.

Enclosed is a program that I hope will repay part of my debt. This modest program calculates a checksum for the contents of a range of memory addresses. If the range is larger than sixty-four bytes, it will also display intermediate checksums every sixty-four bytes. This is primarily useful when someone is typing hexadecimal data or programs into a computer. It verifies that the person has typed all of the information accurately. There is, however, one catch. Both the writer and the typist must use equivalent checksum programs, otherwise the checksums will not match.

I am suggesting that you should publish this program (or one like it), and use

it to calculate checksums for all of the hexadecimal information appearing in *Softalk*. It will definitely save many hours of debugging, comparing semi sensical numbers. Some features of this particular program are simplicity, fast execution speed, and portability. I have tested it in both Integer and Applesoft Basics, and I think it will also work in Microsoft Basic-80.

There is one thing about *Softalk* that I would like to see changed. Would you please stop typesetting the program listings? It might make the program listings more accurate, but the uniform spacing will definitely make them easier to understand.

```
100 REM WRITTEN BY:
110  REM
120  REM HAYDN HUNTLEY
130 REM P.O. BOX 1111
140 REM FAIRFIELD, IA 52556
150 REM
160 REM MAY 10, 1982
170 REM
180 REM RUNS IN MOST DIALECTS OF
190 REM BASIC AS IS
200 REM
210 CALL -936: REM CLEAR SCREEN AND HOME
    CURSOR
220 PRINT
230 PRINT "THIS PROGRAM CALCULATES A
    CHECKSUM"
240 PRINT "USING THE CONTENTS OF A GIVEN
    RANGE OF"
250 PRINT "MEMORY ADDRESSES."
260 PRINT
270 PRINT "BEGINNING OF RANGE= ";
280 INPUT B
290 PRINT "        END OF RANGE= ";
300 INPUT E
310 PRINT
320 FOR I=B TO E
330 IF X<64 THEN 360
340 X=0
350 PRINT "CHECKSUM AT ";I;" IS ";C+16384
360 X=X+1
370 C=C+X* PEEK (I)
380 IF C>16383 THEN C=C-32767
390 NEXT I
400 PRINT
410 PRINT "THE FINAL CHECKSUM IS ";C+16384
420 END
```

Haydn Huntley, Fairfield, IA

Conditional Surrender

I have decided that the benefits of subscribing to *Softalk* far outweigh the disadvantages of not subscribing. Therefore, I am sending you a two-year subscription order, but I feel there are some problems that exist with your publication that need to be addressed.

First, there is the flimsy cover, and next, the lack of a reader service card. Also there is a lack of editorial response within Open Discussion. It's bad enough that there is an apparent three-month lag between a letter being written and its appearance in the magazine. Then to expect only readership response to such questions coming in later adds up to a six month delay.

Finally, the blackest mark against your magazine is the presence of sexually oriented ads. Other magazines that I subscribe to don't carry this kind of advertising, and it is a mystery to me why you feel you have to. It's one thing to accept distasteful material into one's home alongside the good because it comes free, and quite another to endorse such material with a paid subscription. Please take my two-year renewal as a way of indicating to you that you don't need this material.

Now that people like me will be increasing your revenue, you should be willing to settle this question once and for all. You can't be that hard up for money.
George Wruck, Jr., Dallas, TX

Cleans and Dirties

I am fourteen years old and enjoy reading *Softalk*'s Open Discussion each month, but it seems to me that in each issue the letters about the advertisements get longer and longer. I think that all a magazine should do is screen out the pornographic ads. It should not be responsible for screening an ad because it displeases a certain group.

If the reader does not agree with an advertisement then the reader should not complain to the magazine, he should complain to the company that sponsors the advertisement. Why don't the readers stop picking on *Softalk* when it is not doing anything wrong?
Josh Zeidler, Beverly Hills, CA



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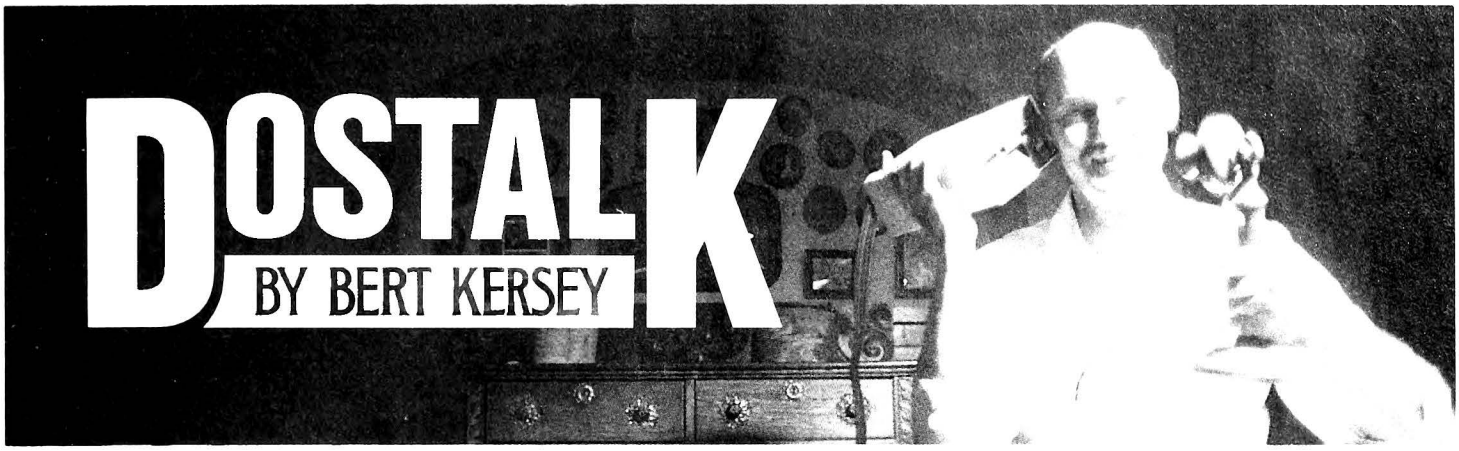
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This month we're going to tackle the subject of binary files and discuss ways of manipulating them with DOS commands. We'll also write a couple of handy *exec* utilities that will perform some useful tricks for us. If all goes well, we'll both learn something along the way.

What Is a Binary File? A binary file is simply a series of values ranging from 0 to 255 and stored in consecutive locations in your Apple's memory or on disk. It's that simple. Here's a sample binary file.

```
194 197 193 199 204 69 160 194 210 207 83
```

These numbers can represent whatever some programmer wants them to represent: numbers, letters, machine language commands, hi-res screen values, or whatever. Any number of values can be stored in a binary file, up to the limits of your Apple's memory. You'll recognize a binary file in a catalog by the letter B to the left of the file's sector (size) number.

When you encounter a binary file, it's *probably* one of three things: a series of values to be *bloaded* and used as some kind of data by a Basic program; a machine language program meant to be *brun* in which each number is part of a machine language command or statement; a visual image meant to be *bloaded*. A number could represent a text screen character or lo-res color plot, or it could light up a set of dots on the hi-res screen. DOS lets you handle binary files with its *brun, bload,* and *bsave* commands. Here's a rundown of each command.

Brun (usually pronounced "bee run"): The *brun* command is used to *load* and then *run* a machine language program. It is parallel to DOS's *run* command, which is a combination of DOS's *load* and Applesoft's *run*. *Brun* is instead a combination of DOS's *bload* and Applesoft's *call* commands. If you know the address in memory where a machine language program starts and that program is in memory, you can *call* that number to execute the program. For example, the *FID* program on the *System Master* disk is a machine language program. To use it, you normally type *brun FID* (return). You could instead type *bload FID* and then *call 2052*. After quitting *FID*, you can *call 2052* to restart it, meaning *go to location 2052* ($803) and execute what's there. If no program is there, or if you call the wrong number, the call will crash into the Monitor (see command notes box).

Bload (say "bee load"): The *bload* command is used to *load* any kind of binary file from disk into your Apple's memory. Some binary files, like hi-res pictures, are meant *only* to be *bloaded*; they are never (and could not possibly be) *brun*. To specify where in memory a file is to be *bloaded*, type ",A" plus the starting location after the file name. Here's an example.

```
HGR (return)
BLOAD IMAGE, A8192 (return)
```

The commands just listed will clear the hi-res screen (locations 8192–16383) to black and load the binary file named Image (ideally, but not necessarily, a hi-res picture) into memory, starting at location 8192 (hex $2000, see box) and continuing, byte-by-byte, until the entire file is in memory. If the binary file you *bload* is a hi-res picture, you'll actually see the screen light up in Venetian blind fashion. If you *bload* any other kind of binary file, you will get a random-looking snowy screen. If you had not specified the start location and typed only *bload image* (return), the file would have loaded to the location from which it was *bsaved*.

Bsave (say "bee save"): You can specify almost any section of memory and store it on a disk—a Basic program, a machine language program, a lo-res or hi-res picture, or simply a string of numbers. You just need to tell the Apple *where* the section of memory starts and *how long* it is.

Note: Both Applesoft's *save* command (for cassette use) and DOS's *save* command followed by a file name automatically *know* the location and length of the file being saved. *Save* is used only for storing Applesoft or Integer programs; specifically, whatever program happens to be *in memory* when the command is executed. A program includes the commands, print statements, and remarks in that program, as well as line numbers and line locations.

To *bsave* a straight chunk of memory—specifically the *values* of consecutive bytes of memory—you need to specify the *starting address, A,* and the *length, L,* of the range of memory you want to save. Here are some typical *bsaves.*

```
BSAVE NAME, A8192, L8192
  or BSAVE NAME, A$2000, L$2000      Stores hi-res picture, page one
BSAVE NAME, A16384, L8192
  or BSAVE NAME, A$4000, L$2000      Stores hi-res picture, page two
BSAVE NAME, A1024, L1024
  or BSAVE NAME, A$400, L$400        Stores text/lo-res screen, page one
BSAVE NAME, A2048, L1024
  or BSAVE NAME, A$800, L$400        Stores text/lo-res screen, page two
```

Moving Memory Via DOS. Programmers often want to move memory; that is, to move the *contents* of a certain section of memory from one location to another. For example, you might have a hi-res picture stored on page two that you want to move to page one. Let's try it; *run* this little program first to set up both hi-res screens:

```
10  HOME: HCOLOR=3: HGR: REM CLEAR HI-RES PAGE ONE
20  FOR X=0 TO 279 STEP 20: HPLOT X,0 TO X,191: NEXT
30  FOR Y=0 TO 191 STEP 20: HPLOT 0,Y TO 279,Y: NEXT
40  HGR2: REM CLEAR HI-RES PAGE TWO
50  FOR X=0 TO 260 STEP 20: FOR Y=0 TO 180 STEP 20
60  HPLOT X,Y TO X+4,Y TO X+4,Y+4 TO X,Y+4 TO X,Y: NEXT: NEXT
70  POKE 49236,0: REM VIEW PAGE ONE
80  POKE 49235,0: VTAB 20: END: REM MAKE CURSOR VISIBLE
```

After you *run* the program and *save* it, *bsave* your two works of art on disk with the following direct commands (no line numbers):

```
BSAVE PAGE 1 GRID, A$2000, L$2000 (return)
BSAVE PAGE 2 SQUARES, A$4000, L$2000 (return)
```

You will see these two *b* files in your catalog. Hi-res pictures are almost always thirty-four sectors in size. You may *bload* either picture onto either hi-res page by specifying the start location after the *bload* command. *A$2000* (or *A8192*) means page one, and *A$4000* (or *A16384*) means page two. For example, this command will load our squares pattern (which was *bsaved* from page two) onto page one:

```
BLOAD PAGE 2 SQUARES, A$2000 (return)
```

And while you're sitting there, you might as well try *bloading* a picture "between pages" (not too practical, but interesting):

```
BLOAD PAGE 1 GRID, A$3000
```

As you can see, *bsave* and *bload* may be used to (slowly) move memory via disk. Just *bsave* a section of memory to disk, then *bload* it back into memory exactly where you want it.

Now type *run* (return) to redraw the two pictures. You should be looking at a grid pattern on page one. Notice that it is much faster to *plot* these two pictures than it is to *bload* them. Not only that, but Applesoft commands we used to draw our two pictures probably occupy about 3 percent of the disk space taken up by *bsaving*. Of course, this all depends on the complexity of the pictures involved.

Page two's squares pattern is in memory (and on disk) but is not currently visible. Two *pokes* can determine which page we are looking at:

POKE 49237,0 (return)	See page two
POKE 49236,0 (return)	See page one

After you type the first *poke*, your typing will be invisible but still functional. Hit reset or type *text* (return) if you get lost. Now, suppose we actually want to *move* the page two image to page one. Bring page one's grid into view and try the following direct commands (no line numbers, just type and watch):

CALL −151 (return)	Gives you an asterisk prompt
2000<4000.6000M (return)	Moves memory; duplicates page-two picture ($4000-$6000) on page one ($2000-$4000)
(Control-C) (return)	Returns you to Basic

Pretty slick, huh? Since this is supposed to be a DOS column, we'll resist the temptation to explain what goes on here. As an introduction to DOS's *exec* command, however, let's write a little utility that will automatically execute these three commands without leaving Basic.

Exec Mover. *Exec* is a handy direct DOS command that works with text files (see last month's text file discussion). *Exec* takes whatever text is in the file (until a carriage return is encountered) and executes it as if it were being *typed directly from the keyboard.* If some kind of legal command is read from the disk, the command is executed. If a program line is read, that line is added to the program in memory. If gibberish comes up, the gibberish will be "typed in" and you'll probably get a ?Syntax Error.

The following program will write a memory-moving text file for us based on the previous hi-res experiment. Notice the three commands used in print statements in lines 40-60:

```
10  D$=CHR$(13)+CHR$(4)
20  TEXT: HOME: PRINT D$;"MONICO"
30  PRINT D$; "OPEN MOVE 2 TO 1": PRINT D$; "WRITE MOVE 2 TO 1"
40  PRINT "CALL -151"
50  PRINT "2000<4000.6000M"
60  PRINT "": REM INVISIBLE CONTROL-C BETWEEN QUOTES
70  PRINT D$;"CLOSE"
```

Run this program. A text file called Move 2 to 1 will be written onto your disk. Now *bload* a picture onto hi-res page two, then watch page one while you type:

```
EXEC MOVE 2 TO 1 (return)
```

The Apple goes to our text file on the disk and dutifully executes the commands it finds there, moving page two's image to page one!

What if we want to move memory in the *other* direction? We could make a second text file that moves memory from page one to page two (line 50 would have to be *print "4000<2000.4000M"*). That would work all right, but it would clutter up our catalog with another text file, and, besides, it doesn't teach us anything new.

Instead, let's rewrite the program by adding some new commands. We'll number the commands in computer fashion, 0−5:

```
10  D$ = CHR$(13) + CHR$(4): PRINT D$; "MONICO"
20  PRINT D$;"OPEN SWITCH": PRINT D$;"WRITE SWITCH"
30  PRINT "CALL -151": REM COMMAND #0
40  PRINT "2000<4000.6000M": REM COMMAND #1
50  PRINT "": REM COMMAND #2 (CONTROL-C BETWEEN QUOTES)
60  PRINT "CALL -151": REM COMMAND #3
70  PRINT "4000<2000.4000M": REM COMMAND #4
80  PRINT "": REM COMMAND #5 (CONTROL-C BETWEEN QUOTES)
90  PRINT D$;"CLOSE"
```

Running this program writes the text file *switch* onto your disk. If you *exec* the text file by typing *exec switch* (return), you will move hi-res page two to page one (thanks to the

DOS COMMAND NOTES

Hex notation is optional with DOS commands. For example, instead of the command *bload image, A8192*, you could use the equivalent, *bload image, A$2000*. It was extremely thoughtful of the Apple guys to include this feature when they wrote DOS. Hmm, do you think the Apple would understand *catalog, S$06, D$01 . . .*?

Monitor execution is permissible with immediate-mode DOS commands; handy if you're *poking* around in hex and want to *catalog* a disk, *save* your work, or whatever. If you are in the Monitor (after a *call −151*), and you type a DOS command (*catalog*, for example) the command will execute as expected, and you will get a bonus—a string of five two-digit hex numbers (which we highly recommend ignoring). If you encounter a DOS error, you will automatically reenter Basic and be presented with the error message you deserve.

Control-D, or CHR$(4), is usable with all DOS commands. For example, to *bload* a file from within a program, use:

```
100  PRINT CHR$(4); "BLOAD FILENAME,A1234"
```

The order of commands, semicolons, and quote marks can be tricky. To specify a file name with a string and a location with a variable, use something like:

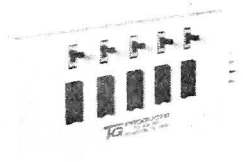
```
100  NAME$="FILENAME": LOC=1234
110  PRINT CHR$(4); "BLOAD "; NAME$; ",A"; LOC
```

By the way, all of the semicolons in line 110 are optional.

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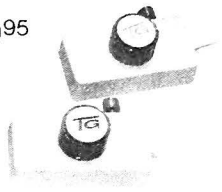


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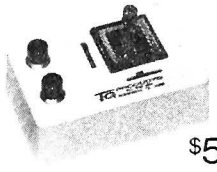
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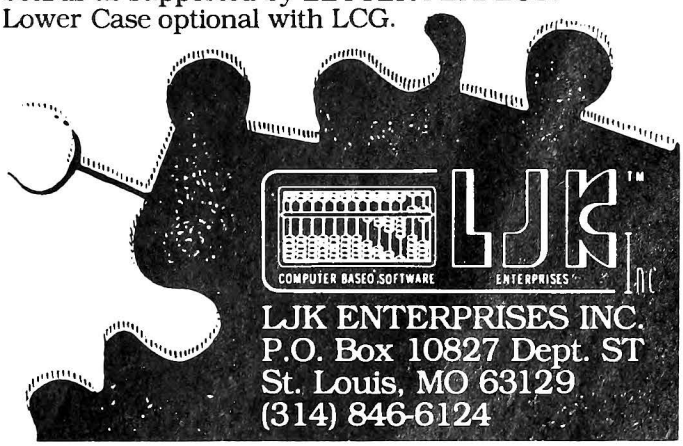
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2000<4000.6000M command). The *4000<.2000.4000M* command (see line 70 above) is executed also, but that essentially does nothing; it moves page one's image, now a *duplicate* of page two, back to page two.

The thing is, we can make *exec* start *anywhere* in a text file that we want. Notice the command numbers in the REM statements above. If we want, we can make our *exec* statement start executing with command number three by typing:

```
EXEC SWITCH, R3
```

The R stands for "relative position" or something like that. To prove that this works, put a hi-res picture on page one, type *hgr2* (return), and then *exec switch, R3* (return). Page one's image is cloned onto page two! So we have a dual purpose exec file that works with two commands:

```
EXEC SWITCH      Moves hi-res poge two ta poge one
EXEC SWITCH,R3   Moves hi-res page one ta page two
```

Exec seems to be designed as a direct-execution command because it behaves very strangely in Applesoft programs—unless it is the last command in a program; then it works fine. To move memory from the middle of a program, it is best to use a machine-language routine similar to the one built in at location 65068 ($FE2C) in the Apple.

Double Cat. Here's another exec utility; this one will split your catalog into two columns by *poking* DOS's catalog routine, *cataloguing*, and then *repoking* DOS with normal values. First, let's go over the DOS *pokes:*

```
POKE 44578,234: POKE 44579,234:    Removes corriage returns
  POKE 44580, 234                    after file nomes
POKE 44578,32: POKE 44579,47:
  POKE 44580,174                   Narmal values far these locotions
POKE 44567,12                      Shortens file names to
                                     thirteen chorocters
POKE 44567,29                      Narmol thirty chorocters
```

Here's a text file writer that uses these *pokes*. Type it, *save* it (optional), and *run* it:

```
10  D$=CHR$(13)+CHR$(4)
20  PRINT D$; "OPEN CAT2": PRINT D$;"WRITE CAT2"
30  PRINT "NOMONICO"
40  PRINT "POKE 44578,234: POKE 44579,234: POKE 44580,234"
50  PRINT "POKE 44567,12"
60  PRINT "CATALOG": REM (NO CONTROL-D; SEE BOX)
70  PRINT "POKE 44578,32: POKE 44579,47: POKE 44580,174"
80  PRINT "POKE 44567,29"
90  PRINT D$;"CLOSE"
```

Now, typing *exec cat2* (return) will catalog your disks in two columns! File names are necessarily reduced to thirteen characters maximum length. This is not a printer utility, by the way, since it relies on the carriage returns supplied by Apple's text screen routines.

See you next month with some more utilities. But first . . .

DOS Mystery of the Month. Chris Volpe, Apple key banger from Trumbull, Connecticut, reports that the command *cataloga* produces an Applesoft ?Syntax Error. So does *catalogb* and *cataloga. Catalogd,* however, reports Range Error, probably because Apple thinks you mean catalog drive zero. *Cataloge* and several other catalog/character combos produce a Syntax Error (DOS error with no question mark). The command *catalogv* really produces the unexpected: it catalogs!

Here's a list of the illegally extended catalog commands and the errors they produce. I don't have an explanation; in fact I don't even *want* an explanation. I just think it's interesting!

```
CATALOGA,B,C,I,O, and R    Applesoft ?Syntax Error
CATALOGD, L and S          Range Error
CATALOGV                   Cotologs
All others                 DOS Syntax Error
```


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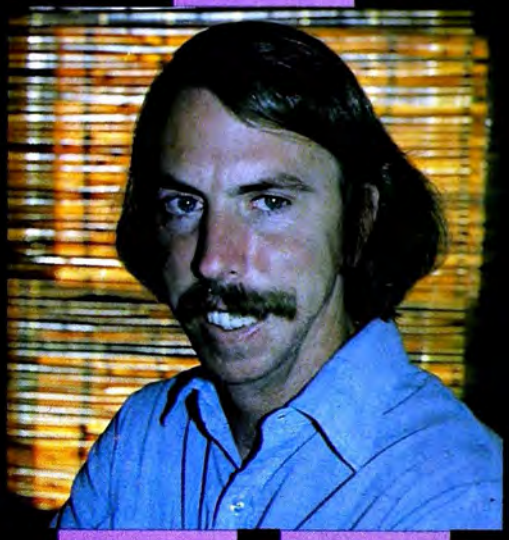
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Exec







Sirius

Reaching for the Stars

BY DAVID HUNTER

The star Sirius is the brightest object in the heavens. More than three thousand years ago Egyptians and Babylonians built temples facing the place where Sirius appeared on the horizon.

In the crazy world of software games, the name Sirius represents a bright star in the form of a company: Sirius Software, a firm that considers itself the leader in entertainment software for the Apple.

Sirius resides in Sacramento on the edge of a time warp. The day may come when it's proven that playing computer games causes cancer in rats. When that day comes, Sirius will throw in the towel and move on to the next thing humans find entertaining.

But for now, cofounder and secretary-treasurer Terry Bradley puts it like this: "Our long term goal is to produce the best recreational software with the given technology for as many forms and media as is economically possible."

Top Dogs of the Star. Though Bradley's title is secretary-treasurer, he is on equal footing with Sirius's president, Jerry Jewell. (One benefit for Bradley is that Jewell gets a lot more phone calls.) Jewell once worked for Bradley at Computerland of Sacramento, but the pair formed Sirius Software together.

Despite the hierarchy indicated by corporate titles, Bradley and Jewell act as codirectors and share the decision making. Bradley claims that they see eye to eye on almost everything through something akin to ESP.

"Projecting what Jerry's answer might be to a particular question, I'd say my prediction is correct 95 percent of the time. Jerry and I come from completely different backgrounds and are ten years apart in age. There's only three things we have in common: We've both been in military service, we both like our meat raw, and we have sympathetic views on the way to run Sirius."

They may be in the business of providing sometimes silly software like the game *Lemmings*, but Jewell and Bradley take their firm seriously. Both have plenty of business experience in their previous occupations: Bradley spent more than twenty years in the air force managing men and budgets; Jewell was a special agent and account executive in the insurance business.

Jewell bought an Apple in 1979 and is a self-taught programmer and coauthor of *E-Z Draw*. Jewell has since hung up his keyboard, though, because the time-consuming task of programming would interfere with his full-time job of managing Sirius Software.

In the Tombs of Ancient Software. Unlike Stoneware, Howard Software, Southwestern Data Systems, Synergistic Software, and others, there is no single great programmer behind the success of Sirius. At least not anymore. In the beginning it was a different story.

When Sirius placed six programs on *Softalk*'s Top Thirty nearly a year ago, four of them—including third place *Gorgon* and seventh place *Space Eggs*—were authored by Nasir Gebelli.

One of the popular programming names in early Appledom, Nasir was synonymous with Sirius for almost a year. For many months he was the company's only full-time programmer, producing a series of hit games that earned a lot of money and a good reputation for Sirius.

Though other good programmers were soon freelancing for Sirius, Nasir was the undisputed star.

Just as that particular *Softalk* issue arrived in homes, Nasir left Sirius to start his own company, Gebelli Software. Jerry

---

For left, cofounder Terry Bradley. Center left, cofaunder ond president Jerry Jewell. Neor left: Tap, Ernie Brock. Middle, Jim Ackerman. Bottom, most of the Sirius staff—frant raw, Jerry Jewell, Stan Alves, Greg Cattrill, Ernie Brock, Kathy Bradley, Diana Rabinsan, and Terry Bradley; middle row, Cloudia Camponile, Dan Thampson, Joanne Knauer, Lynn Marquis, Beverly Damitz, and Jasie Rables; back raw, Jerry Dingman, Tony Russell, ond Bob Beyn.

Jewell says candidly that he's sorry Nasir left—from the dollar perspective.

"Nasir is an excellent programming talent. He just wasn't a team player."

Like the North losing their best general, Robert E. Lee, Sirius has missed Nasir, but they're still a winning team. With programming talents like Larry Miller and Mark Turmell to pick up the ball, Sirius has not suffered in either sales or reputation.

"You can't survive in an industry unless you're filling a hole in the market. You've got to provide something that the public needs," Bradley explains.

What Say We Go Out and Stomp a Few? There are wants and there are needs. Food and shelter are needs. Games are wants, but sometimes they take on the status of a quasi-need. Bradley doesn't expect people to spend their last dollars on Sirius games—but when they're flush with cash, Bradley wants them to go straight to Sirius for their entertainment software.

A lack of good entertainment software is what led Bradley and Jewell to start Sirius in May 1980. At first the pace was laid back and Sirius was not taken too seriously.

"It was something to keep us off the streets and out of trouble," claims Bradley. "Even now we're just trying to get a reasonable return on our investment like any entrepreneur. We would like to see the business profitable after taxes.

"We never started this to get rich. We're trying to earn an income so that when we wake up there's someplace to go."

Bradley, a retired air force colonel, left active duty in 1979. During his twenty-one years of active duty, Bradley was an airlift director working with a budget of hundreds of millions of dollars. From this experience, Bradley feels he learned a great deal about management.

Bradley stayed because he wasn't sure he could hold on to a civilian job. Rather than risk losing his retirement benefits, he stuck it out in the air force as long as he could. The day he had been dreading finally came, and Bradley was just another civilian.

After retirement, Bradley started searching for something to do. He first looked at real estate investment and went so far as to get a California real estate license. But the life of a broker was not for him.

He researched available franchises at the library, pursuing a long existing dream of starting his own business. A small print shop seemed like a good prospect, requiring little risk and only a small investment. But, one day, Bradley saw a magazine ad for Computerland. Here was a truly fascinating prospect that led him to check out a local Byte Shop to find out what a computer store was all about. With the master's degree in management from Golden Gate University and his air force experience, Bradley confidently approached Computerland with a proposal for opening a store in Sacramento.

Computerland of Sacramento opened in late 1979, and Bradley hired Jerry Jewell, a veteran of Vietnam, the next spring as sales manager. About that time, Nasir came strolling into the store with a program he had written. Bradley looked at it and said it was "okay." But when Nasir came back a few days later and said, "What do you think of it now?" Sirius Software was born.

And the Battle Has Just Begun. That first program, *E-Z Draw,* is still selling well. Nasir followed it quickly with *Both Barrels*, *Cyber Strike*, and *Star Cruiser*.

Nasir programmed full-time, while Jewell and Bradley worked a regular day at Computerland and ran Sirius part-time—almost like a hobby. Despite the laid back approach, Sirius was off to a shoot-'em-up start, both barrels blazing.

There is one way to illustrate the immense popularity Nasir and Sirius had the first year. *Space Eggs*, one of only a handful of programs to dethrone *VisiCalc* from its usual top spot,

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placed first on *Softalk*'s Top Thirty twice. Nasir's games continually made it to the Top Thirty—and often remained there a long time (*Gorgon* placed twenty-first in June 1982).

Sirius became so successful that Bradley sold the Computerland store in May 1981. Jewell left with him. Bradley and Jewell hadn't expected Sirius to get so big; they thought the only good money was in hardware. But it's difficult to look success in the eye and pretend it's not there.

Jim Ackerman was hired in the spring of 1981 as an operations and production assistant. The ex-sheriff has gone on to become head of the department and handles much of the company's day-by-day routine. One of the first full-time Sirius employees, Ackerman has now been joined by more than thirty others, including Atari and IBM groups.

One or two of every ten games submitted to Sirius is given serious consideration. Sometimes a game meets Sirius's standards 100 percent, like Tony and Benny Ngo's arcade game *Bandits*. If a game is only 70 percent, however, the author works with product manager Ernie Brock.

A prolific programmer and the author of *Pascal Graphics Editor*, a rare nongame product from Sirius, Brock was working a year ago at the Bank of America, designing Apple-based data-capture systems.

Brock would periodically drop by the Computerland store when Jewell and Bradley were in residence. He showed them programs for publication, but this was before Sirius got serious. Besides working with programmers, Brock says with good humor, he spends most of his time shuffling paper.

What was originally just "something to do" is now what Bradley sometimes calls the "wall of software." When you go into a store, perhaps a third of a wall is taken up by Sirius Software; in a year's time, Bradley would like to see that third become half.

"We consider ourselves number one in the game market, and there is no number two. There's a big tie for third, but no number two."

Releasing three to four games a month for the Apple, Sirius is publishing at a torrid pace. There should be few arguments about whether they're indeed number one in volume. But volume publishing can have its drawbacks. With so many Sirius games coming out, retailers and customers begin to have problems distinguishing the products.

Bradley claims that Sirius ships fifteen to twenty thousand pieces a month. Marketplace feedback indicates that for every competitor's game sold, Sirius sells two.

"We're not blind, though," Bradley says. "We're not the only ones in this business, and we welcome the competition of On-Line, Broderbund, Gebelli, and Continental.

"I must compliment Broderbund for the cuteness of *Choplifter*. It's a really superb program."

One edge that Sirius hopes to maintain over the competition is low prices. Jewell wants 90 percent of the product to sell for less than thirty dollars each—as the average market price for state-of-the-art games inches toward thirty-five dollars.

The Game That Will Steal Your Bandits. Both Jewell and Bradley are angered by the rampant piracy that is, by Jewell's estimate, producing five illegal copies of every legal copy sold. He believes that high software prices are the result of revenue lost to piracy, and the added expense of protection.

Bradley thinks many pirates have no idea how serious their crimes are. Many pirates are not legally adults. What they don't realize is that their parents could go to jail, not them, he says.

"The majority of people pirating software are either juvenile in age or mentality. It's the old adage of 'the right to make back-up copies of valuable software.' No way are games valuable software in this sense."

Sirius's replacement policy is utterly fair. If you include the receipt with the bad disk, they'll provide a new copy free. If you don't have a receipt, the charge is five bucks with no questions asked.

Bradley cites a typical pirate tactic: breaking the protection scheme, making one or more copies, fixing the game so it

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won't boot, and then trying to exchange it for a different game.

The tools of piracy are readily available—and Bradley is vehemently opposed to their sale.

"I believe the people who market nibble copiers are crooks. In the law it's called contributory copyright infringement."

Sony is currently involved in just such a case over its video cassette recorders. Bradley is attentively watching that case develop. It could set a precedent for similar cases in the software industry.

In the realm of possible infringement of arcade game copyright, Sirius has had some experience. Nasir's *Gorgon* was a superior copy of Williams's popular arcade game *Defender*. At the time the law only prohibited the actual duplication of code.

Since then the law has been expanded to include game graphics and sound effects. Sirius has acquired a license for *Gorgon* and now pays royalties to Williams. They also continue to pay author's royalties to Nasir.

Because of the double payment of royalties, Sirius is not terribly interested in copying arcade games. Not unless the author of the computer version is willing to take a smaller cut.

One problem a big company like Atari presents to smaller software publishers is its ability to pay money up-front to an arcade manufacturer for personal computer rights. With guaranteed sales to owners of Atari computers, half a million bucks for such rights is peanuts.

Nonetheless, Bradley admires some of Atari's practices. Like the cowboy and disco crazes, *Pac-Man* fever was created. And, manufactured or not, the phenomenon helped put Atari's name in everybody's minds. What's admirable is how Atari used the success to promote the company.

"Let's say you put out twenty games and you have one or two windfalls that sell a million copies," begins Bradley. "The first reaction is usually 'I'm set for life, time to invest or retire.' But this is shortsighted. If you have a real barn burner, then you should put the profits into more institutional advertising. Blow the windfall money on getting your name out there and known.

"The business will grow like a pyramid. The wider the base, the higher the top of the pyramid."

Big pyramids tend to spawn little pyramids. Sirius owns another firm, River City Ads, which is about to benefit from a big contract between Sirius and Twentieth Century-Fox. Sirius will produce a new line of games for the Atari VCS, and Twentieth Century-Fox will handle marketing and manufacturing. The games should start appearing this fall.

Sirius now accounts for about 70 percent of River City's business, but next year it may be a different story. River City landed Twentieth Century-Fox as an advertising client for the new VCS games.

What Has 48K and Is Addictive? With all this philosophy of business and marketing, what about the games themselves? Both Bradley and Jewell have definite ideas about what makes a good game.

A typical game needs to be fun above all else. It must have some depth so that it is challenging. Ideally, a game will be simple enough at the beginning for a klutz to enjoy but have enough challenge to please the erstwhile arcade expert.

There is no point in having a game that is physically impossible to play. If the creatures or what have you are moving too fast, either the controls are inadequate or the game requires superhuman coordination.

Bradley believes that fantasy-type games are the way of the future. Sports games and board games are much more satisfying in their original forms; they play better with the real props. You can't go out on the street and play *Gorgon*.

Risk and the fantasy of danger are crucial to some games, even if it's mostly on a subconscious level. *Pac-Man* has these elements. Part of the game entails flirting with disaster, attempting to make best use of the energy dots. Ultimately, the only harm you incur playing *Pac-Man* is losing a quarter.

Encouraging the player to be greedy and take risks is a desirable element in arcade games. So is a reward for good playing.

"People want to score. But not a grand total of seven points. They want to score seven million. It's like working," explains

GOTO 165

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Copy-Protection System for the Apple II

by Jeff Gold

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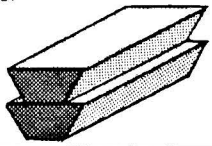
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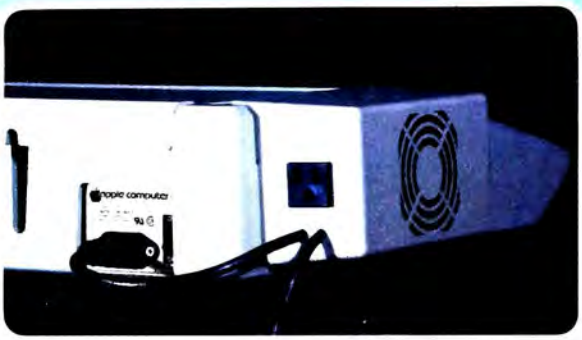
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INTRODUCING



BY JIM MULLER

A Schoolhouse Apple Feature

"Personal computers should be made as easily available to a child as pencils," observed Dr. Seymour Papert before a group of educators at the University of Dallas in November 1981. "The pencil is used to scribble, to doodle, to draw, to write, to work sums, or to chew on. It is used for illicit notes as well as for official assignments. I see the computer in the life of the child as equally ubiquitous and equally versatile. I also see it as equally personal. Children own pencils; they are not intimidated by them. This should be equally true of the child's personal computer."

Papert is one of the world's leading authorities on how children absorb knowledge and how best to develop their learning skills. He is also one of a large number of experts who recognize the enormous impact computer science is having on the educational process, both in the classroom and in the home. With his associates at the Artificial Intelligence Laboratory at the Massachusetts Institute of Technology, he spent twelve years developing a unique philosophy of education that has been implemented through the computer language called Logo.

Tool or Threat? Today, even with computers already a pervasive part of our everyday world, electronic technology is far less forbidding to the average child than to his parents, who are often bewildered by the onrushing progress of the technology. To the young person, the computer is nothing more or less than a fascinating tool. But his parents tend to blame an endless variety of problems on the computer.

When today's youngster reaches adulthood, his environment will have been computerized to the degree that it will be totally accepted as the way the world *is*. For this reason, it is becoming increasingly important that a child's education incorporate familiarity with, and understanding of, a technology that will be as much a part of his surroundings tomorrow as pencils and paper are today.

Actually, computers have been around the classroom for more than twenty years, starting with rudimentary programmed instruction in the late 1950s and progressing very slowly through the 1970s. Intel Corporation began the dramatic change with the introduction of the microprocessor in 1971. This led to the first microcomputer in 1975. It also brought active use of the computer to the classroom.

The typical use has been for the talented and gifted students to use preprogrammed software as drill and practice for math and other technical courses. However, a few innovative teachers have used computers to help the learning disabled and the so-called slow learners. Programs have been individualized for the specific needs of each child so that each is continually challenged and continues to move at her own pace. The child, in turn, develops a personal one-on-one relationship with the computer, receiving immediate feedback and reinforcement.

No-Fault Learning. More important, the child is not embarrassed in front of friends or the teacher if a wrong answer is entered—he just tries again. As the child experiences immediate success with a correct answer, he is encouraged to continue to learn, even to excel. Slow learners gain valuable self-confidence in their approach to problems. And brighter students become more creative because they use the computer to deal with interesting real-life situations where the numbers can become quite cumbersome. They use it for everything from reliving the Civil War to simulating a flight in an aircraft or in a spaceship.

But this type of experience can create problems. Rather than learn to use their innate creativity, the students must rely on the creativity of the programmer. The computer becomes little more than an intelligent video game.

On the other hand, teaching youngsters to program can be equally cumbersome. Words such as *init, CHR$, MID$, ABS, gosub,* and *Syntax Error* are not part of a typical child's vocabulary. Coupled with the complexities of operating such high-level languages, young people tend to find it extremely difficult to explore the potential of the computer.

With the introduction of Logo, however, the student is able to become immediately involved in a unique, computer-based learning environment where mathematics, language arts, logic, and other areas of traditional learning can be absorbed in an instinctive, natural fashion, much as a child learns to speak, to walk, or to experience the wonders of a butterfly—or a turtle.

Logo, however, is far more than just a learning language. It can serve the needs of all ages and experience. It is much like the game of chess. A six-year-old can learn the basic moves of chess, but elderly masters still seek to learn more about the game. Like Logo, it appears to offer infinite expandability.

Graphic Pet. Young people are introduced to Logo through turtle graphics. Where once the turtle roamed the floor as an electromechanical device controlled by a large computer, now the Logo turtle is a cybernetic pet that resides on the computer screen. Rather than draw pictures on paper spread out on the floor, the turtle is now a small triangle, ready to move and draw at the command of the user.

Using very simple primitive commands, even preschoolers learn to control the turtle, moving it *forward, back, left,* or *right.* They also find that they can have *penup, pendown, penerase,* and *penreverse.* Drawing a simple house quickly becomes a sequence of "turtle steps."

```
FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90
```



This creates the frame of the house in the form of a square. Now we'll put a triangle on top of the house to create a roof.

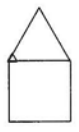
```
FORWARD 50
RIGHT 120
FORWARD 50
RIGHT 120
FORWARD 50
RIGHT 120
```



The only problem with this procedure is that the roof appears inside the house. But this is not necessarily wrong—it is merely a bug that has to be corrected.

Let's take another look at the problem. And let's also simplify the program entry.

```
REPEAT 4 [FD 50 RT 90]
FD 50
RT 30
REPEAT 3 [FD 50 RT 120]
```



Now the triangle is properly positioned on top of the square to present a rudimentary picture of a house.

Follows Orders. Having drawn the house, we can now "teach" the computer to draw any number of houses by defining a new Logo command, *House.*

```
TO HOUSE
REPEAT 4 [FD 50 RT 90]
FD 50 RT 30
REPEAT 3 [FD 50 RT 120]
END
```

By entering the new command, *House*, the triangle is drawn on top of the square.

However, this is only the beginning of the power of Logo.

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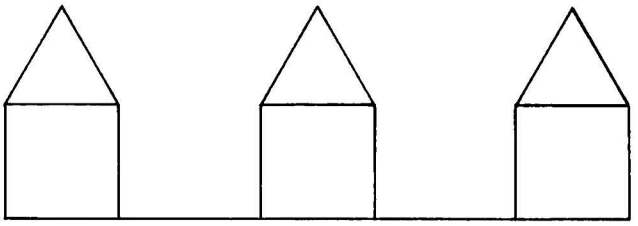


Figure 1.

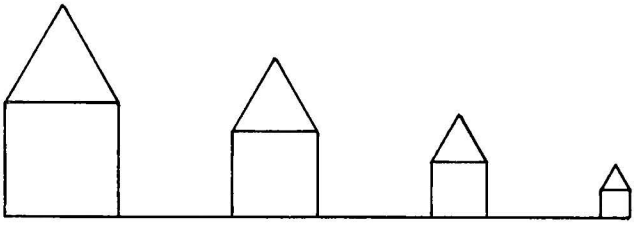


Figure 2.

Now the new command can be used to draw a suburban community (see figure 1).

```
TO SUBURB
SETX -100
HOUSE
SETX -50
HOUSE
SETX 0
HOUSE
END
```

Now, by entering the new command, *Suburb,* three houses are drawn. But even this is a bit cumbersome. What if you want to redefine the suburb at some point? This option opens up even more of the power of Logo (see figure 2).

```
TO HOUSE :DISTANCE
REPEAT 4[FD :DISTANCE RT 90]
FD :DISTANCE RT 30
REPEAT 3[FD :DISTANCE RT 120]
SETY 0 SETH 0
END

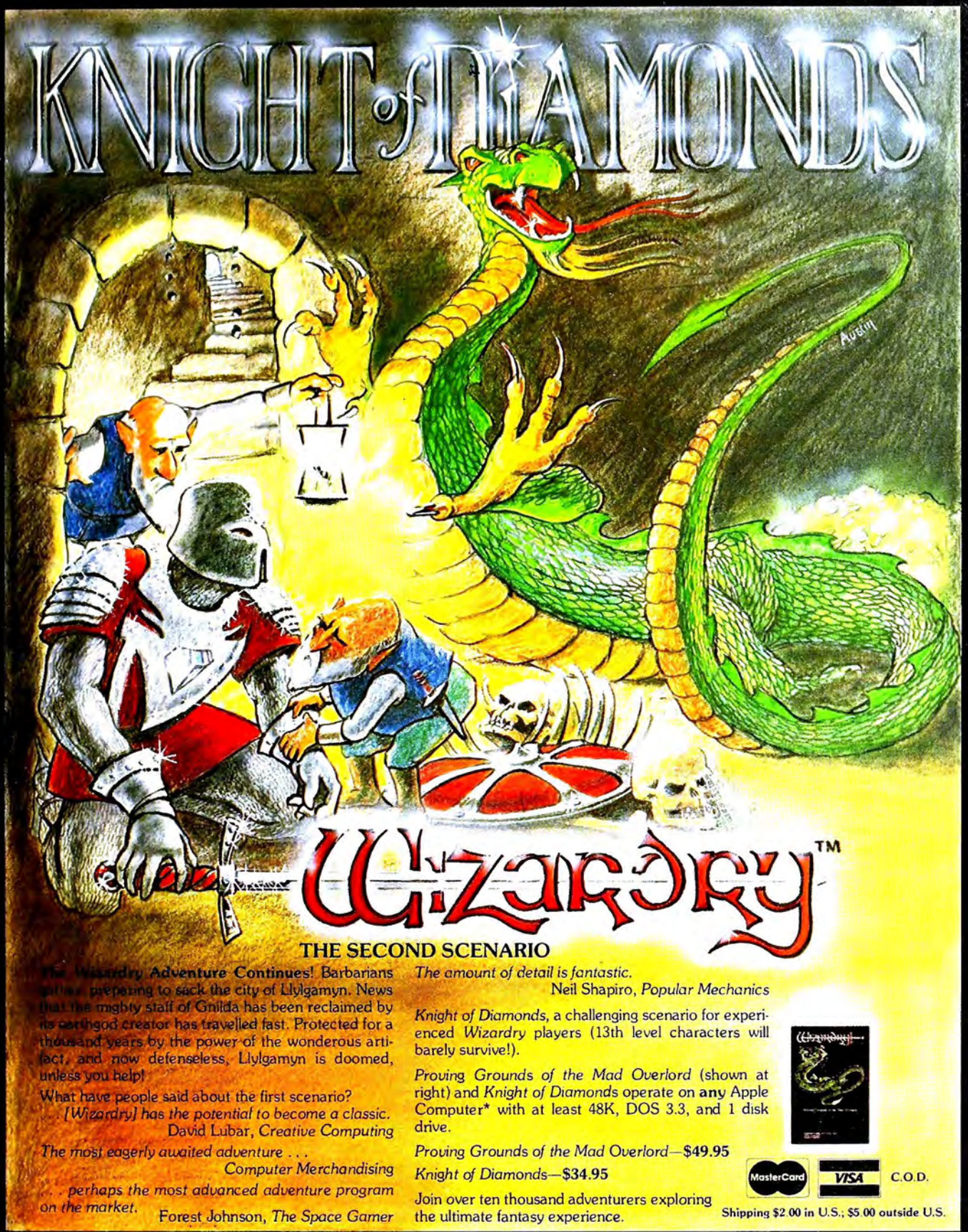
TO SUBURB :DISTANCE :SPACE
SETX :SPACE
HOUSE :DISTANCE
MAKE "SPACE :SPACE + 60
MAKE "DISTANCE :DISTANCE - 5
WINDOW
SUBURB :DISTANCE :SPACE
END
```

Both *House* and *Suburb* have now been redefined to include the variables *:Distance* and *:Space. Distance* represents a side of the house, while *Space* represents the space between houses. When *Suburb* is entered now, along with numerical values for *Distance* and *Space*, series of houses will be drawn, each smaller than the preceding house.

Another interesting feature of Apple Logo demonstrated here is *recursion,* the use of a problem, or procedure, to call itself as a function of the solution. More closely associated to programming, recursion is the use of a routine to call itself.

But, let's go beyond this a bit. What has really happened here?

Mapping Mathematically. From the simplest known—drawing a square—we have moved through progressive stages to develop a suburban community. We have taken a problem, broken it into "mind-sized bytes," and reassembled these into a structured, procedural solution to the problem. In the process, we have explored the concepts of Cartesian coordinates, geometry, and algebra. The primary grade youngsters that go



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HARD TALK

BY JEFFREY MAZUR

One of the Apple II's most powerful features is its capacity for expansion via the eight peripheral connector slots on the motherboard. In particular, the ROM expansion technique incorporated into the Apple allows any peripheral card to take over various portions of the C100-CFFF address space. This makes it possible to give intelligence to add-on devices by way of software residing in PROM (programmable read only memory). Most peripheral cards make use of this feature.

To take advantage of this feature and try out your own custom designs, you need a way to program PROMS. EPROMs, chips containing *erasable* programmable read only memory in 1K and 2K versions, are ideal for experimental use.

EPROMs are also used for character generators, controllers, advanced logic for printers, and other sophisticated electronic applications. Having access to an EPROM programmer allows you to alter the operation of such devices to suit your needs. You might add descenders to the character-generating EPROM on a lower-case adapter. Or you could change the program in your printer so that it defaults to different conditions. It's also possible to put useful routines in the unused ROM sockets in the Apple or on a ROM board, from which they'd be available without having to load them from disk. In fact, it's even possible to replace the entire ROM on the motherboard or on a ROM card so that the Apple becomes a dedicated turnkey computer, performing your application as soon as it's turned on. EPROMs can be very useful indeed.

What Are EPROMs? Erasable programmable read only memory—what does it all mean? Well, first of all, we're talking about an integrated circuit, or chip, which is merely a collection of electronic components—transistors, resistors, capacitors, and so on—all connected in a particular fashion to perform a desired function. In the case of a 2K PROM, more than sixteen thousand transistors populate that little black box. Like all DIP (dual in-line package) ICs, a 2K PROM has two rows of connecting pins that exit from the chip so that it can be wired to other components to make a complete system.

A memory chip differs from other ICs such as CPUs or address decoders in that it usually consists of a large array of memory cells. Each memory cell represents one bit of data; therefore, any device that can be in one of two states can function as a memory cell. As an example of a simple memory element, consider the power switch on your computer. When you flip this switch up, the computer turns on and then stays on even after your hand moves away from the switch. Thus, the switch remembers that you have turned it on. It will stay in this state until you push the switch down to turn it off. By contrast, a doorbell uses a momentary switch that turns on only as long as you hold it down with your finger. When you let go, the switch turns off; this kind of switch has no memory.

Transistors make very good switches; therefore most semiconductor memory chips use them for the storage elements. The controlling portion of a transistor is known as the *base* (or *gate*) and it is the presence or absence of an electric charge or voltage at this base that determines if a transistor will be on or off. Memory chips typically lay out a large array of transistors that can be reached via a binary address. With just ten leads to the outside world, for example, we have the capability to select one out of 1,024 possible memory elements. Some memory chips are organized to communicate with eight bits at a time. Such chips are referred to as *byte-wide* memories.

Once the desired memory element location has been selected, data can be read from (or written to in the case of random access memory) the cell by the computer. With read only memory, only preprogrammed data can be read out by the computer. Contrary to their name, most ROMs are also random access. This just means that any memory cell can be called directly. The alternative is serial access, such as exists in bubble memories, where data must be read in order.

Contact! There are many ways to control which of the transistors in the entire memory array will represent ones and zeros. For example, at each memory location where we want logical "one" data, we can connect the base of the transistor to the positive voltage supply; where we want a "zero," we can leave the base unconnected. Thus, a very intricate pattern of connecting wires must be formed as part of the manufacturing process for making the chip. Such a device is known as a *mask programmable read only memory* or, just simply, a ROM. The chips that store the Integer and Applesoft interpreters are of this type. ROMs are inexpensive to make, but since they require a special custom design when manufactured, a large one-time "mask fee" is usually charged. Therefore, ROMs become cost-effective only when large numbers (thousands) are needed. Since a new mask fee must be paid if the ROM pattern is changed, it is also imperative that the code being placed in ROM is bugfree and unlikely to be changed.

For smaller applications, there is the programmable ROM, or PROM. This device is manufactured with all memory cells wired to represent the same state. Individual cells can then be programmed into the other state. PROMs are not as simple to program as RAM; you need special apparatus.

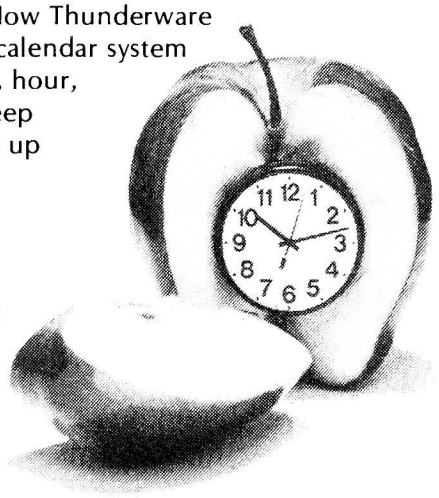
The most common form of PROM is the fusable-link variety. This device uses a very fine wire at each memory cell. Each wire can be individually *burnt* away (now you know why we call this "burning a PROM") to program the state of that cell. Thus, you can create any desired pattern of ones and zeros within the PROM to represent your data. If you make a mistake, you'll probably have to throw the PROM away; once a fuse is burnt it can't be repaired.

The most interesting type of PROM by far is the erasable PROM, or EPROM. Besides being programmable, this device can also be erased and used over again. Erasure is accomplished by exposing the chip to a strong ultraviolet light for twenty to thirty minutes. This is the reason these chips have a clear window on top. (It's not just to let you see what the actual chip looks like, although it's quite fascinating to look inside; you may gain a finer appreciation for what really goes into a computer.) Obviously, when you erase an EPROM, all the cells get erased simultaneously.

Tech Talk. An EPROM works by isolating the gate of each memory transistor; that is, there is no direct electrical connection to the gates. Under these conditions, the output of each cell will be at logic high, or at the byte level $FF. Zeros are programmed into the EPROM cells by placing a small static charge near the gate regions. The programmer accomplishes this by using a relatively high voltage (about 25V). This charge remains in the selected gate region, causing that transistor to change states. Since the gate is isolated from the rest of the device, there is no way for this charge to leak off. Therefore, the EPROM will remain programmed for at least ten years (there is a very small leakage rate that will erase the

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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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EPROM eventually).

When the EPROM is exposed to ultraviolet light, energy absorbed from the light causes these charges to be neutralized. Thus, the EPROM reverts back to its all $FF state and can then be reprogrammed. Because of the EPROM's susceptibility to ultraviolet light, most people cover its window with opaque labels after having programmed it. This is just a precautionary measure—even if you were to leave an EPROM out in direct sunlight, it would take several weeks to erase it.

The basic differences among EPROMs have to do with their storage densities (how many bit cells per chip) and with the supply voltages required. Earlier EPROMs operated on three separate power supplies: +12V, +5V, and −5V. Most EPROMs today use only the +5V supply. However, since many devices, including peripherals for the Apple, were designed with the older EPROMs, it is important to recognize differences among EPROMs, especially the differences in the ways they are programmed.

Usually you can tell what a chip is by its part number. The most popular EPROMs are the 27XX and 25XX series devices (XX represents the number of kilobits of storage). These devices are all byte-wide, so a 2716 can store 2K of data.

One of the reasons we have both 27XX and 25XX series goes back to the early days when the single-supply EPROMs were just coming out. Two IC manufacturers claimed the same part number for each of their very different EPROMs. Texas Instruments had been manufacturing triple power supply EPROMs such as the 2708; their new EPROM with twice the capacity was called, logically, the 2716. Intel, however, had a better part that was also a 2K EPROM but used only one supply. They chose to call their part a 2716 also. Thus, it became confusing to talk about 2716s without knowing whose chip you were referring to.

While many other manufacturers make EPROMs, for the purpose of this discussion we will refer to the Texas Instruments and Intel 2716. Since the single-supply EPROMs are easier to use, even Texas Instruments offered them eventually; thus, the 25XX series. The current state-of-the-art is single-supply EPROMs, including the 2716, 2732, and 2764 (2K, 4K, and 8K respectively). You may still come across tri-voltage 2708s or 2716s, though. Let's take a look at some of the EPROM programmers available for the Apple II.

Microproducts EPROM Programmer. The Microproducts programmer has been around for several years; it was probably the first EPROM programmer designed specifically for the Apple II. It features a Textool zero insertion force socket for the EPROM and a programming power switch. The ZIF socket makes it easy to insert and remove EPROMs without bending or fiddling with the IC pins. This board is designed to program +5 volt EPROMs only but can be modified easily to work with multivoltage PROMs also.

The only software included in the Microproducts EPROM programmer comes in the form of an EPROM *Mover* program. This program transfers any given block of data (usually from RAM) into the PROM. The programmer can also be used with the company's assemblers to burn programs directly from source code. This is accomplished by having the blank EPROM appear to occupy the address range it will actually occupy when it is used. For example, if you're going to burn a PROM that's meant to replace the F800-FFFF Monitor ROM, the programmer board should be strapped to the F8 position. A small jumper wire is provided for this purpose, along with several socket pins into which the wire is placed. These pins are provided only for the D0 and D8 blocks, however; you must supply your own to configure the board for any others. The reasoning behind this goes back to the days of Integer-only Apple IIs in which D0 and D8 sockets on the motherboard were empty. This programmer was often used to burn EPROMs for those sockets. However, those sockets are designed to accept ROMs, not EPROMs. There's a slight difference between ROM sockets and EPROM sockets, but Microproducts also sells an EPROM adapter socket that makes the EPROM compatible with a socket meant for ROM.

While the addressing scheme just described can be useful

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for assembling code directly into ROM, it is usually unnecessary. If you already have a complete binary image of the PROM somewhere in RAM, the *Mover* program can transfer the data to whichever block the board is configured for. This binary image can be gotten from a variety of sources such as reading an existing ROM or from an assembler using the OBJ directive to place the object code in RAM.

Using the programmer with the *Mover* is quite simple. The program asks for the starting and ending addresses for the block of data to be moved into the ROM. Then it asks for the destination address, which will usually be the default block for the board or D000 (this does not imply that the code being moved must actually run at this address). After confirming that the information was entered correctly, the EPROM is burned. This takes several minutes, after which the computer is turned off and the EPROM removed.

While this programmer works very well and can be modified for multiPROM use, no provisions are made for reading the PROM while it is in the programmer. Also, some people may find it an inconvenience that the Apple must be turned off when installing and removing EPROMs. Of course, even these shortcomings can be solved with a few more modifications.

All in all, this is a fairly good unit for the price. The Microproducts EPROM Programmer sells for $99.95. The EPROM socket adapters are $9.95 each.

Mountain Computer ROMWriter. The ROMWriter has many features including a ZIF socket, a write-protect switch, and a PROM power switch. This last switch allows EPROMs to be inserted or removed even while the computer is on. The PROMs can also be read from this board, making it possible for you to verify that the PROM is erased prior to programming. It also allows the programming software to verify that the burn is successful by comparing the contents of the PROM, after burning, with the original data. Only single supply 2716s can be programmed.

The ROMWriter places the EPROM in the $C800-$CFFF address space of the Apple. For this reason, there is also another switch labeled CFFF OFF. The purpose of this switch lies in the Apple I/O protocol with regard to I/O ROM expansion. This protocol requires that all peripheral boards turn off (that is, relinquish the C800-CFFE common I/O space) whenever the address CFFF is accessed. This could pose a problem if you wished to read or program the last byte of a PROM on the ROMWriter. Thus, a switch was added to defeat the shutdown of the ROMWriter after accessing CFFF.

EPROM programming is fairly simple with the software supplied, and the pretest for blank and verification add a bit of reliability to the procedure. The Mountain Computer ROMWriter sells for $175.

Word Power PROM Programmer. Here's a newcomer in the field with a low-cost, easy-to-use programmer for +5V 2716s. To keep costs down, a regular IC socket is used for the EPROM instead of a ZIF type, but there's a special area on the board on which you can install your own ZIF socket.

The programmer must be installed in slot 3 and the Apple should be off when changing EPROMs. The software included allows EPROM erasure verification, single-step read or write, or entire block read or write of the PROM. All block writes are verified after programming is complete.

Aside from a few bugs in the demonstration software (typical of a first release on a new product), the unit performed well. There's some confusion as to what area of RAM gets burned into the EPROM. In each of the examples, the starting address of $2000 is used, but when we tried to burn our first EPROM by loading the object data into this area, it didn't work. We then had to *list* their Applesoft program to discover that the real buffer starts at $4800.

ROM Boards. As previously mentioned, there are lots of reasons for programming EPROMs. If you're going to use the EPROM in some other piece of equipment or if you're just modifying the information on an existing device, the new EPROM already has a place to go. If the EPROM contains some program that you want the Apple II to execute, it must be plugged into the motherboard or into a socket on a ROM card. When using an EPROM in place of a ROM, on the motherboard or an Integer/Applesoft ROM card, don't forget to use an adapter socket like the ZIF from Microproducts. Other boards are designed to accept EPROMs directly.

ROMPlus. A complete description of this board was given in the August 1981 issue of *Softalk*. Basically, this board allows up to six EPROMs to be used, via bank switching into the C800-CFFF space. A control PROM on the board simplifies interfacing your programs and allows you to run them with just a few keystrokes. With the appropriate software, one PROM can call another on this board, making it possible to put programs longer than 2K into EPROM.

Microproducts ROM Memory Module. This board acts like the Integer/Applesoft ROM card in that it replaces up to 12K of the motherboard's ROM space (D000-FFFF) with ROM software on the board. A switch provides selection between Apple-type ROMs or +5 volt 2716s. Another bank of DIP switches selects which of the six ROM sockets will be active when the board is called. As with Apple's ROM boards, you can also choose whether the board is selected upon power-ups.

One purpose for a board like this is to replace the Apple's native Basic with a specialized language, an operating system, or even a dedicated application program. For example, the Microproducts 6502 Development System is available in EPROM. This system brings together their assembler, disassembler, and debugger programs into a consolidated package that can be up and running as soon as the computer is turned on. Thus, you can turn the Apple into a dedicated operating tool and still use it as a computer when you want to.

The ROM Memory Module from Microproducts sells for $99.95. With the Development System EPROMs installed, the price is $249.95.

Soft CTRL Systems ROM Board System. Soft CTRL Systems made several EPROMs in the past that were designed to work in a ROMPlus. In an attempt to broaden their market, they have now released an inexpensive single ROM board of their own. Thus, you can take any one of their ROMs and insert it into this board for instant use by the computer. The main advantage to this board is its low price—$29.95.

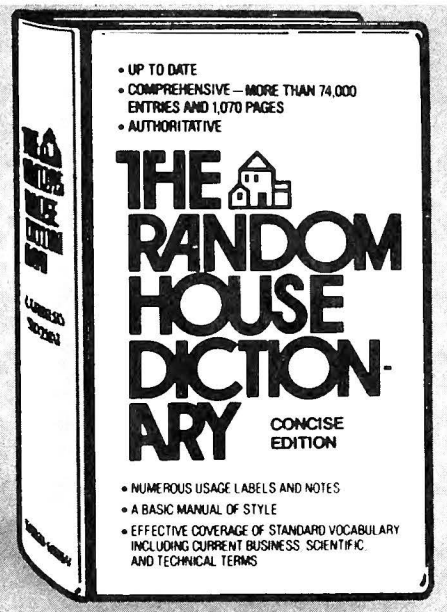
Finally . . . There are several other EPROM programmers available for the Apple, including one made by Apparat that has personality modules; unfortunately, it was unavailable for review. Dedicated stand-alone programmers are quite expensive but can sometimes program sixteen EPROMs at once for production use. As the 2732 and 2764 become more popular, we should see low-cost programmers for them, too.

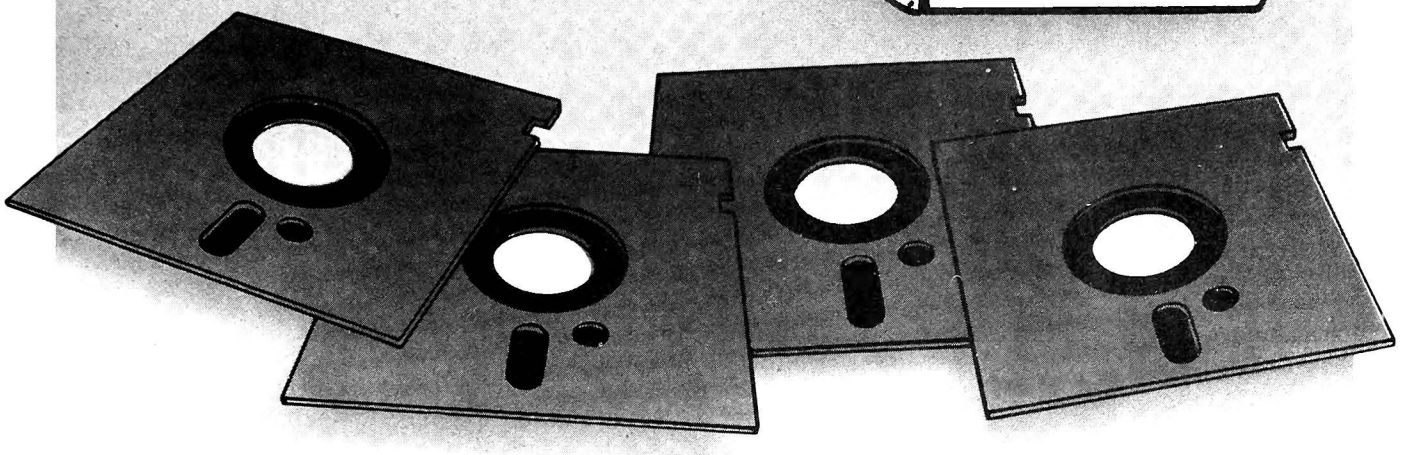
On a different front, there is a lot of competition for the EPROM from such other devices as the EAROM (electrically alterable ROM) and EEPROM (electrically erasable PROM). As their names imply, these devices can be programmed while in the computer. In addition, they can be selectively erased and rewritten, making them the almost perfect memory device. Although these devices currently suffer from several drawbacks, they are a good choice for a read-mostly memory where nonvolatile storage is needed.

Finally, here are a few tips on handling EPROMs: (1) Cover the window with opaque tape or a label when not erasing. (2) When you want to erase an EPROM, make sure the quartz lid is very clean; a small speck of dirt or gum from a previous label can shadow some of the cells, preventing their erasure. (3). Do not overerase. Most ultraviolet PROM erasers take 15 to 25 minutes to erase a PROM. (4) Texas Instruments chips should always be completely programmed. If you need only a portion of the memory space, fill the rest of the EPROM with $FFs (the EPROM's natural state). When adding to a previously programmed EPROM, run through the entire address space rewriting the old data. ❑■

Microproducts, 24627 Watt Road, SDCE, Ramona, CA 92065. (714) 789-6510. Mountain Computer, 300 El Pueblo, Scotts Valley, CA 95066. (408) 438-6650. Soft CTRL Systems, Box 599, West Milford, NJ 07480. (201) 728-8750.

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by Jean Varven

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Established in December 1979, Avant-Garde entered the education market the following spring with *Sentence Diagramming.* Chief programmer Don Jones, one of Avant-Garde's cofounders, created the program after the company discovered that a number of educators wanted to teach language skills through sentence diagramming and were unable to find a suitable program for doing so. Among Avant-Garde's other products are the *AEN Grading System* package and *Word Scrambler and Super Speller,* a spelling program some learners find as entertaining and challenging as a video game.

Avant-Garde also produces *ZES*, a courseware system developed in Australia that allows users to create their own educational courseware without a background in programming. In addition, the company is eager to make available a pool of classroom courseware generated through the *ZES* project.

Company cofounder Mary Carol Smith, who describes the education market as "the most challenging," believes that microcomputers have the potential to transform education. The computer, says Smith, helps students become more responsible for their own learning, and, as a consequence, both the educational setting and the role of the teacher will change.

Edutek Corporation, 415 Cambridge, #14, Box 11354, Palo Alto, CA 94306; (415) 325-9965. Contact: Keisha Williams, Aretha Lawrence.

Edutek qualifies as an old-timer in the educational software field, having produced software for use in preschools, schools, community organizations, and homes since 1978. Their hand-eye coordination package includes *Cooperation Maze*, a program in which two players work together to move the cursor through a maze; *Write It in Color*, an introduction to the Apple keyboard; *Make a Tune*; and *Computer Palette*, which enables users to create and save their own paintings. (Each of these programs is also available individually.) In addition, the company offers programs in music theory, math, and language skills.

Another product that's likely to interest educators is *Poly-Choice*, a program that enables teachers with no programming knowledge to create multiple-choice activities in science, social studies, math, language, and so on.

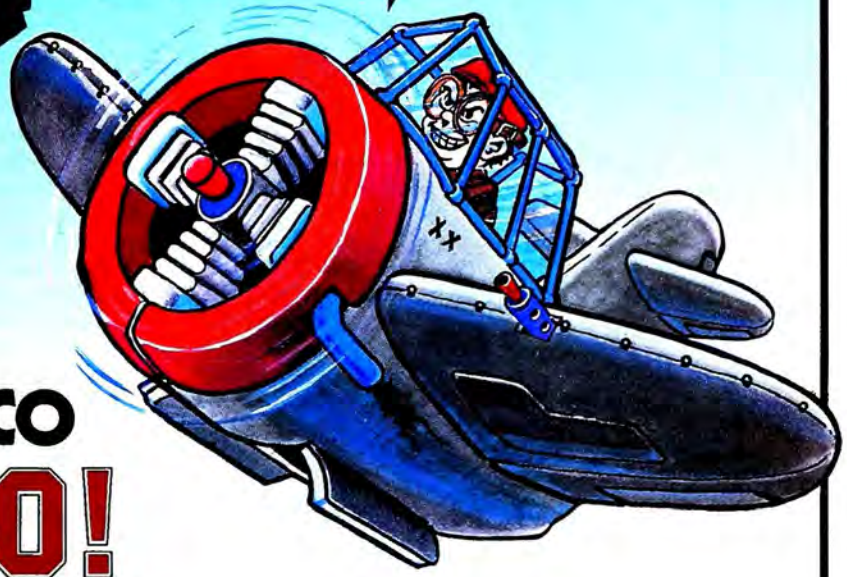
Besides producing software, Edutek offers programming and consulting services.

Hartley Courseware, Box 431, Dimondale, MI 48821; (616) 942-8987. Contact: Tim Hartley.

Jane Hartley, a veteran elementary school teacher, and Tim Hartley, an air traffic controller turned programmer, formed their own educational software company in 1979. Since then, this mother-son team has been busy creating and marketing educational software for K-10 students in reading, language arts, and mathematics. In addition, they offer a series of *Create Your Own* disks that enable teachers and parents with no programming knowledge to create lessons in reading and math. Their most recent release is *Capitalization*, a menu-driven program that presents the rules of capitalization and gives students the opportunity to apply what they have learned to practice sentences.

All Hartley Courseware programs, including the *Create Your Own* disks, feature "student planning." This management plan provides a teacher with accurate records of stu-

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Hartley Courseware programs are tested in Jane Hartley's classroom and other school settings. All programs run in either DOS.

IdeaTech Company, Box 62451, Sunnyvale, CA 94088; (408) 985-7591. Contact: Ron Eckert.

Ron Eckert and his wife Sue formed IdeaTech two and one-half years ago to create and market educational software to serve the needs of learning-disabled and mentally handicapped students. As is often the case with smaller companies, one of IdeaTech's goals has been to create software in areas that not many people have addressed before. Their program *Basic Electricity*, on the market for about a year and a half, provides a good example of this philosophy in action. Another program, *Color Guess*, teaches preschool through second-grade learners how to recognize and spell color words by associating them with the colors themselves.

Much of the educational software IdeaTech produces is created by others on a freelance basis. IdeaTech offers a free assessment of the software it receives from others. The Eckerts evaluate the submissions from both technical and educational perspectives. Programs also spend several months' time in a classroom environment.

All programs run in either DOS and are available as part of a subject-area package (*Mathpack-1* and *Languagepack-1*) or individually.

Micro Power and Light, 12820 Hillcrest Road, Suite 224, Dallas, TX 75230; (214) 239-6620. Contact: Ed Frantz.

Founded by Ed Frantz in the winter of 1979, Micro Power and Light devotes all of its efforts to the development of educational software for the Apple II. Courseware categories include math, science, language arts, and tools for teachers. All of the programs the company markets are created on contract by practicing educators.

The company's wide-ranging and somewhat unusual product line is primarily a product of Frantz's belief that good courseware is created when teachers make programs about those subjects they're qualified to teach that interest them most. The company also attempts to produce courseware for subject areas that are not being addressed by software currently on the market. Examples include their programs *Map Reading*, *Advertising Techniques*, and *Scientific Method*.

Important aspects of Frantz's role include making certain that the teacher's instructional strategies remain intact once they have been translated into courseware and determining whether there is indeed a market for a particular program. Products are field-tested in various school settings and refinements are made based on the results of an interactive process between creators and users.

Program Design, Inc. (PDI), 11 Idar Court, Greenwich, CT 06830; (203) 661-8799.

Program Design came to life in March 1978; John Victor, Lyn Sandow, and Jenny Tesar are the firm's working partners. Most of the educational software the company produces is sold to home users, rather than to the school market.

Victor's fifteen years' experience in educational technology brings a special perspective to the company, seen in the software they produce. *Step by Step*, the company's beginner's course on Basic programming, reflects this background. *The New Step by Step* is a revision and expansion of the original program. The package includes two disks, two audio cassettes, and a workbook, and learners receive instruction on two levels, visual and aural. The company also plans to issue *Step by Step II* and *III*, programs that expand upon the material covered in the originals. Topics will include the Apple memo-

ry map, the meaning of hexadecimal codes, the fundamentals of disk operation, how to write files, and so on.

The company is also hard at work on a machine language that will enable beginners to attain a theoretical understanding of machine language by means of simulation.

Sliwa Enterprises, Inc. (SEI), Box 7266, Hampton, VA 23666; (804) 826-3777.

Steve Sliwa uses various mainframe computers in his work at NASA, but since late 1980 he's been spending a lot of time working and playing at his Apple. Consisting primarily of study aids for exams like SAT and GRE, the company's product line grew out of Sliwa's thinking back to his own experience preparing for these kinds of tests. Sliwa asked himself what kinds of tools he would have liked to have on the Apple. SEI's *Verbal Skills Pak, Math Skills Pak*, and German, French, and Spanish programs are his answer.

The *Verbal Skills Pak* consists of three programs—*Vocabulary Builder, Word Analogy,* and *Sentence Completion* (all three available individually). The most recent version of *Word Analogy* offers learners a hint option. Part one of the *Math Pak* helps students improve their skills in precalculus algebra, geometry, and trigonometry; then in part two, learners move into more advanced geometry and trigonometry, accompanied by graphic displays of the problems (both parts of math are also available individually). The language skills programs can be used to move from foreign language to English or from English to the foreign language, depending upon preference.

All of SEI's programs have a database format and an editor that allows the user to add to and alter data lists. This makes the programs versatile, ongoing tools for learning. SEI also plans to release two new programs soon, both in the expandable/modifiable database format. The first is *Acronyms/Abbreviations* (quick, what does SEATO stand for, anyway? . . . how about RBI?). The second, *Foreign English*, is a database of foreign words and phrases that are used in everyday English. It gives users the correct translation (in either direction), pronunciation, language of origin, and literal translation, if necessary.

Sterling Swift Publishing Company, 1600 Fortview Road, Austin, TX 78704; (512) 444-7570. Contact: Wayne Roe, Sterling Swift.

This well-established book publisher offers numerous books about computers, including *Computer Literacy: Problem Solving with Computers*, a text intended for use by junior/senior high and college students with no previous experience with computers; *Computers and Education*, a handbook for educators; and *Microcomputer Systems and Apple Basic*, an introductory level text on operating the Apple and programming in Basic. Teachers and parents will find the company's *Apple II Educational Software Directory*, published in collaboration with Apple Computer, an especially valuable source of information.

Sterling Swift also publishes a "hands-on" tutorial on programming in Basic, consisting of two disks (or four cassette tapes) and a workbook. Designed to be used while the learner is seated at the computer, the workbook covers branching, for-next loops, arrays, character strings, functions and subroutines, graphics, advanced topics, and applications.

The company has recently issued an on-line learning system designed for use in teaching elementary mathematics. This class-tested software was written by three former classroom teachers whose company is called Courses by Computers. This is the only program of this sort we know of that is offered in both English and Spanish.

Making Connections. In an earlier installment of this column, we brought up some pressing questions. One was: How can educators, parents, and others with an interest in educational software determine what's out there and whether it meets their needs without wasting precious time and money? Regional evaluation centers, clearinghouses, and monthly

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publications have sprung up across the country in response to the need for accurate information about software. Now TERC (Technical Education Research Centers), a nonprofit research/development organization based in Cambridge, Massachusetts, hopes to provide an answer. TERC plans to bring together users and experts across the country by taking advantage of the very technology it is conveying information about.

Since its inception in 1965, TERC's concern has been the study of social and technological change. Their goal has been to apply their knowledge to the improvement of education. In recent years TERC has devoted much effort toward the promotion of microcomputers in the classroom. Now TERC is in the process of establishing SET-NET (Software and Educational Technology Network). This experimental electronic network is designed to test whether an electronic network is a viable way of providing educators with useful information and educational software evaluations at a reasonable cost. Another goal of the SET-NET experiment is to develop three pilot databases—one on Logo procedures, another on software reviews emphasizing science and math programs, and a third on educational software for the handicapped.

To conduct its experiment, TERC is bringing together a small network of educational software experts and users who will share information with one another via the Source and EIES (Electronic Information Exchange System, run by the New Jersey Institute of Technology). SET-NET participants will include a core group of twenty educational software experts (five general experts and five experts in each of the three applications areas). Once the three pilot databases have been created, a group of teachers and school librarians in the Boston area will use SET-NET and evaluate it and the databases. Plans call for expanding SET-NET and its databases if the initial experiment is successful. This means that educators across the country may eventually be able to take advantage of SET-NET via the Source and/or the EIES networks. A report on the project is being prepared now, as is a detailed plan for a year-long test of the SET-NET. Further information can be obtained from TERC, 8 Eliot Street, Cambridge, MA 02138; (617) 547-3890.

Conference Calendar. Computer-Using Educators (CUE) will hold its third annual fall conference October 1 and 2 at Independence High School in San Jose, California. The conference features hands-on workshops Friday afternoon (preregistration required), a Friday evening banquet, and speakers, workshops, and exhibits all day Saturday. You can obtain further information by contacting: Computer-Using Educators, Box 18547, San Jose, CA 95158; (408) 288-7642.

The Educational Computer Consortium of Ohio (ECCO) has announced that its second annual Educational Computer Fair will take place October 16 at Cleveland State University in Ohio. Described as "a fair by educators, for educators," the event will feature forty workshops for beginning and experienced computer users, along with discussion groups, exhibits, and student demonstrations. The presentations should be of interest to educators of kindergarten through twelfth-grade students. You can obtain further information by contacting Ellen Richman, ECCO Coordinator, 4777 Farnhurst Road, Cleveland, OH 44124; (216) 291-5225.

EdCom '82, a National Computer Expo and Conference for Educators, will be held October 21 through 24 at the Los Angeles Convention Center. Cosponsored by *Educational Computer Magazine*, this four-day conference will feature seminars, workshops, and exhibits designed to interest educators working in a whole range of educational settings, from early childhood through higher education. Topics of the scheduled presentations include administration, graphics, literacy, management, programming, research, and special education. For more information about how to register or about how to reserve exhibit space, contact Judco Computer Expos, 2629 North Scottsdale Road, Suite 201, Scottsdale, AZ 85257; (800) 528-2355. Contact: Carol Houts. ■

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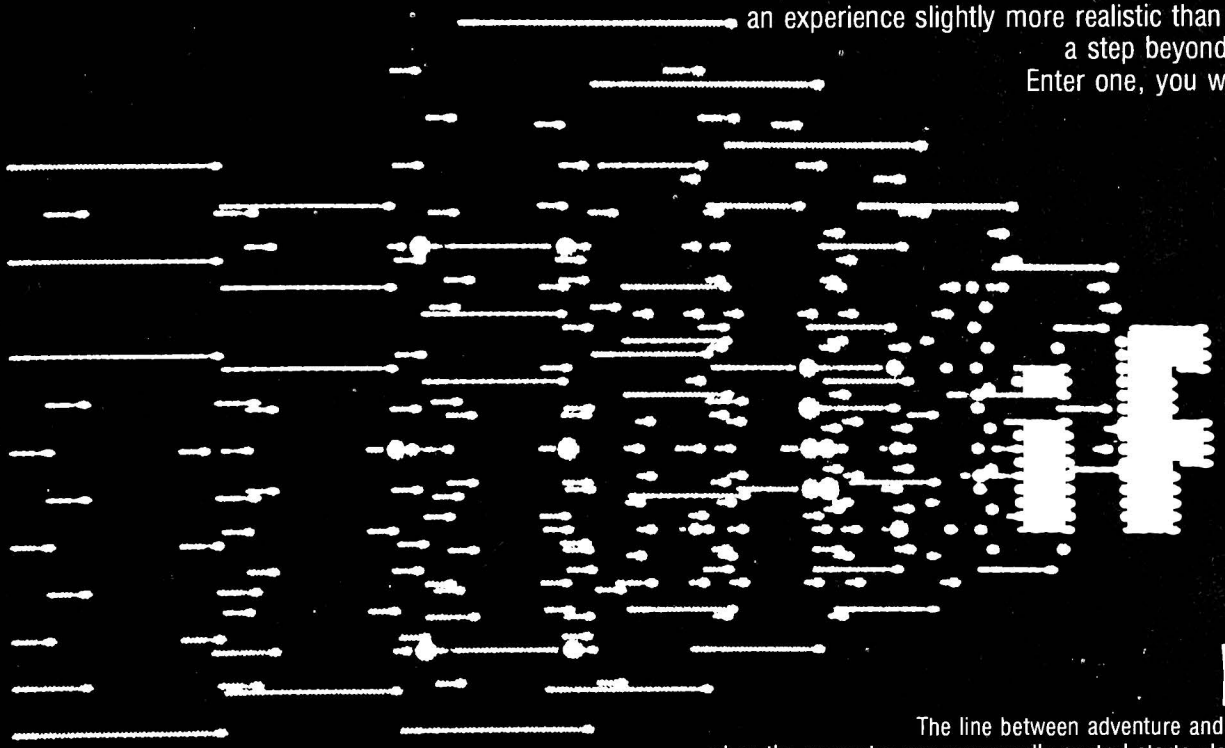
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THE BASIC Solution

By Wm. V. R. Smith

Among the most valuable computer programs ever written for the business marketplace are the spreadsheet calculators. Electronic spreadsheets have become as valuable to the business marketplace as Basic is to the beginning programmer.

This month's Basic Solution offers *BasiCalc,* an electronic worksheet in Basic that is easy to use and readily expands to fit your system. An electronic calculator at heart, *BasiCalc* contains the basic mathematical functions, some spreadsheet functions, and various styles of data representation.

BasiCalc brings together many of the Basic subroutines that have appeared in this column during the past year. The first Basic subroutine, *Dollar Formatter,* is utilized in the global default output section of *BasiCalc. Video Tape Calculator* was the main catalyst for *BasiCalc.*

The subroutine that is the heart of *BasiCalc* is the *Input Calculator* from the February 1982 issue. This one routine performs string array parsing and all the math functions of *BasiCalc.*

BasiCalc uses two string arrays. The first one can be called the input array. The user types into a cell of this input array, and the *Input Calculator* scans each cell and tries to perform its function. The result from the input calculator is sent through *Dollar Formatter,* if necessary, and then placed in the adjoining cell of the second array. Each cell of the output array is truncated or expanded according to the column-width value.

The second array can be called the output array. *BasiCalc* reads each cell of the output array and presents the proper cells on the video screen.

Many other routines could be added to *BasiCalc,* but bear in mind that each addition increases the chance of the Basic program becoming large enough to cause string memory problems.

Applesoft has an irritating habit of "going away" for a few seconds to a few minutes to clean up the array space. The current version of *BasiCalc* was constructed to avoid this problem. All Applesoft programs will benefit as soon as a fast "free" routine is invented.

BasiCalc uses a worksheet of ten columns by seventy lines. The screen display is twenty lines of thirty-seven characters. Each column width can be individually adjusted to your requirements. Columns are labeled A through J, and lines are labeled 1 through 70. Answer cells are addressed by column letter and row number; for example, A1 through J70.

BasiCalc starts with an inverse bar over location A1.

The top right hand corner of the video screen has an indicator that shows the current cursor directions. The space bar changes the direction of the indicator. The arrow keys move the inverse bar around the worksheet. If the indicator is horizontal, the inverse bar moves from left to right. When the indicator is vertical, the inverse bar moves up and down.

After you've placed the inverse bar over a location and typed a string or expression, *BasiCalc* will evaluate the expression and place the evaluation under the inverse bar.

Mathematical expressions such as 12 − 3 * 10 are evaluated from left to right. Expressions may contain answer cells as values, such as 4 + A5 * B3; *BasiCalc* looks up the values of A5 and B3 and then evaluates the expression. If an error is found, the answer cell contains a copy of the expression itself.

The usable functions are +, −, *, and /. Parentheses are not functions, but the program can be modified to accept them as such.

Answers are automatically converted to dollar format. Unless the expression contains a value control, *BasicCalc* uses a colon and a value control symbol. :I converts the value to an integer; :$ converts to dollar value; :F converts to floating point; :* converts the answer to graph mode.

There are a number of immediate mode commands. The arrow keys are immediate commands that move the inverse bar. The space bar changes the indicator direction; @ clears an answer cell; "!" recalculates the entire sheet; and "/" places you in the command menu.

The command menu contains the following options: change current column width; save work page; load work page; clear page; go to page location; and print to paper.

The ampersand, &, initializes the sum function that adds a row or column of numbers together.

It is important to note that there are no *Onerr* statements in the listing. *Onerr* statements can cause a world of problems when typing and debugging a long program. Typing errors are much easier to find in code without *Onerr* statements. *BasiCalc* eventually requires an *Onerr* statement only to trap control-C.

We strongly recommend compiling the Applesoft listing that follows. The Basic program operates remarkably fast; however, once you're familiar with its operation, Applesoft's fastest may seem pretty slow.

A major reason for writing a program in Basic is ease of modification. If you think you've found a significant modification for *BasiCalc,* send it to Softalk BasiCalc, 11021 Magnolia Boulevard, North Hollywood, CA 91601. If your routine is the first chosen to be added permanently to *BasiCalc* you'll win a copy of that other *Calc*, and your update will be published in Basic Solution.

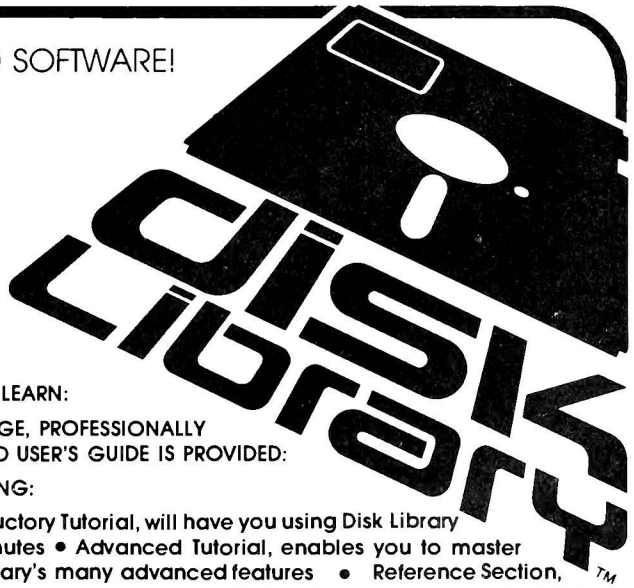
BasiCalc *is also available on disk. Included on the disk is the spreadsheet in Basic and in compiled form using two of the popular Applesoft compilers. If you're interested in receiving this disk send $8 to Softalk BasiCalc Disk, 11021 Magnolia Boulevard, North Hollywood, CA 91601.*

```
10  REM * ****************************
11  REM *                            *
12  REM *    ELECTRONIC WORKSHEET    *
13  REM *                            *
14  REM *                            *
15  REM *       WILLIAM V R SMITH    *
16  REM *                            *
17  REM * ****************************
18  REM
19  CLEAR : DIM A$(70,10),B$(70,10),CW(12),IV(50)
20 SY = 1:XM = 1:YM = 1:SX = 1
30  FOR X = 1 TO 12:CW(X) = 9: NEXT X
35 S$ = "                    "
37 T$ = "ABCDEFGHIJKLMNO"
38 T1$ = "**********"
99  GOTO 2000
100  REM ****************************
101  REM *       VARIABLE PARSER      *
102  REM ****************************
103 L = LEN (A$(Y,X)):F = 2:A1 = 0:A2 = 0:P = 1:H$ = "":OF = 1
105  IF L = 0 THEN 400
110  IF P > L THEN 400
```

```
115  GOSUB 500
130  IF C > 64 THEN GOSUB 450: IF P > L THEN RETURN
135  IF C = 46 THEN 170
140  IF C > 41 AND C < 48 THEN GOSUB 200:F = C - 41: GOTO 110
150  IF C = 38 THEN 700
160  IF C > 47 AND C < 58 THEN 170
162  IF C = 58 THEN 900
165  GOTO 400
170 H$ = H$ + CHR$ (C): IF P > L THEN GOSUB 200: GOTO 600
180  GOSUB 500: GOTO 130
200 A2 = VAL (H$):H$ = "": GOSUB 300: REM FUNCTION
210  RETURN
220  REM * INPUT STATEMENT **
225 IV = 1:I$ = "": GOTO 235
230  IF LEN (I$) = 0 THEN A$ = "": RETURN
235  GET A$
240  IF A$ = CHR$ (8) THEN L = LEN (I$):I$ = MID$ (" " + I$,2,L - 1): HTAB 1:
     PRINT I$;: CALL - 868: GOTO 230
245  IF A$ = CHR$ (21) THEN 275
250  IF A$ = CHR$ (13) THEN 280
255  IF ASC (A$) < 31 THEN 235
260 I$ = I$ + A$
265  HTAB 1: PRINT I$;
270 IV = IV + 1: GOTO 235
275 A$ = MID$ (A$(Y,X),IV,1): GOTO 260
280  IF IV = 1 THEN A$ = "": RETURN
285 A$ = I$: RETURN
300  REM ************************************
301  REM *                                  *
302  REM *       PERFORM MATH FUNCTION      *
303  REM *                                  *
304  REM ************************************
305 F1 = F:F = 2
310  ON F1 GOSUB 330,340,320,350,320,370
320  RETURN
330 A1 = A1 * A2: RETURN
340 A1 = A1 + A2: RETURN
350 A1 = A1 - A2: RETURN
370  IF A2 <    > 0 THEN A1 = A1 / A2
380  RETURN
399  END
400 H$ = MID$ (A$(Y,X),1,L) + "                "
405 H$ = LEFT$ (H$,CW(X))
406  IF H$ = B$(Y,X) THEN RETURN
407 B$(Y,X) = H$
409  GOSUB 680: REM * XM AND YM TEST
410  RETURN
440  REM ************************
441  REM *                      *
442  REM *   FIND MATH VALUE    *
443  REM *   OF SCREEN          *
444  REM ************************
450 X3 = C - 64
451  IF X3 > 15 THEN GOSUB 400: RETURN
452 H$ = "": IF L = 1 THEN 400
453  GOSUB 500: IF C < 48 OR C > 57 THEN GOTO 400
454  GOTO 460
455  GOSUB 500
460  IF C < 48 OR C > 57 THEN 470
465 H$ = H$ + CHR$ (C)
466  IF P > L THEN 470
467  GOTO 455
470 Y3 = VAL (H$)
475  IF Y3 > 70 OR X3 > 15 THEN H$ = "ERROR":P = L + 1: GOTO 620
480 H$ = B$(Y3,X3)
485  GOSUB 200
490  IF P > L THEN GOSUB 600: RETURN
495  RETURN
500  REM *** PARSE LINE FOR CHAR
510 C = ASC ( MID$ (A$(Y,X),P,1)):P = P + 1
520  RETURN
600  REM ******************************
601  REM *                            *
602  REM *       ASSIGN ANSWER        *
603  REM *                            *
604  REM ******************************
610  IF A$(Y,X) = "" THEN RETURN
615  IF LEN ( STR$ ( INT (A1))) > CW(X) THEN H$ = "ERROR"
620  ON OF GOSUB 640,650,660,670
625  IF OF = 4 OR OF = 1 THEN 675
630 B$(Y,X) = RIGHT$ ("          " + STR$ (A1),CW (X))
635  GOTO 675
```


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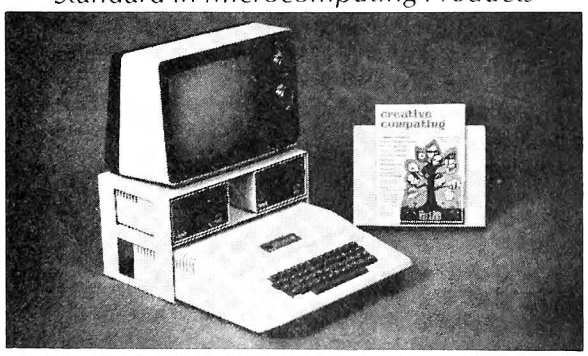
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```
640 A3 = INT (A1):A1 = (A1 - A3) + 1.001:H$ = STR$ (A3) + "." + MID$ (STR$
    (A1),3,2)
645 B$(Y,X) = RIGHT$ (S$ + H$,CW(X)): RETURN
650 A1 = INT (A1): RETURN
660  RETURN
670 A1 = INT (A1): IF A1 > 20 THEN A1 = 20
671  IF A1 < 1 THEN A1 = 1
672 B$(Y,X) = LEFT$ ( LEFT$ (T1$,A1) + "        ",CW(X))
673  RETURN
675 OF = 1
680  IF X > XM THEN XM = X
681  IF Y > YM THEN YM = Y
690  RETURN
700  REM **** SUM(FUNCTION)
710 P = P + 4: GOSUB 500
720  GOSUB 450:Y4 = Y3:X4 = X3
730  GOSUB 500: GOSUB 450
740 A1 = 0:A2 = 0:X5 = X3:Y5 = Y3
750  IF Y4 = Y5 THEN 800
760 X3 = X4: FOR Y3 = Y4 TO Y5
765 P = 1
770  GOSUB 480
780  NEXT Y3
790  GOSUB 600: RETURN
800 Y3 = Y4: FOR X3 = X4 TO X5
810  GOSUB 480
820  NEXT X3
830  GOSUB 600: RETURN
900  REM * OUTPUT FORMAT *
905  GOSUB 200: GOSUB 500
910  IF C = 36 THEN OF = 1: GOTO 600
920  IF C = 73 THEN OF = 2: GOTO 600
930  IF C = 70 THEN OF = 3: GOTO 600
940  IF C = 42 THEN OF = 4: GOTO 600
950  GOTO 600
1000  REM ***************************
1001  REM *     VIDEO SCREEN LAYOUT     *
1002  REM ***************************
1099  NORMAL
```


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```
1100  FOR Y1 = 1 TO 70
1103  VTAB 1: HTAB 25: FLASH : PRINT "WORKING";
1105  IF Y1 > YM THEN Y1 = 100. GOTO 1180
1110  FOR X1 = 1 TO 9
1111  IF A$(Y1,X1) = "" THEN NEXT X1: GOTO 1180
1112  VTAB 1: HTAB 34: PRINT MID$ (T$,X1,1);Y1;" "
1115  IF X1 > XM THEN X1 = 100: GOTO 1170
1121 X2 = X:Y2 = Y
1122 X = X1:Y = Y1
1125  GOSUB 100
1140 X = X2:Y = Y2
1170  NEXT X1
1180  NEXT Y1
1185  GOSUB 1500
1186  VTAB 1: HTAB 25: CALL - 868
1190  RETURN
1300  REM ***************************
1301  REM *     SCREEN VALUE PRINTER     *
1302  REM ***************************
1305 CW(0) = 0
1306  IF CW(X) < > LEN (B$(Y,X)) THEN GOSUB 100
1307  IF X = SX THEN CO = 3: GOTO 1330
1310 CO = 0: FOR X2 = SX TO X - 1:CO = CO + CW(X2): NEXT X2:CO = CO +
     3
1330  VTAB Y + 5 - SY: HTAB CO
1340  PRINT B$(Y,X);
1399  RETURN
1500  REM *********************
1501  REM *                   *
1502  REM *     SCREEN PRINT     *
1503  REM *                   *
1504  REM *********************
1550  VTAB 4: HTAB 1
1600  INVERSE
1602  PRINT "  ";:MT = 10
1603 PP = 0: FOR FX = SX TO 10:PP = PP + CW(FX): IF PP > 37 THEN MT = FX -
     1:FX = 11
1604  NEXT FX
1605  FOR FX = SX TO MT
1606 H = CW(FX) / 2:H1 = INT (H):H2 = INT (H - .2)
1609 H$ = LEFT$ (S$,H1) + MID$ (T$,FX,1) + LEFT$ (S$,H2)
1610  PRINT H$;
1612  NEXT FX
1613  CALL - 868
1614  VTAB 5: HTAB 1
1615  FOR FX = SY TO 18 + SY: PRINT FX;: IF FX < 10 THEN PRINT " ";
1616  PRINT : NEXT FX
1617  VTAB 5
1618  NORMAL : POKE 32,2: POKE 33,38: VTAB 5: CALL - 958: POKE 32,0: POKE
      33,40
1619 A = SX:T = 3
1620  VTAB 5
1621  FOR X1 = 0 TO 18
1625  HTAB T: PRINT B$(SY + X1,A)
1800  NEXT X1
1850 T = T + CW(A):A = A + 1: IF A = < MT THEN 1620
1999  RETURN
2000  REM *********************
2001  REM *                   *
2002  REM *   PROMPT OF INPUT   *
2003  REM *                   *
2004  REM *********************
2005 DF = 1
2006  HOME
2010  GOSUB 1500
2020 X = 1:Y = 1
2030  VTAB 1: HTAB 1: PRINT MID$ (T$,X,1);Y;"  "
2035  VTAB 2: HTAB 1: PRINT A$(Y,X);
2050  INVERSE
2060  GOSUB 1300
2070  NORMAL
2080  GOTO 2220
2090  REM ***************************
2091  REM *                         *
2092  REM *     INPUT AND PERFORM     *
2093  REM *                         *
2094  REM ***************************
2100 A = PEEK ( - 16384): IF A < 127 THEN 2100
2102 A = A - 128:A$ = CHR$ (A)
2103  IF A = 47 THEN 4000
2104  IF A > 43 THEN 2255
```

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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.

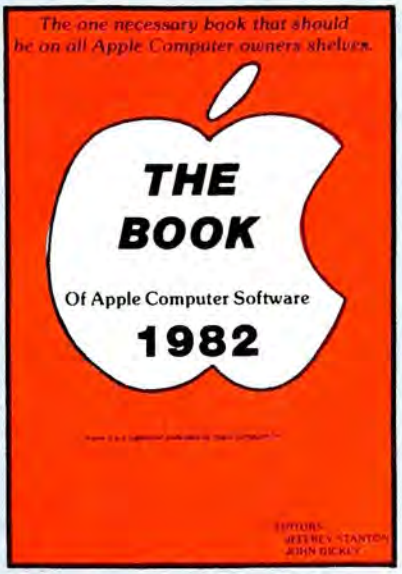
Other pitfalls await the uninformed buyer. For instance, In too many cases you cannot by the appearance of the package whether the program requires Integer Basic or Applesoft Basic or whether it needs 16, 32 or 48K of RAM. It is also often difficult to tell when you purchase a program on tape whether 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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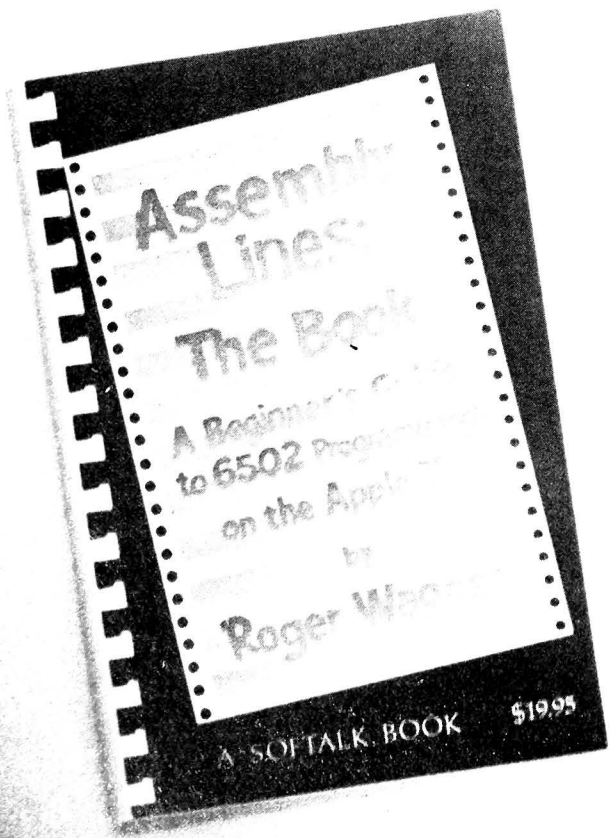
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```
2105  IF A = 33 THEN GOSUB 1300: GOSUB 1000: GOTO 2050
2106  IF A = 21 THEN 2113
2107  IF A = 8 THEN 2160
2108  IF A = 32 THEN 2200
2110  IF A = 38 THEN 2300
2111  IF A = 34 THEN GET A$: GOTO 2255
2112  GET A$: GOTO 2090
2113  GOSUB 1300
2114  ON DF + 2 GOTO 2115,2140,2130
2115 X = X + 1: IF X > 10 THEN X = 10: INVERSE : GOSUB 1300: NORMAL :
     GOTO 2900
2116  IF X > MT THEN SX = SX + 1: GOSUB 1500: GOTO 2116
2120  INVERSE : GOSUB 1300: NORMAL : GOTO 2900
2130 Y = Y + 1: IF Y > 69 THEN Y = 69: GOTO 2135
2133  IF Y > 18 + SY THEN X3 = - 1:SY = SY + 10:Y = SY + 18: IF Y > 69 THEN
     Y = 69:SY = 69 - 18
2134  IF X3 = - 1 THEN GOSUB 1500:X3 = 0
2135  INVERSE : GOSUB 1300: NORMAL
2140  GOTO 2900
2150  REM
2160  ON DF + 2 GOTO 2170,2190,2180
2170  GOSUB 1300
2175 X = X - 1: IF X > = SX THEN INVERSE : GOSUB 1300: NORMAL : GOTO
     2900
2176 SX = SX - 1: IF X = 0 THEN X = 1:SX = 1: GOTO 2179
2177  GOSUB 1500
2179  INVERSE : GOSUB 1300: NORMAL : GOTO 2900
2180  GOSUB 1300
2182 Y = Y - 1: IF Y = > SY THEN INVERSE : GOSUB 1300: NORMAL : GOTO
     2900
2183 SY = SY - 10:Y = SY: IF Y < = 0 THEN Y = 1:SY = 1
2184  GOSUB 1500
2185  INVERSE : GOSUB 1300: NORMAL : GOTO 2900
2200  REM *****************************
2201  REM *                           *
2202  REM *  SHOW CURSOR DIRECTION    *
2203  REM *                           *
2204  REM *****************************
2205  REM
2210 DF = DF * - 1
2220  VTAB 1: HTAB 38
2230  ON DF + 2 GOTO 2231,2240,2235
2231  PRINT "-";: GOTO 2240
2235  PRINT "!";: GOTO 2240
2240  GOTO 2900
2250  REM ** INPUT STRING FOR PAGE
2251  REM
2252  GOTO 4000
2254  IF A$ = "&" THEN 2300
2255  VTAB 2: HTAB 1: PRINT A$(Y,X);: VTAB 2: HTAB 1: GOSUB 220
2256  REM
2257  IF A$ = "" THEN 2270
2258 A$(Y,X) = A$
2260  GOSUB 100
2270  GOTO 2030
2300  REM ** SUM STATEMENT **
2310  POKE - 16368,0
2320  VTAB 1: HTAB 1: CALL - 868
2330  VTAB 2: INPUT "SUM(START = ";A$
2350  VTAB 2: CALL - 868: PRINT "SUM(";A$;" THRU ";: INPUT "";B$
2360  VTAB 2: HTAB 1: PRINT "SUM(";A$;" THRU "B$;")"
2365  IF A$ = "" OR B$ = "" THEN 2900
2370 A$(Y,X) = "&SUM(" + A$ + "-" + B$ + ")"
2380  GOSUB 100: GOTO 2030
2900  VTAB 1: HTAB 1: PRINT MID$ (T$,X,1);Y;"    "
2904  VTAB 2: HTAB 1: PRINT A$(Y,X);
2905  CALL - 868
2907  POKE - 16368,0
2910  GOTO 2100
4000  REM *********************************
4001  REM *                               *
4002  REM *   HANDLE GLOBAL COMMAND       *
4003  REM *                               *
4004  REM *********************************
4005  POKE - 16368,0
4006  VTAB 2: HTAB 1: CALL - 868
4010  INPUT "1-WIDTH 2-SAVE 3-LOAD 4-CLEAR 5-GOTO LOCATION
     6-PRINT";A$
4015  ON VAL (A$) GOTO 4020,5000,5500,19,6000,7000
4016  GOTO 6000
4020  VTAB 2: CALL - 868: INPUT "WIDTH = ";A$:A = VAL (A$): IF A > 30 THEN
     4020
4030 CW(X) = A
4040 YH = Y
4050  FOR Y = 1 TO YM: GOSUB 400: NEXT Y
4060 Y = YH
4140  GOSUB 1100
4150  GOSUB 5900: GOTO 2030
```

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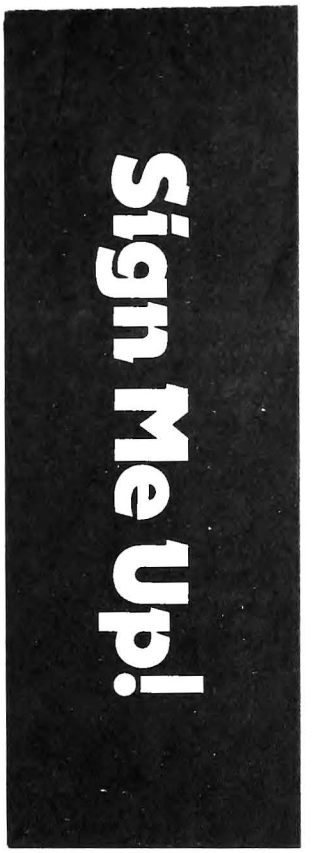
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```
5000  REM*********************
5001  REM*                   *
5002  REM*       DISK I/O    *
5003  REM*                   *
5004  REM*********************
5100  REM * FILE OUT *
5105  GOSUB 5900
5110  VTAB 2: HTAB 1: CALL - 868
5120  PRINT "SAVE FILE TO DISK FILENAME = "
5130  INPUT "";A$
5140  IF A$ = "" THEN GOSUB 5900: GOTO 2030
5146  VTAB 1: HTAB 1: PRINT
5150  PRINT CHR$ (4);"OPEN ";A$
5160  PRINT CHR$ (4);"WRITE ";A$
5165  PRINT XM: PRINT YM
5170  FOR X = 1 TO XM
5180  PRINT CW(X)
5190  FOR Y = 1 TO YM
5200  PRINT A$(Y,X)
5210  NEXT Y
5220  PRINT "<>"
5230  NEXT X
5240  PRINT "<>"
5250  PRINT CHR$ (4);"CLOSE"
5255 Y = 1:X = 1
5260  GOTO 7230
5500  REM * FILE IN *
5510  HOME : PRINT CHR$ (4);"CATALOG"
5549  VTAB 1: HTAB 1
5550  PRINT "READ FILE FROM DISK FILENAME = "
5560  GOSUB 220: PRINT "": IF A$ = "" THEN GOSUB 5900: GOTO 2000
5565  PRINT CHR$ (4);"UNLOCK";A$
5570  PRINT CHR$ (4);"OPEN ";A$
5580  PRINT CHR$ (4);"READ ";A$
5590  INPUT XM: INPUT YM
5600  FOR X = 1 TO XM
5610  INPUT CW(X)
5620  FOR Y = 1 TO YM
5630  GOSUB 220:A$(Y,X) = A$
5640  NEXT Y
5650  INPUT B$: REM ERROR IF NOT <>
5660  NEXT X
5670  INPUT B$: REM ERROR IF NOT <>
5675  PRINT CHR$(4);"CLOSE"
5677  GOSUB 5900
5678 X = 1:Y = 1
5680  GOSUB 1000: GOTO 2020
5900  VTAB 1: HTAB 1: CALL - 868
5910  VTAB 2: HTAB 1: CALL - 868
5920  VTAB 3: HTAB 1: CALL - 868
5930  RETURN
6000  REM ** GOTO LOCATION
6005  GOSUB 6010: GOTO 2030
6010  GOSUB 5900
6030  VTAB 2: HTAB 1: INPUT "GO TO PAGE LOCATION :";A$
6040  GOSUB 6200
6050  IF X1 + Y1 = 0 THEN RETURN
6180 X = X1:SX = X1:Y = Y1:SY = Y1
6185  GOSUB 1500
6190  INVERSE : GOSUB 1300: NORMAL : RETURN
6200 L = LEN (A$): IF L < 2 THEN X1 = 0:Y1 = 0: RETURN
6210 X1 = ASC ( LEFT$ (A$,1)) -64
6220  IF X1 < 1 OR X1 > 10 THEN X1 = 0: RETURN
6230 Y1 = VAL ( RIGHT$ (A$,L - 1))
6240  IF Y1 < 1 OR Y1 > 50 THEN X1 = 0:Y1 = 0
6250  RETURN
7000  REM *** PRINT OUT
7100  GOSUB 5900
7110  VTAB 2: HTAB 1: INPUT "UPPER/LEFT CORNER:";A$: GOSUB 6200
7120 X3 = X1:Y3 = Y1
7130  VTAB 2: HTAB 1: INPUT "LOWER/RIGHT CORNER :";A$: GOSUB 6200
7140 X4 = X1:Y4 = Y1
7150  PRINT CHR$ (4);"PR#1"
7160  FOR Y1 = Y3 to Y4
7170  FOR X1 = X3 TO X4
7180  PRINT LEFT$ (B$(Y1,X1) + S$,CW(X1));
7190  NEXT X1
7200  PRINT
7210  NEXT Y1
7220  PRINT CHR$ (4);"PR#0"
7230 X1 = 1:Y1 = 1: GOSUB 6180: GOTO 2030
```

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 $8.00 (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.

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One sign of the vitality of the Apple marketplace was the number of women in key positions. From the left: Bessie Chin, author of PFS: Graph from Software Publishing Corp.; Doreen Lawrence, general manager of Great Lakes Digital Resources; Grace Zimmerman, marketing manager of Microcom; Kathy Brodley, sales rep for Sirius Software; Judy Londau, Applied Software Technology, showing potential customer Bob Amiro her husband's Versaform program; Lisa Schachter, sales education rep for VisiCorp; and Mary Carol Smith, president of Avant-Garde. Big companies were there also: Rick Lewark represented Dow Jones; major board game producer Avalon Hill was represented by Richard Bomberg, Jackson Dott, William Volk, Dott's June bride Robin, and Greg La Flamme; and, of course, the group from Apple.







Some of the software authors demoing their products were from left: Virginia Lawrence and Steve Madigan of Human System Dynamics; Richard Orban of Riverbank; Michael Berlyn of Sentient, shown with Alan and Barbara Garber from Sentient's business side; and Roger Tuttleman of Sensible Software. Other software purveyors were Ron Ericson for Piccadilly and John Lund for Great Plains Software. Phil Wershba of Southern California Research Group showed his keyboard adapter. Among the vendors of monitors were Tom Cunningham from Sanyo and the Electrohome group of Don Leach, Jim and Betsy Piper, Cathy Mello, and Jim Stewart.







Talking Apples were much in evidence: Andy Clare showed Echo from Street Electronics; Jim Anderson demoed the Mimic speech synthesizer, and F. William Shea touted the Type-'N'-Talk program from Votrax. There were dozens of vendors with thoughtful peripheral solutions to Apple user problems. Among them were Tim Farris of Quadram with the Microfazer printer buffer; Michael Mock of Rana Systems with floppy disk drives; Tom Knowles of Corona Data Systems with a five-megabyte hard disk; Gary Angel of Practical Peripherals with the Microbuffer printer buffer, and John Nosek of Xebec with a hard disk kit. Other business was conducted at the Fest: Phil Wood and John Sullivan of distributor Leading Edge chat with DataMost's Dave Gordon.

apple fest

Macro Convention of Micro Folk

More than 200 exhibitors showed in excess of 7,000 products at Moy's Applefest in Boston. They were bidding for the attention of approximately 20,000 attendees during the three-day affair. Apple furniture is getting to be a big and sophisticated business: Elizabeth Hovey showed off the Station II from Troce, while Frank Jedziniak proffered the Cool Stock Sentry II. Industry insiders present but not exhibiting included Silas Warner of Muse and Patrick Dillon of Berliner Computer. The most specialized interest group present was the Zork Users Group, represented by Deborah Deutsch, Eric Meretsky, and Rocky Cordausco.






Different approaches to graphics were evident. Stoneware introduced the Graphics Processing System, which uses a graphics tablet. Involved were Susan and Mike Belling, Ron Lubmon, Frank Diffley, Ken Klein, and Richard Blum. Daniel Johnson of Cascade Graphics Development showed an Apple-aided drafting system. Kile Mullen of Computer Station demoed the Computer Portrait Subsystem, which uses a dithertizer; and David Turner of Interactive Structures presented Pkoso, a graphics dump program. Esoteric applications included a laboratory automation system from Cyborg, shown by Mead Sommers and Joe Caruso; interactive video from Covri, demoed by Alison Roth, Robin Maddern, Eleanor Seaman, and Chris Pino; a four-color data plotter from Houston Instruments, shown by Paul Kowalski of J. M. Lancaster; and Strawberry Tree's temperature probe for controlling both home and industrial processes, shown by Walt Maclay.





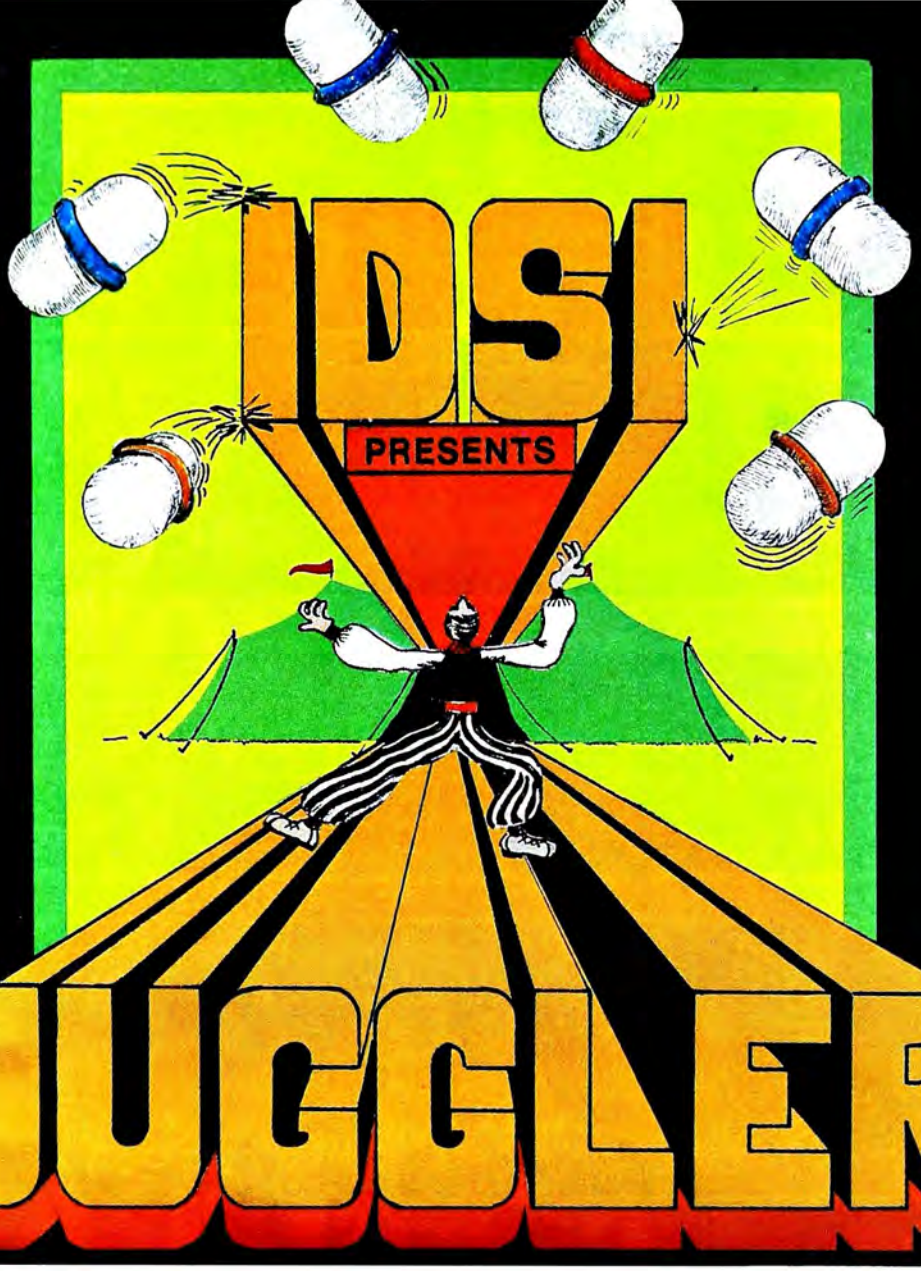

There were word processors for every taste and application. John Risken of Sof/Sys displayed Executive Secretary; Armond Miloni and John Wagner introed Gutenburg, which is something more than a word processor and something less than a printing press; Kensington's Phil Damiano touted Format II as a challenger to WordStar; David Guest, Wendo Volpe, and Bryon Freedman displayed Beamon Porter's PowerText; Dr. Charles Stillman of Action-Research Northwest tub-thumped the Australian-bred Zardax; and Roger Feoring repped Magic Window. Investors had plenty to ogle also. Russell Lewis (right) explained Stock Market Software products to potential buyer C. L. Bonkhead; Alan Friedman and Tom Tesser displayed the integrated Applecations software.








The Windy City was repped by the micro folks: Dave Albert and Patricia Glenn of Micro Co-op; Robin Freeman, Martha Erickson, Stan Goldberg, Evelyn Berg, and Kathy Cooper of Micro Lab. User groups were prominent. Tracy Licklider helped out at host Boston Computer Society's booth; Sally Davies and Kevin Donahoe manned the A.P.P.L.E. booth for the largest user group in the country; Peter Weiglin, a new editor and publisher of Apple Orchard, covered International Apple Core meetings held in conjunction with the Fest. Educational software publishers were prominent, including R. C. Smith and Janet Dight of Universal Systems for Education; Bruce Friedland and Jack Cohen of Krell; Tim and Jane Hartley of Hartley Courseware; and Jean Gard and George Murphy of SRA.



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All About Applesoft

by Doug Carlston

This month we're going to return to word processing, which we fiddled around with a bit a couple of months ago. We'll design a routine that permits you to write one-page memos and then save them to disk (assuming you have a disk drive). The routine is straightforward and uses a lot of the techniques we have employed heretofore (which is the sort of thing certain authors always say right before they throw you a tight curve).

Here's the new vocabulary:

POKE 32,n	POKE 34,n	POKE 35,n
BLOAD	BSAVE	POP
	PEEK (37)	

The Text Window. Let's start by recalling a command that we first used in February when we were learning the editing commands. *Poke 33,33* changed the width of the text window from its usual forty columns to thirty-three. Turn on your Apple and enter the following command:

```
HOME: POKE 32,10: POKE 33,20: POKE 34,10:
      POKE 35,15: VTAB 11
```

Now type anything on the keyboard and watch the screen. What we have done is shrink the text window by *poking* in the four borders. The four commands work like this:

Poke 32,10 moves the *left-hand margin* over to column eleven (column one is *poke 32,0*).

Poke 33,20 sets the *width* of the text window to twenty columns. The right-hand margin is equal to the left-hand margin plus the window width, in this case, column thirty-one.

Poke 34,10 sets the *top margin* to row eleven.

Poke 35,15 sets the *bottom margin* to row sixteen.

Let's not get into the question of whether or not these four definitions seem a little inconsistent. As Emerson said, "A foolish consistency is the hobgoblin of little minds, adored by little statesmen and philosophers and divines." Not a word about programmers there!

If your cursor is outside your newly poked window, it may behave erratically. If you *poke* in strange things, like bottom margins that are above your top margins, you may expect your Apple to respond in kind. If matters really get out of hand and you would like nothing so much as to make a quick exit to normalcy, type *text* and all will be forgiven.

Saving Binary Files. This next part is just for those with disk drives. Any part of your Apple's memory can be saved to disk simply by using the *bsave* command (it stands for binary save), followed by the starting point in memory and the length of the area to be saved. To test this out, boot a disk with some free space on it. Then clear the screen and type yourself a reminder to order subscriptions to *Softalk* for all your friends for Christmas (you can never plan too far ahead). When you're finished, press return. You will probably get a message saying "syntax error" since your Apple thought you were trying to tell it something and since *Christmas* is not a valid Applesoft command.

Now type the following line:

```
BSAVE MESSAGE,A1024,L1024
```

Your disk will whir away for a couple of seconds. Type *catalog* and you will see a new file called Message on the disk. The B in front of it tells you that Message is not an Applesoft program at all, but a binary file. Next, clear the screen or, even better, turn the computer off and then on again. Your message is forever lost unless you can recover it from the disk. So try typing this:

```
BLOAD MESSAGE
```

There it is! Everything comes back, just the way you left it before you turned the Apple off. Now let's figure out what we've done. The *bsave* command has to be followed by two parameters. The first is the starting address in memory to be saved. The address is always preceded by the letter A (which may even stand for Address). The second parameter is L,

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which is the length of the area in memory to be saved. Therefore, our instruction up above told the Apple to save the area in memory from 1024 to 2048 onto disk under the name Message.

If you recall our memory map, this is the area in the Apple memory that displays the text page on the screen. The addresses may be given either in decimal or in hexadecimal form. People who like round numbers could have written the same command as: *bsave message, A$400, L$400.* $400 is the hexadecimal equivalent of 1024.

These two commands can be very useful. If you ever create a particularly beautiful display on one of the two hi-res screens, you could save that picture to disk with the same command: *bsave picture, A$2000,L$2000.*

The Memo Minder. Now it's time to forget about learning anything and to get on with programming. Let's take that little word processor from a couple of months ago and try to turn it into something useful.

The central input loop is a matter of a couple of lines:

```
10 HOME : GOTO 100
100 GET A$
150 PRINT A$;: GOTO 100
```

Note how we left space at the beginning of the program for our subroutines (not that it will make any difference in speed for a program of this length, but it's a good idea to get into these habits).

This program is going to allow us to write simple one-page messages to ourselves on the text page. When we are ready to save our file onto disk, we will need some way to enter a special code that tells the computer we are ready to save our message. The control keys are good "special message" keys. Let's add a line that takes us out of our loop if any control key is pressed:

```
120 IF ASC (A$) < 32 THEN 200
```

Now we have set aside an area of our program, starting at line 200, designed to handle special signals. The first such command that comes to mind is one that will save the screen to disk. We might use control-S as a signal to *save*:

```
200 IF A$ = CHR$ (19) THEN GOSUB 20: PRINT
    CHR$ (4); "BSAVE";A$;",A$400,L$400":
    GOTO 100
```

That's not as complicated as it may look at first. The letter S is the nineteenth letter of the alphabet, so CHR$(19) refers to control-S. The *gosub 20* refers to a subroutine, yet to be written, that will allow us to choose a new name for each file we want to save (otherwise we could only store one message per disk, which is not a very efficient use of disks). CHR$(4) is control-D, which, you may remember, is the special character you have to print in order to get your disk drive's attention whenever you want it to respond to something printed in an Applesoft program. The rest of that line is just a *bsave* command, with everything except for the variable A$ in quotes. You can throw away the semicolons if you like. They're just window dressing.

Let's write that subroutine now. It doesn't need to say much:

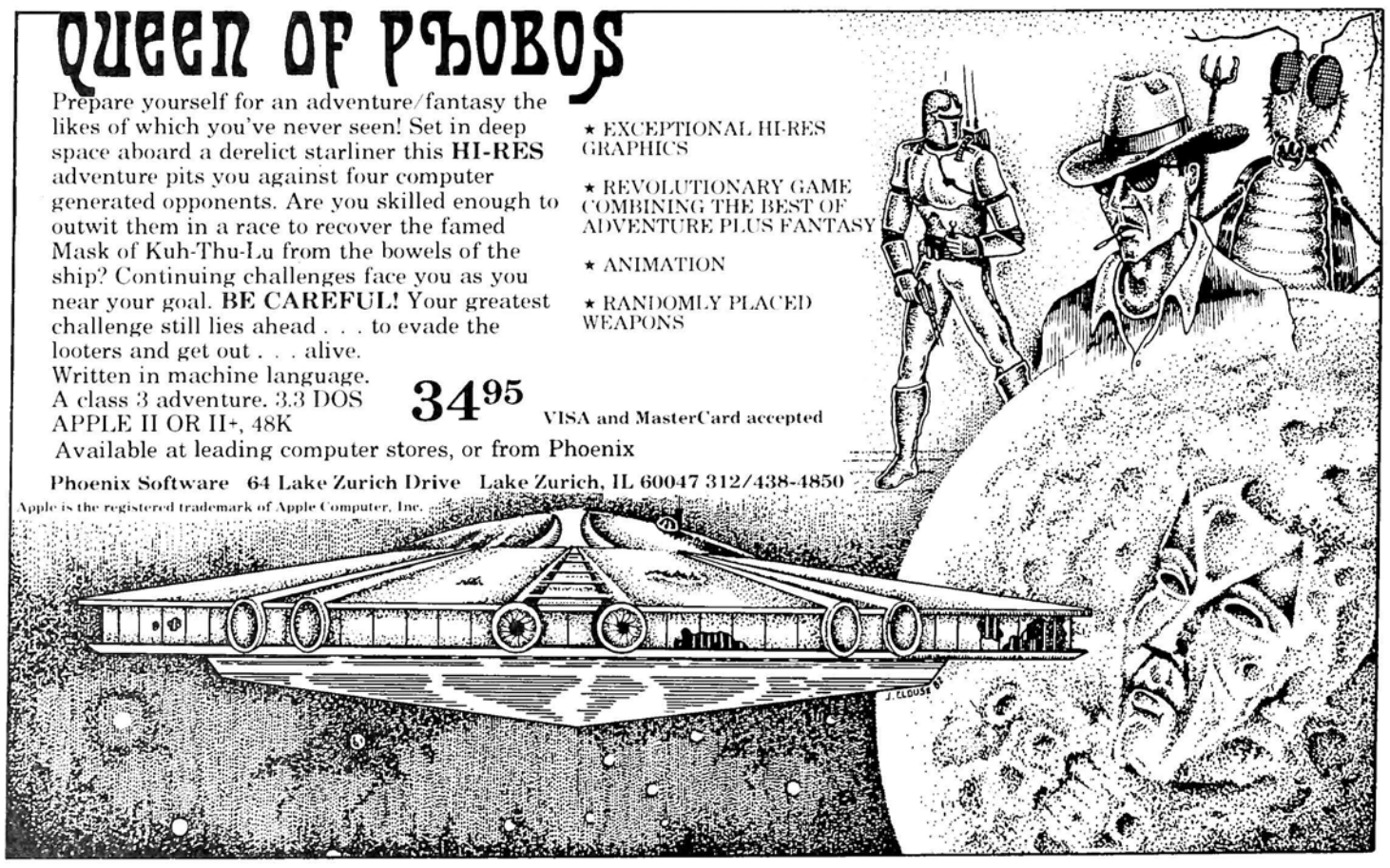
```
20 VTAB 23: INPUT "ENTER FILE NAME
   >>>>> ";A$
30 VTAB 23: CALL - 958 : RETURN
```

We tab down to the bottom of the screen so that we won't disturb whatever message we have written. Then we ask for a file name and store it in the string variable, A$. Finally, we erase the prompt line and our answer using the *call -958* command that means, "Erase to the end of the page."

We should add a control character that also permits us to load our messages back onto the screen from the disk. Control-L seems like a logical choice:

```
210 IF A$ = CHR$ (12) THEN GOSUB 20: PRINT
    CHR$ (4)"BLOAD"A$: GOTO 100
```

And we had better add a line that puts us back on track in case our nimble fingers type in some unintended control character:



```
300 GOTO 150
```

The reason we went back to line 150 is so that anything we type gets printed (remember, the computer will read backspace and return entries as control characters, and we might actually want to backspace occasionally).

If word wraparound is to be avoided, you may recall the fix:

```
130 IF POS(0) > 33 AND A$ = " " THEN PRINT:
    GOTO 100
```

Perhaps we would like an easy way to clear the screen from within the program, in case we want to start over. Let's use control-C (for *clear*) to do this (and if you aren't trying to figure these out on your own before reading the suggested code in this column, then you are depriving yourself of one of the true delights of programming). Here's one way to do it:

```
240 IF A$ = CHR$(3) THEN RUN
```

Another handy feature would be the ability to catalog a disk before you try to load or save a file. Typically, you don't think of this until you've already typed control-L or control-S, so the best place to add this feature might be inside the subroutine that allows you to input the file name. Try writing a line of code that gives you the disk catalog if the user asks for a file with no name. Don't read another word until you've tried it on your own. Here's one way:

```
25 VTAB 23: IF A$ = "/" THEN PRINT
   CHR$(4);"CATALOG": PRINT: PRINT:
   GOTO 20
```

There's just one problem with this nice little feature. If you have written yourself a memo, it occupies the top part of the screen (presumably). If you then type control-S to save it and press return to check to make sure that you are about to save it under an unused name, you will be quite irritated to watch your little memo scroll merrily off the screen. What is needed is a technique to freeze the top part of the screen while permitting us to scroll the bottom part. ("Aha!" you cry. "Now I understand why you started this column off with all that academic stuff about *peeking* and *poking* text windows!")

The first thing to figure out is how much of the screen to freeze and how much to allow to scroll. Of course we could just arbitrarily draw a horizontal line across the middle of the screen and declare that no memo can be more than twelve lines long. But we won't. Because it wouldn't be elegant. Because it wouldn't be efficient. Because it wouldn't allow us to use another brand-new command.

As you remember, *pos(0)* is a command that returns the current horizontal position of the cursor. As such, it always returns a value between 0 and 39. What you need is a vertical equivalent of this command that will tell your program just how many lines of the screen you have used. Once again, Applesoft comes up a little bit short. There is no equivalent command. However, your Apple does possess the information we need, if we only know where to look. Address 37 always contains the current vertical position of the cursor. It will contain a number between 0 (the top line) and 23 (the bottom). If we add the following line to the program, X% will always represent the current cursor position:

```
110 X% = PEEK (37)
```

Now let's use this new reference value to clean up a couple of lines in our code:

```
25 VTAB 23: IF A$ = "/" THEN POKE 34,X% + 2:
   PRINT CHR$ (4); "CATALOG": PRINT : PRINT :
   POKE 34,0: GOTO 20
30 VTAB X% + 1: CALL - 958: RETURN
```

As long as we're fiddling with the subroutine, perhaps there's one other feature we ought to add. What if, heaven forbid, we thoughtlessly type control-L when we don't mean to? We stand on the verge of having our entire memo erased if we can't recover somehow and return to the main loop. You might add another line to the subroutine designed to send you back to the main program if you type some special name, like this:

```
22 IF A$ = "HELP" THEN VTAB X% + 1: CALL
   - 958: GOTO 100
```

This will work. However, it violates one of the cardinal rules of programming: Never leave dirty dishes on the stack! (Translation: Don't leave subroutines except by the exit!) There are times when the exit just doesn't exit to the right place, however, and for these special cases there is a special command. Recall what happens when you use the *gosub* command—your position in the program is temporarily stored in an area of the Apple's memory called the *stack*. Then when you encounter a return, the computer looks at the stack and picks off the last address stored there, to which it then wanders. If you frequently encounter the *gosub* command and less frequently run across return, there will be a build-up on the stack, which can ultimately have unfortunate consequences.

Pop is a simple little command that does just what it sounds like it might. It *pops* the last address off the stack. Therefore, if we rewrite line twenty-two as follows, all will be well in Dogpatch:

```
72 IF A$ = "HELP" THEN VTAB X% + 1: CALL
   - 958: POP: GOTO 100
```

Try it. As always, the proof is in the pudding. ■



The Apples Baseball Drafts a Shrewd Rookie

BY LAN BARNES

WITH PHOTOGRAPHS BY ROBERT J. SALGADO

To most people, baseball seems like an ancient sport, with its origins lost in the dim mists of American history. General Abner Doubleday is said to have encouraged his troops to play it during the Civil War—and by this country's standards, that's old.

But that attitude is hardly fair to baseball or to the people who comprise the game today. Baseball has always had its statisticians and innovators working side by side with the tobacco-chewing traditionalists who fly by the seat of their pants. Today, major league baseball usually leads the other professional sports in new training and sports medicine techniques.

Still, it may surprise some fans to learn that Apples have invaded the training rooms of three major league baseball teams: the Philadelphia Phillies and the Cincinnati Reds, both of which use their Apples for rehabilitating injured players, and the Texas Rangers, which has broader—and more confidential—uses for its Apples. (See accompanying story.)

Travel now to Philadelphia and to Arlington, Texas, to meet some of the men and women who are bringing the modern reality of microcomputers to the Great American Game.

A Rose in Any Other Game. Philadelphia: The name conjures up images of antique row houses, cobbled streets, the Liberty Bell, and one of the class organizations in the National League, the Philadelphia Phillies. World Champions in 1980 and never far out of first place since, the Phillies have a reputation for quality and innovation.

As one member of the Phillies management puts it, "We're very fortunate that the man whose family's owned this ball club for the last thirty years is good about spending money on things that have potential to pay off in the long run, because he sees it's not only going to help his ball club but help baseball as a whole."

So it makes sense that the Phillies were the first baseball club to bring an Apple computer on board to help the staff. What may come from left field to some observers, however, is that the Apple is being used exclusively in the training room as an adjunct to the team's sports medicine program—not as a number cruncher for baseball statistics.

The story of the Phillies's Apple is the story of a symbiotic relationship between team trainer Jeff Cooper and Dr. Jim Richards of the University of Delaware's physical education department. The two men's paths crossed because of a shared interest in a device called a "Cybex isokinetic strength tester," and its applications to sports injuries and performance.



Above: Pete Rose keeps Eddie Milner of the Reds honest on the bose paths. Left: Dick Ruthven winds up and pitches.

Cybex machines have been around in training rooms and physical therapy clinics since the late sixties. The machine's leverlike resistance arm is used to exercise a muscle in an "isokinetic" contraction, that is, moving at a preset constant speed, no matter how strong or weak the muscle contraction.

Getting the Green Light. A Cybex machine permits an injured muscle to exercise at its full potential without overstraining it. And because the Cybex also records the strength of the muscle's contraction through its full range of motion, the machine is invaluable in diagnosing injuries and charting recovery.

As head trainer for the Phillies, Cooper was familiar with the Cybex from his undergraduate days at the University of Delaware and from graduate work at Indiana State, where he earned the master's degree. A certified athletic trainer ("You have to be certified in the big leagues, that's the rule," he says), Cooper routinely used the machine to test all the Phillies's players—especially the pitchers' arms.

Which is why the team got its Apple. As Cooper tells it, "It started in spring training of '80. I did two hundred sixty-six leg tests on the Cybex and tested sixty-five pitchers with three arm tests on each side of the body at two different speeds. I had tons of raw data, but the front office wanted to know where each player ranked against the others as far as torque and joint action, so they could use this data.

"Come July, after I analyzed it all longhand, I told them I had the percentile ranks they wanted, but nobody really cared by that time. The results were too far removed from the testing, and I could see that I needed a faster way to do the calculations. In addition, I just wanted some simple manipulation of the data done—standard deviations and all that stuff."

So Cooper journeyed back to the University of Delaware to consult with some of his former teachers in the biomechanics



section of the physical education department. There he was referred to a new associate professor: Jim Richards. Richards, Cooper was assured, "eats that kind of stuff up."

Digital Screwballs. Getting started for Cooper meant showing Richards the mountain of data he'd collected. "It was mostly torque readings of pitchers' arms," he says. "But the bottom line in sports is power, not torque. It's not your strength, but how quickly you can develop it."

Before, Cooper had taken all the torque curves for the pitchers' shoulders and integrated them on a Hewlett-Packard digitizer to find the amount of work that was done. Knowing the time from the Cybex, he could then derive the power. "I spent between eighty and one hundred hours sitting down in the lab doing that," he says.

But Richards was an old hand at reading laboratory instruments into computers, and knew that the first step was capturing the analog (smoothly continuous) signal from the Cybex and translating it into digital terms for the Apple.

First Pick in the Draft. How did the Apple get in on the act? "Jim did all that research—he's the guy with the smarts," Cooper says. "He just thought it was the most versatile machine around."

"I had looked at a number of machines, and the Apple seemed to be best suited for our needs," Richards says. "Furthermore, Apple, the company, is very helpful if you want to get inside to modify your Apple to meet your needs. They say, 'Ask us, we'll help.' Companies like Radio Shack or Pet sometimes seem to go out of their way to hide the insides of their machines."

Before he undertook the project with the Phillies, Richards did enough interfacing in his own lab to satisfy most hardware hackers for life. "The Apple II in my lab is hitched up to a Cybex; to a force platform where it monitors three transducers at around 400 Hz per channel; and we're in the process of hitching it up to three devices that comprise an oxygen analysis system, those being an O_2 analyzer, a CO_2 analyzer, and a flow meter. Between those three pieces of equipment and a stress test, we can perform really accurate assessments of a person's ability to use oxygen."

The Apple isn't overloaded, Richards explains, because he runs four channels off a vectored interrupt from an internal clock, which begins a sequence of reads from the A to D board which are then manipulated to produce all the data. The system is close to its limit, however, because he needs reads



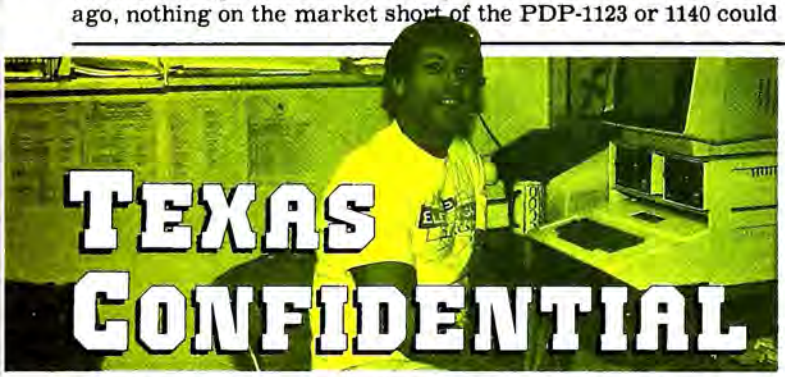
off the force plate at 350 per channel for eight channels, and "that's going to be close.

"I take a lot of ribbing in the lab because of my Apple," Richards says. "The people at the university all use our mainframe for their research, so they see me hunched over my Apple and they think I'm playing with a toy. What they don't realize is the amount of computing power micros make available to one person.

"In the kind of a lab I'm in, it's imperative that the data be collected at specific rates, and, up until about three, four years ago, nothing on the market short of the PDP-1123 or 1140 could do that. And there weren't a lot of labs that could afford those."

Warming Up the Bullpen. Another aspect of Apple ownership that makes it valuable in a laboratory is the availability of peripherals—clocks, A to D boards, and all the other plug-ins. "You don't get that with any of the other machines," Richards remarks. "There are so many companies making peripheral equipment for the Apple that it's really easy to get almost anything you could need."

If the Apple II is so good, why did the Phillies get an Apple III? Cooper explains: "At that time, the Apple III had just come out, and we didn't know that it had a lot of problems. For



TEXAS CONFIDENTIAL

Mike Fitzsimmons, director of physicol conditioning progroms for the Texos Rongers, ond Apple.

The countryside in the half-suburban, half-rural Metroplex community between Dallas and Fort Worth is surprisingly lush and Texas-large. Steady prairie winds and morning temperatures in the middle 80s keep the area "cool and pleasant," at least according to local meteorologists, who don't know any better. On the bridge over Interstate 80 midway between the sister cities' skylines the panorama admits a view of Arlington Stadium, home of the Texas Rangers baseball team.

Locals are proud of the stadium. One of the newest in baseball, it was built expressly to lure the Rangers's franchise away from the District of Columbia. And although the young team is struggling in the standings, the Rangers are proud, too—proud of their elegant new clubhouse under the right-field stands and proud of the newest addition to that clubhouse. The Rangers have an Apple.

More specifically, Mike Fitzsimmons, the Rangers's director of physical conditioning programs, has an Apple II in the team's ultramodern training room. "I do sense a little bit of pride over it," Fitzsimmons says, "when I hear the players talk to people they show around—family or visitors from out of town. They like to show off our clubhouse, which is one year old and the nicest in baseball, and they come back to the room there and say, 'This is the Cybex and this is the computer and this is what we do with the computer.' There's a uniqueness to it, and I think it makes them feel special, although they might not admit it."

Called Up from the Minors. In a way, Fitzsimmons is an unlikely person to be a professional computer user. He got a B.S. in physical education at Cal Poly, San Luis Obispo, California, and went on to the University of Houston for the master's degree after working with the YMCA for two years. Losing his interest in going further ("I didn't see myself as a college professor anymore"), he came aboard with the Rangers when the team created his position.

Although Fitzsimmons's boss told him about the plan for a computer when he was hired, "I didn't expect that I'd be the person responsible for buying it," Fitzsimmons says. "If I had, I'd have probably told him it was a mistake, because I didn't know a damned thing about computers.

"To a certain extent I was just a layman being thrown out there saying, 'People, I need some help, we gotta do something in a hurry.' But when the Apple kept coming up, I said, 'Okay, get us one of those'—and in the end that probably was the one absolutely bright thing we did."

Drafting a Free Agent. A second factor in choosing an Apple, Mike recounts, was discovering in Jan Kern, wife of then-Ranger Jim Kern (since traded to Cincinnati), a programmer who already had an Apple in her home.

"Jan has been the greatest help, beyond what any of us had expected," Fitzsimmons says. "And it made sense to have the same kind of machine. Now we can swap disks when we need to, and we plan to send stuff over the telephone between our Apples when she takes her family to Cincinnati for the rest of the summer."

Kern was a lucky find indeed. At the time, she was working on the master's degree in statistics and computer science at the University of Texas, Arlington, to complement her bachelor's from Case Western Reserve in Cleveland. "Jim was still playing for the Rangers when they got their Apple," Kern says. "He casually mentioned that if they needed any programming, I could help them out. So I got into writing some programs for the Rangers, and then he got traded to the Reds, and I'm still programming for Texas."

Kern's Apple was originally a present. "My husband gave it to me," she says. "He talked to people in various computer stores and finally was sold on the Apple. I ended up getting a very nice package—the Apple with two disk drives, the SmarTerm eighty-column card, and the language card with Pascal. I'm just getting into Pascal, and I'm real impressed with it. It's similar to PL/1, which is what we use at the university.

On the Warning Track. And what are the Rangers doing with their Apple? Here's what Fitzsimmons says:





From left to right: Phillies battle Reds at Veteran's Stadium; Ruthven and Schmidt await the outcome; the dashing Pete Rose.

example, Richards couldn't read its books—this guy's got a Ph.D. in biomechanics and computer science, but he couldn't read the books they sent with it. Since then, they've sent out a new series of manuals."

Richards adds that the Apple III's builtin A to D board, which the II doesn't have, led them to believe that it would be easier to program the Cybex routine on it.

But Cooper hasn't found the Apple III particularly friendly. "It's not an easy machine for me, knowing nothing about computers," he says. "When I was an undergraduate, we did some minor stuff with computers, and I was told then you can't break it. But there's so much to learn about, so much to do, that I find that I'm playing on the machine when I should be getting other work done.

"I've written four or five little programs on my own, slowly increasing their difficulty, and I want to put all my training-room inventories, and all my injury data, and all our fat testing on it, but right now it's all hand-done."

But Cooper doesn't regret getting the Apple III—now. "I think the Apple III is more of a machine than we'll need to use in the next four or five years, but we wanted to buy that potential because we knew that, once we got it, we'd think of more and more things to do with it."

"We're going to be collecting fitness and conditioning data. We want to test each player five times—when they report, March 1, June 1, August 1, and at the end of the season, which would be October 1. That would give us some idea of the toll that the season takes, it would help us establish specific requirements for each individual's conditioning, and it would tell us if they'd been following their conditioning program or not—you can't fool machines.

Conference on the Mound. The Rangers have more specific—and more confidential—uses for their conditioning data, Fitzsimmons says. "Management might want to find out how healthy or unhealthy a player is, or how he compares with someone on another team. There might be a prospective trade involved, or a decision on whether to keep a player at this point in his career versus developing a younger player. A database of these physical measures will instantaneously tell us what we want to know.

"We're using the Apple to do baseball statistics, but traditionally baseball owners and the managers don't reveal their particular methods of keeping statistics on other players and clubs. I really can't talk about it."

Kern does confess that the Rangers are using *DB Master* to set up files on the players and keep track of physical fitness data, and there are plans to hook the Apple up to the Cybex as Philadelphia has. But she remains silent on what the Rangers are doing with the Human Systems Dynamics's *Anova* statistics package and on the contents of their disks labeled "Baltimore," "Cleveland," "California," and the like.

Although both Fitzsimmons and Kern are circumspect on particulars, Fitzsimmons is willing to share some predictions. He doesn't think Apples will appear in dugouts for a while, for example. "Not everybody in baseball is in tune with using statistics for decision making during a game," he points out. "In any sport, there aren't that many people who rely on statistics on a move-to-move or inning-to-inning basis.

"There are statistics coming out of our ears that could be used in those situations, but, unless people grow up with that kind of thinking, they just don't trust the process—they'd rather do it by the seat of their pants.

"Also, in baseball there are a lot of people who intuitively know what's happened in every game and situation and what that information would yield statistically. But there are plenty of other people who would find themselves benefiting from an Apple on the bench, if they could trust the process."

Double Play Depth. To cope with the problems, they worked their initial program out on the Apple II in Applesoft. "I don't know if you're familiar with the Apple III's history, but when it first came out, it really wasn't documented, and it didn't have everything that they claimed it had in it," Richards says. "So we had to work around some of its little quirks."

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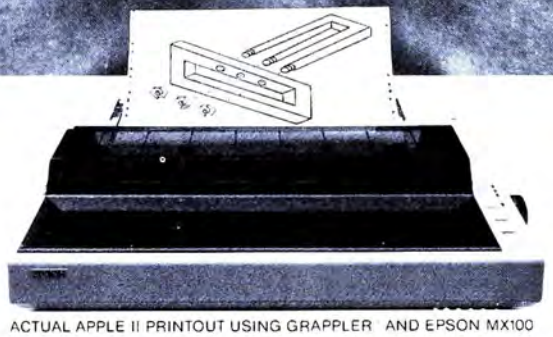
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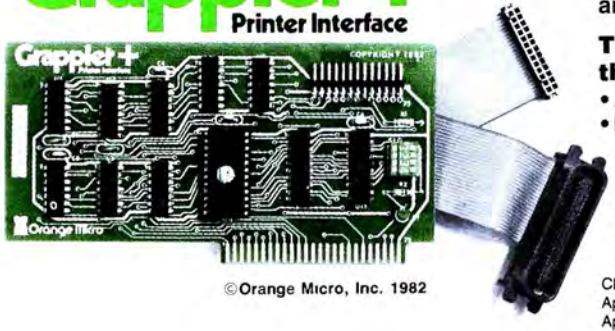
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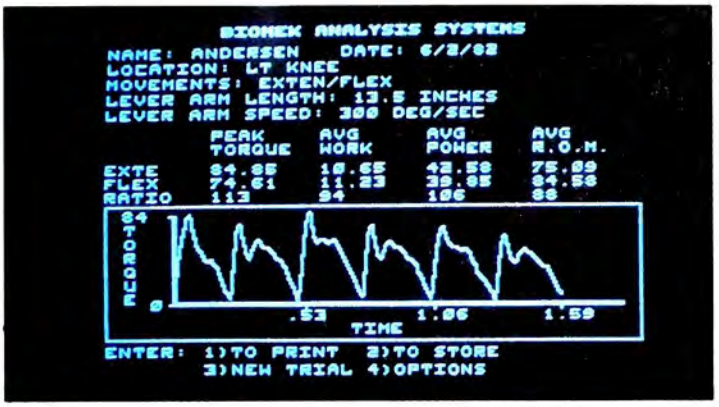
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Above: Cybex readouts of leg extension inflection (R.O.M. stands for range of motion). Left: Phillies trainer Jeff Cooper gets a taste of his own medicine.

They ended up with a program that has machine language subroutines linked by an Applesoft command structure. "It's all modular," Richards says. "If I want to change something, I just throw it out, which is why I prefer programming in Pascal—it forces you to do that.

"The machine language areas of the program are at the very beginning to sample data through the A to D board. What it basically does is sample the A to D converters to make sure that the conversion is complete, put the data into the stack in the upper memory, and go back and resample.

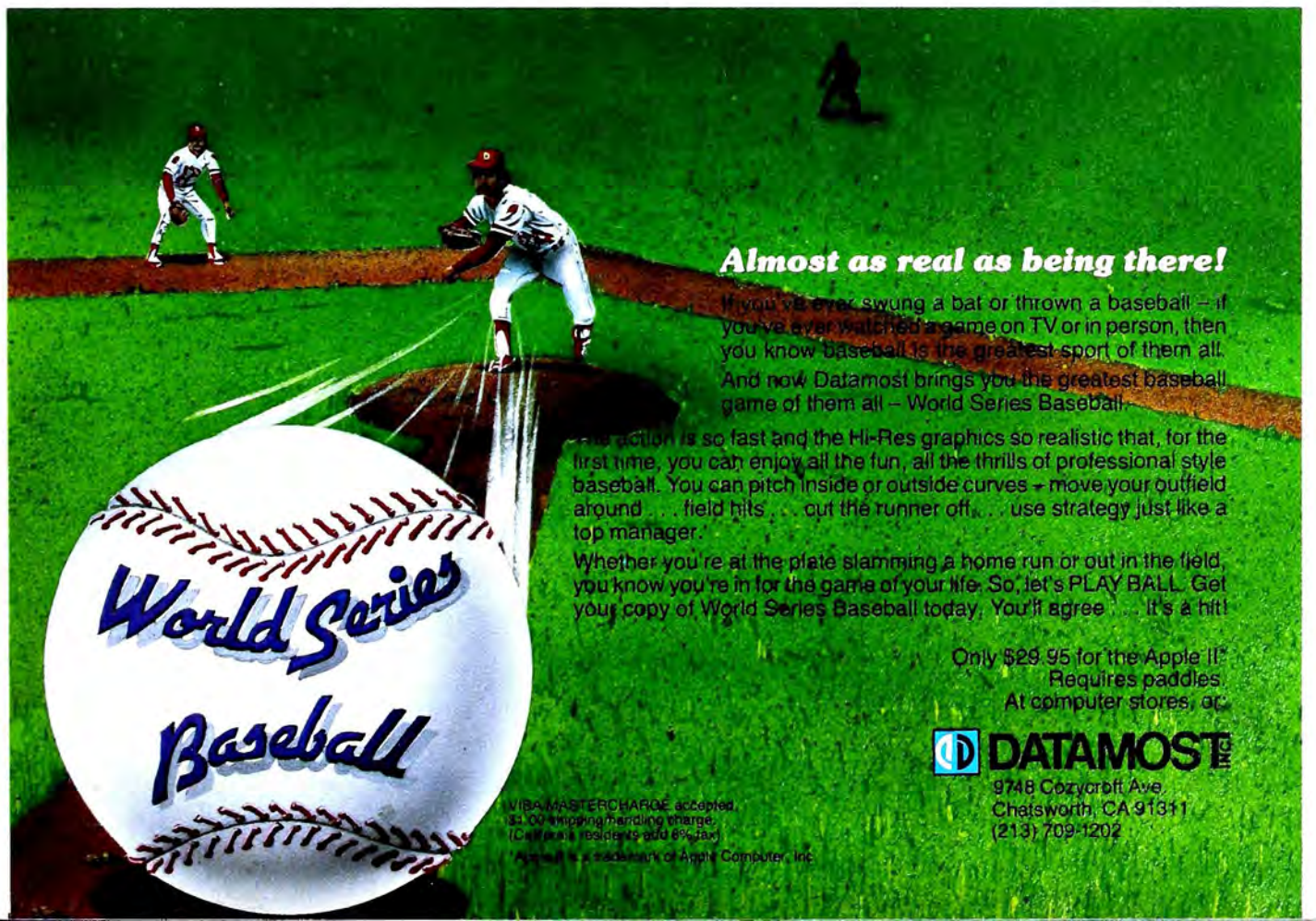
"It also tests for zero load to make sure that it's doing something with the Cybex. If there's no load on the Cybex and the voltage is back to baseline, it kicks out and goes back to Basic routine. The Basic routine updates and checks out how many repetitions you're supposed to do, and finds out if there're any more waveforms you're supposed to collect. If there are, it sends you back to the machine language routines.

"So basically the machine language routines are involved in all the data collection steps. It's the only way you can do it fast enough. Then Basic can handle all the data manipulation. It does the math.

"The program creates three files. The first is a housekeeping file, with the date, the number of trials, and incidental information like that; the second keeps data such as peak torques and speeds; and the third stores the waveforms."

Richards says that there are still some things that need modifying to make the program optimal for a clinical situation. He's developing menus to make it operable from one command level, so that it will be responsible in a clinical setting, where operators don't always have time or enough computer expertise to change program routines. He also says the error-catching routines need to be extended and enhanced. "When we get it where we want it, we'll compile it, which should improve its speed, too."

Rain Delay. Although no Cybex tests on any of the Phillies were available, Richards had some output from tests of sev-



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eral Olympic-caliber ice skaters with him.

"We found interesting things in one of the skaters," Richards says. "In this girl, the ratio of extension to flexion strengths is 1 to 1 at the higher speeds, and very close to it at the lower speeds, which is what it should be. But another girl we tested had a problem getting off the ice—she'd jump, and just go nowhere.

"In skating, you don't have a solid base to jump off of, so you have to take it as you can. A lot of the upward momentum comes from stopping the body parts on the way up, so you swing the free leg hard and then freeze it, and that gives you a tremendous amount of lift.

"We found out that the girl who couldn't jump had an extensor-to-flexor ratio of about 2:1—she had absolutely no flexors at all. She could swing her legs sharply up, but she couldn't stop them; they would s-l-o-w down, and she'd just sit there on the ice." Proper training with sprints to strengthen her flexors will improve the skater's jumps, Richards says.

One thing is certain—with or without hardware, the Cybex-Apple interface program would be a lifesaver for athletic trainers and physical therapists. Dedicated strength-testing machines are being marketed today that do only part of what the Phillies's Apple program does, yet these dedicated machines cost upwards of eight thousand dollars. "There are some stupid ideas out there that aren't going to last long," Richards says. "That's one of them. There's just no way they're going to sell that thing when we're on the market."

That may not be a wild boast. Because almost every professional or college team and every hospital and sports medicine clinic has a Cybex already, the Phillies's software and an Apple II are a real bargain.

But Richards's satisfaction is more than commercial. "It's exciting to me because of the research implications," he says. "Now people are going to be able to get data that they should have been collecting years ago. We've been looking too long at torque outputs, simply because it's been the only thing that's been easy to collect. But we've all known that there's other information in that waveform that would tell us much more.

"In most cases we're finding that power, which you only get by integrating the waveform, is more important than peak torque. And to get that, you need an Apple to help you sample. Without it, you'd go insane, because it takes you about twenty minutes to integrate a waveform the old way. So if you're runing about forty patients through your clinic a day, with two waveforms per limb and a half hour per wave, not to mention all the other paperwork, you can't do it."

Setting Up the Hit and Run Play. So, though this may seem like the birth of yet another struggling software company (*MicroCyb?—PhillieSoft?*), in another sense it represents a breakthrough in clinical data collection outside a laboratory setting. "Right now, physical therapists don't even bother to find the areas under the waveforms," Richards says. "They concentrate on finding peak value and take their little calibration cards and hold them up to the wave. That's nice, but it doesn't necessarily give you the information that you need.

"This program is going to get people in physical therapy and clinical settings to start thinking about the Cybex in terms of their patients' actual needs.

"I get a little bit excited about that—that's the sort of thing that makes you feel a little bit useful. When you write a scientific paper, it's published and maybe four or five people who are already doing the same thing might read it. It's nice to do something that can be used."

Success with the Apple has added a sense of new horizons for Cooper, too. "We're one of the most modern clubs in the game when it comes to training, and this Apple is part of that," he says.

"I've even been encouraging management to consider using our Apple on the field, for guys' batting averages and things like that," Cooper adds. "You know, this guy's been pitching fastball-fastball-slider and getting men out, or is it fastball-curveball-slider? That kind of program is something we could really use. Baseball is full of percentages, like how often you get a certain guy out on a given pitch and data like that—it's got that kind of potential, and I think it should be explored." ◨

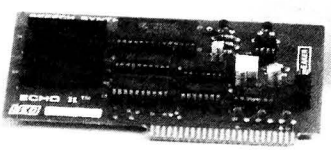
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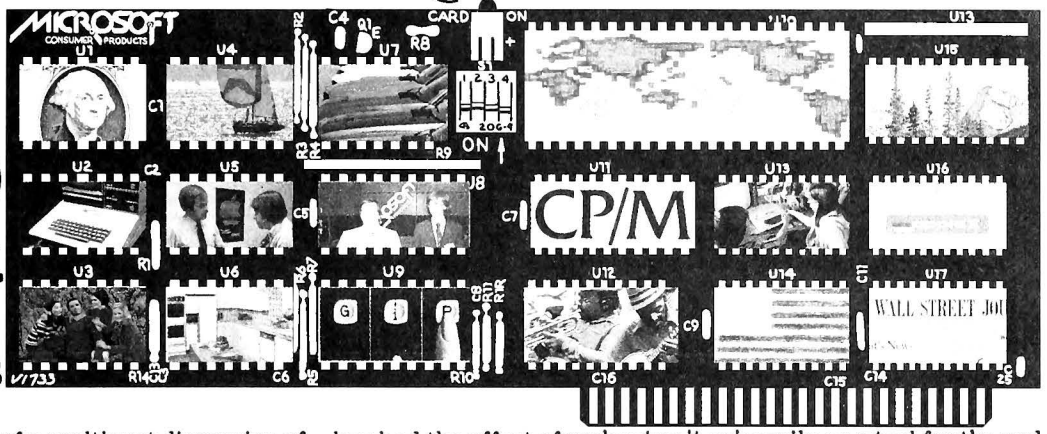
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SOFTCARD Symposium

by Greg Tibbetts



Welcome to the first installment of a multipart discussion of DDT.COM. This discussion of DDT is itself the final installment of a series on the assembly language utilities supplied with SoftCard.

To recap for a moment, these last two months have been a sectioned exercise in the alteration of the Digital Research file dump utility, DUMP.COM, which is supplied on the SoftCard master disk in both source and object form. As you remember, in May we covered the CP/M text editor ED.COM and used it to alter the source file for DUMP. These alterations were designed to produce three changes in the function of DUMP. First, we wished the program to respond to its environment by internally configuring its output for either a forty-column or an eighty-column screen; second, we inserted code to force it to separate individual 128-byte records during output by the insertion of a blank line between them; and finally, we wanted the relative address printed before each line to be separated from the data by a colon. These changes were defined and then installed using ED.

In June, after some discussion of assembly language and assemblers in general, we took this altered source file for DUMP and demonstrated the use of the CP/M 8080 assembler ASM.COM that's included on the SoftCard master disk. The assembly process was fairly straightforward, and if you followed this exercise, you should have a working copy of DUMP that includes the three changes we installed.

Gets the Bugs Out. If after doing the exercise just described you do not have a working program, this new series on DDT is for you. DDT.COM is the Digital Research 8080 debugger. The letters DDT actually stand for Dynamic Debugging Tool and, as the name implies, DDT is a utility that aids in the detection and removal of program bugs, the computer buzzword for programming errors.

The concept behind DDT has probably been implemented as many times as there are systems available. In the early history of microcomputing, most machines came equipped with something called a *front panel*, which was nothing more than a series of switches (and possibly a display device, LEDs, and so on) that allowed the operator direct hardware control over the processor status and the bit values on the address and data buses. Using the front panel, the operator could display and alter memory, execute a single instruction, execute a series of instructions, cause the processor to halt, and so on.

Having such a tool enabled the operator to have very primitive interaction with the system. Manipulating certain program addresses and the switches gave the operator almost total external control over the execution of programs. For example, a program that produced an error, but produced it in such a way that it was not easily related to a specific program section, could be executed step-by-step, and the status of the system could be monitored at the completion of each instruction. When this step-by-step process was followed, the error usually became obvious rather quickly. While the front panel was extremely useful to people working at this level on the system, operators whose interest was only in interacting with the computer through a high-level systems interface (accounting programs, word processing) found it to be of limited value.

The evolution of the microcomputer in the last few years has had the effect of reshaping it primarily as a tool for the end user rather than for the hobbyist or systems programmer. Toward this end, such things as the front panel, with its emphasis on a high degree of technical knowledge, have been left by the wayside. The primitive controls provided by this hardware, however, were and still are very much needed, though by a smaller fraction of the user population. In many machines, these functions have already been assumed by programs—called monitors, housekeepers, and so on—that to one degree or another replaced or enhanced the front panel functions by simulating them in software. These software tools gave computer manufacturers the choice of providing a hardware solution, a software solution, or both.

Primitive Surroundings. Such monitor programs, typically provided in ROM, are usually geared, as were their hardware predecessors, to an extremely primitive, nondisk environment; witness the functions of the Apple Monitor ROM, especially the older one provided on the earlier Integer Basic Apples. In addition to the currently available functions—displaying memory, altering memory, executing a program, moving blocks of memory, and so on—the monitor programs provided the ability to step through a program a single instruction at a time, thereby simulating execution at an incredibly slower rate than normal; the ability to trace program execution with processor status and register contents displayed after each instruction (only somewhat slower than normal); and the ability to do absolute, in-memory entry of 6502 mnemonics via a built-in mini assembler.

In the sense that all these functions may be used to debug programs, these monitors are debuggers in the same way DDT is. DDT, however, provides a more sophisticated range of functions by virtue of the fact that it is RAM-based and can operate from any location in RAM memory, and because it is designed to work in conjunction with the CP/M operating system. This increase in sophistication is due primarily to the fact that DDT allows control over the basic I/O operations of the system as well. Using DDT, it is possible, for example, to load disk files into memory, either overlaying or concatenating them to existing modules previously loaded.

DDT is also educated as to the necessity of performing certain kinds of activity, I/O in particular, at normal speed, called *real time*. Single-stepping or tracing through disk access code, for example, is performed at the operator's chosen pace until the actual timing-sensitive code or system calls are encountered. At that time DDT will switch to real time, returning to the previous mode only when the code that must be performed in real time has been executed. These features expand enormously the utility of DDT over nonintegrated monitors (that is, monitors that do not work with the disk operating system).

Stick with It. More sophisticated debuggers than DDT are available; Digital Research's SID and ZSID are two such programs. Relatively few people continue to use ASM and ED after their initial exposure, but most do continue using DDT. This indicates that DDT is a program worth learning to use. These columns will not make you an expert in the uses of DDT, but we hope they will give you the rudiments necessary to enable you to put this utility to effective use.

DDT is capable of twelve functions:

	Command	Action
1.	A	Assemble the following op-codes.
2.	D	Display memory contents.
3.	F	Fill memory with constant value.
4.	G	Go; execute program command.
5.	I	Input; build file control block.
6.	L	List; disassemble memory range.
7.	M	Move contents of memory.
8.	R	Read file into memory.
9.	S	Set memory to a value.
10.	T	Trace program execution.
11.	U	Untrace; separate form of trace.
12.	X	Examine contents of registers and status.

Through proper use of these functions and the standard CP/M system calls, you can make the computer perform almost any normal function that it is otherwise capable of, yet do so in a controlled environment. DDT commands can be broken into two categories: those that involve simple memory display and alteration and those that involve interaction with the system.

The memory-handling commands are relatively straightforward and are performed with DDT acting like any other applications program. The program-handling functions, however, involve much more sophistication, with DDT acting as a buffer between the program or routine and the operating system so that the program under examination will act as if it is running in memory by itself.

Change of Address. DDT does this by first of all relocating itself to high memory directly under the BDOS module. When DDT is run, it begins at location 0100 hex, and by using the value of the beginning of BDOS stored at locations 6 and 7, it determines where it will have to relocate itself. The relocation address depends on how much memory is available. This relocation clears the transient program area, allowing programs that normally reside there to load and execute without interfering with DDT. DDT then places its own first address at locations 6 and 7 so programs that look here to find the top of free memory will not overwrite it.

Finally, because the instruction at location 5, which uses 6 and 7 to jump to BDOS, now points to DDT, the normal address of BDOS is placed in DDT in a jump instruction that is activated whenever control is passed to that first DDT instruction. In this way DDT is hidden from the system and is essentially transparent to programs running in memory. DDT also stores and updates within itself the contents of the various registers and the status of the processor after allowing an instruction being examined to execute. This is done so DDT can display these contents when requested. It will appear to the user that he is in fact seeing the current processor condition.

The final thing DDT uses to control execution is the restart function. This is a separate processor instruction that causes DDT to halt further execution of the program immediately, go to a specific area of memory, and use the address it finds there as a vector to a service routine of some kind. Using this tactic, DDT can have the processor execute a single instruction and, by putting its own address in the vector and the restart instruction immediately following the instruction to be executed, can have the processor return to DDT when it finishes. By retaining the original content of the location where it placed the restart, DDT can replace the content when finished, essentially leaving everything as it was before.

Depending on where the restart is placed, one to many hundreds of instructions can be executed before stopping the process. This is called *breakpointing* and is a valuable tool in debugging operations because it allows you to execute portions of code in chunks that are as small or as large as appropriate to the situation, while constantly monitoring the program's progress. This method enables DDT to maintain an environment that looks to the program as though it is running normally within the system, when it is in fact running within DDT.

Memory Serves You Well. We will now examine the memory handling functions of DDT and demonstrate each of them in detail. We will save program manipulation and an exercise using our modified DUMP program for next time. By the time we finish with this multipart discussion, you should find yourself reasonably comfortable with DDT and with, at least, the rudimentary uses to which it can be put. It will be most helpful if you can continue to follow along using your computer as you did when we studied ED and ASM, especially when we get to the point of executing our new DUMP program.

Before starting this session, invoke DDT to bring it up and run it. With a copy of your CP/M master disk, or any disk containing DDT, in the drive, simply type its name, DDT, followed by a carriage return. You should see the DDT sign-on message and a minus sign or hyphen. This is the DDT prompt, which is displayed anytime DDT is awaiting a command. One note of caution: during the use of commands that read or write areas of memory, do not attempt to access the memory locations from E000 to E100. To be absolutely safe, no addresses from E000 to EFFF should be accessed without specific purpose. The addresses from E000 to E100 are the hardware control addresses for the Apple I/O slots and indiscriminate access to them can do nasty things like turn on your disk drives in write mode, and so on. Although the larger range is safer, since E100 to EFFF is the area reserved for program ROM space for each of the peripheral cards, in the case of cards (like the SoftCard, for example) that have no ROMs, accessing some of these addresses will have unpredictable effects. For the SoftCard, accessing Ex00 (where x is the slot number) will turn off the Z80. Usually the system can recover from this occurrence, but why take chances?

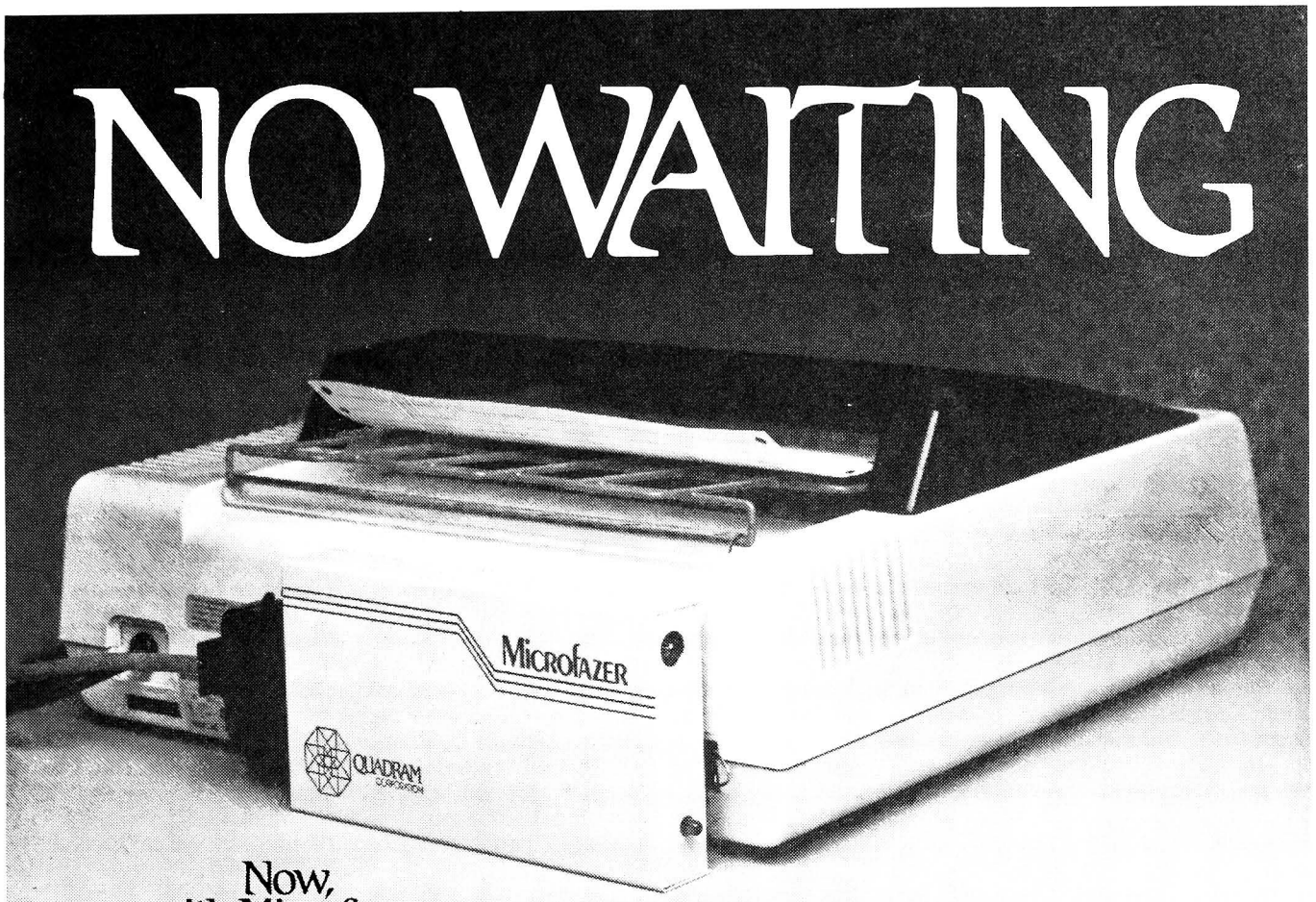
The first job of any debugger is to enable the user to examine and alter individual memory locations. This is one of the keys to front panel simulation; DDT accomplishes this task through the use of the S (for *set*) command. Type S now, followed by a return. What happened? You got a question mark and a repeat of the DDT prompt. You see, some DDT commands require parameters following the command and others do not. The S command is one that requires an address parameter to function.

Now type S100 (return). You should see the address you entered, 0100, displayed. (Note: All addresses and data shown by DDT are displayed in hexadecimal format, and therefore all numbers shown in the column should be assumed to be in hex.) Following this address is a two-digit number, in this case, 01, and the cursor has jumped to the right of the 01 and stayed there. DDT is telling you that the memory location 0100 currently contains 01, and that it is now waiting for your input as to what to do with that location and value.

Keep It Legal. At this point, any legal single-byte hex number you type followed by a return will be inserted in that memory location, while a return by itself will leave the current contents as is. In both cases, however, the next sequential memory location will be displayed with the same resultant wait for input. A period followed by a return at any point of input will cause the S command to be terminated and return you to the prompt. Illegal values entered as numbers will also cause a return to the prompt, but with the DDT question mark indicating an error. The S command is one of the most useful of the DDT commands and is often the means by which patches to programs are distributed. A series of hex bytes is listed and, using the S command, the series is installed in the program after loading it into memory. Such lists are called *hex dumps*. Short programs can even be exchanged in this fashion using the S command to input them and the CP/M SAVE command to save the result to disk.

The next command is D (for *display memory*). This command's primary function is to give you a quick view of the contents of memory, 192 bytes at a time. Values in hex are displayed in twelve rows of sixteen bytes each, preceded by the address of that sixteen-byte section and followed by a series of periods and other characters that correspond to the values. (Note: If you're using a forty-column screen, DDT will display in a different format to keep the display within a forty-column line width. In either case, if a value corresponds to a printable ASCII character, the character is displayed; otherwise, a period is displayed in its place. This allows you to view the contents of memory in both its numeric and its ASCII forms.) Type a D (return) now. You should start seeing a memory dis-

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play that begins at 0100 and shows the DDT copyright message in the ASCII portion of the screen. This is the beginning of the DDT program itself.

Knows Its Place. Type a few more Ds to see what happens. Did you notice that with each new execution the D command continued from where it left off? DDT maintains counters for the defaults of certain commands that, unlike the S command, do not require parameters. If you execute other commands in between the D commands, you'll find that when you return to D it will still continue where it left off.

The D command may also be used with one address or two address parameters, for instance, D6500 or D6500,6900. With one address, the 192 bytes beginning with address 6500 are displayed; with two addresses, the contents of memory from 6500 to 6900 are displayed without breaks. Hitting any key during the display of memory will abort the display and return to the minus sign prompt. You'll also notice that a D command with an address parameter that does not begin an even sixteen-byte section—D5C, for example—will print on the first line *only* the number of bytes remaining to fill out that sixteen-byte section so that the rows that follow begin and end on even sixteen-byte boundaries. The D command is most useful as a means of quickly scanning memory contents.

The next command we'll discuss is the L (for *list*) command. This function of DDT takes memory and displays it as a disassembled listing of the op-codes and operands contained in the segment of memory being listed. Enough memory is disassembled in this fashion to make up twelve lines of screen display. Just as with the D command, a separate counter is maintained with an initial default address of 0100 so that subsequent L commands begin where the previous one left off. The command forms for the L command are the same as those for D; either L (return), L followed by a start address and a return, or L followed by both start and end addresses and a return. Once again, hitting any key during the listing will abort the command and return to the DDT prompt.

Blind to Valid Values. If you do an L now, you should see that it starts at address 0100 and displays two instructions, LXI B,1010 and JMP 013D, followed by a series of register MOVs and MVIs. Further disassembly would eventually produce a ?? = xx, where xx is a two-digit number. In this case, what's happened is that only the first two instructions of that sequence are valid. The remainder of the twelve lines really constitute the ASCII DDT copyright message, but DDT has no way of knowing this, since the values that make up the message are valid op-code values as well.

In our discussion last month of ASM, we touched on the fact that each op-code by its original definition will be followed by no operand, a one-byte operand, a two-byte operand, or, in some cases (though not in the 8080 instruction set), a three-byte operand. DDT's built-in disassembler recognizes which instructions require what number of bytes for an operand (as indeed any disassembler must), and consequently breaks down the listing according to what it recognizes, regardless of whether the values were meant to be op-codes or not. When ASCII data is erroneously broken down in such a fashion, the mistake is fairly easy to detect, since most of the op-codes with values similar to those of the ASCII set are MOV and MVI instructions. Since there's little use in having so many such instructions in series, there's a high probability that this is ASCII data. Using the D command usually confirms such suspicion.

It would be nice if all such disassembly were so obvious, but it's not. Remember we said that you will occasionally see the double question mark and some two-digit number? Well, when you see this, it indicates that DDT got to this point in its listing and found a value that had no analogous op-code where an op-code should have been. What's most likely happened (assuming of course that we're not dealing with a Z80 or 6502 specific op-code that DDT will also not recognize) is that somewhere DDT began disassembling in the wrong place, starting on one of the bytes of an operand, for example. This is probably because you specified the wrong address to start at, or because, due to the inclusion of data in the program similar to the DDT copyright message, DDT got off track by the time it arrived at the next program segment. Disassembly of large programs is by no means a straightforward task. It often requires that you follow the logic of program execution to separate data and operands from actual instructions; sort of an "If I were an 8080, what would I do here?" kind of approach.

Check for Effect. The next command we'll discuss is the F (for *fill memory*) command. This one is pretty straightforward since it has only one form and one purpose. The form is an F followed by a start address, an end address, and a data byte. The purpose is to initialize an area of memory to some specific value, usually to determine what effect your program is having on the area in question. If your program is supposed to be storing 00s in an area, initializing it to FFs and running your program will show you whether the program is functioning properly. The only thing you need bear in mind with F is that the two addresses are inclusive, that is, both of them and all addresses in between will be filled with the value. Try an F command now of the form F1000,1FFF,BB, and then examine the area with the D command. Did it do what you expected?

The next command is M (for *move a block of memory*). No less straightforward than F, M is used to move some segment of memory, of a size you determine, from one place to another. The form of the command is M followed by a start address of the source segment, an end address of the source segment, and the start address of the destination for this block of values. Once again, the start and end addresses are inclusive. This command is most often used to relocate programs and data to some other area of memory during debugging, where it is perhaps easier to observe them. It is also used to copy ROM code down into RAM so that it can be altered and tested. Try the command now by typing M1000,1FFF,3000, and again check the result with D. Fast, wasn't it?

Temporary Solution. The A (for *assemble*) command is used when you wish to alter machine instructions in memory to correct some problem but do not wish to make them permanently part of the source file, at least not until you have had time to test them. As we discussed briefly in last month's column, this is a very primitive assembler. It can translate 8080 mnemonics and register names into the corresponding machine code values in conjunction with addresses you type in, but you are not allowed to use labels or symbols. Any target locations of jumps, loads, or stores must be entered by entering their actual addresses. Also, since the assembler is incapable of relocating existing instructions (of moving everything up or down in memory and resolving the address references), you must assemble into an area of memory that has sufficient space to hold your new code. This is done in either of two ways. The first way is to overwrite code no longer needed. The second is to place a jump instruction—overwriting three bytes of existing code—in the area you wish your insertion to be. This causes the program to jump to a patch area in which you revive the overwritten instruction, insert your new code, and add a jump instruction back to the original program to continue execution.

The format of the command is A xxxx, where xxxx is the address to begin assembly. There is no default address. DDT will respond with the address and a waiting cursor to accept your new instructions. With each instruction assembled, the next available address for assembly will be displayed, and DDT will await input. Erroneous input will cause the address to be repeated without action taken. Like the S command, a period by itself will terminate the assembly action. If you wish to try this command, do some disassemblies using the L command and then use A to copy these at some new address.

This concludes our first session on DDT. So far we have discussed the functions that relate to memory usage, alteration, and display. Next month, we'll begin looking at how programs are manipulated with DDT—how they are loaded, executed, and debugged.

The Errors of Our Ways: On page 211 of May's SoftCard, the eleventh line of the first listing in the left hand column

```
PRSPC: MVI A, ;PUT SPACE VALUE IN ACCUMULATOR
```

should be

```
PRSPC: MVI A,' ' ;PUT SPACE VALUE IN ACCUMULATOR
```

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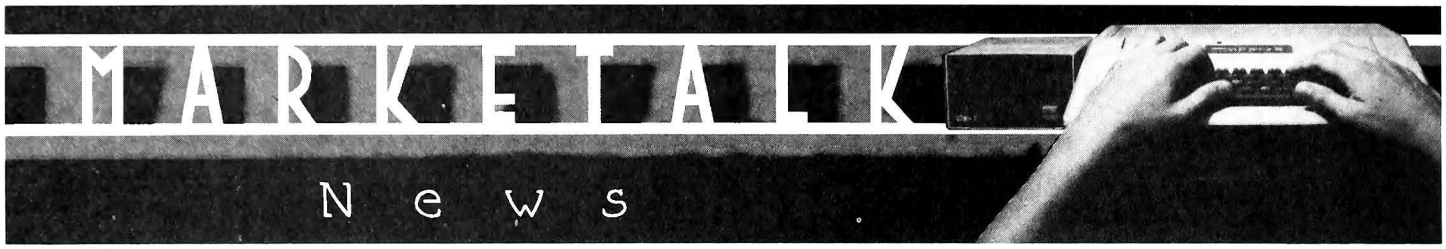
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Unless otherwise noted, all products can be assumed to run on either Apple II, with 48K, ROM Applesoft, and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card. Many Apple II programs will run on the Apple III in the emulator mode.

☐ The sixth edition of *Software Vendor Directory* can be ordered from **Micro-Software Services** (Box 482, Nyack, NY 10960; 914-358-1340). Cross-referenced, with more than 1,800 software vendors providing 12,300 products in 300 categories, plus 123 hardware vendors and twenty-two operating systems. With two updates per year, $100. Without updates, $57.95. Disk (CP/M), $260.

☐ *Watson—The Inspector's Assistant* is a utilities disk designed to work with *The Inspector*, the disk and memory utility program from **Omega Microware** (222 South Riverside Plaza, Chicago, IL 60606; 312-648-4844) that reads and alters disk files, repairs blown disks, and directly examines memory contents. *Watson* adds a disk-file follower, a disassembler with ASCII display, a scrolling-screen dump, and a disk comparer. Requires Integer card. $49.95.

☐ A plethora of graphics programs is available from **West Coast Consultants** (1775 Lincoln Boulevard, Tracy, CA 95376; 209-835-1780) for use with Watanabe plotters. The *Watanabe Digit-Plot WX4671* is an intelligent plotter that produces graphs and drawings in solid or broken lines and generates characters that can be enlarged and rotated. Drafting, mathematics, and design applications. $1,400. ☐ *CurveCopy* is a hi-res screen-to-plotter dump program which scan-maps pictures in three selectable sizes. Vertical orientation and negative plotting features available. $75. ☐ *Curve-Fit* is a hardcopy graphics program which can be used to fit data quickly in straight lines, polynomial equations, exponential curves, and power curves. A special mode can generate all four fits sequentially. $99.50. ☐ *Curve's 3-D* plots surface functions, X, Y, and Z data arrays, space curves, and scaled axes. Rotates 360 degrees. $199. ☐ *Curve II* is an improved version of the *Curve* program, a keyboard interactive general purpose 2-D graphics package. New version performs automatic centering of axis titles, formatting of scale numbers, plots pie charts, linear and logarithmic error bars. Supports the Watanabe series multipen plotter. Requires Z-80 card. $275. As update, $50. ☐ *Curve-USA* plots the boundary of the United States and/or each individual state in full color; shades, labels, and constructs legends. Manual or automatic multipen changer option. $75.

☐ **International Resource Development** (30 High Street, Norwalk, CT 06851; 800-243-5008) has completed *Microcomputers in Large Organizations*, a 120-page report analyzing the microcomputer's impact on business. It forecasts its impact on future sales, the role of corporate data processing departments in future system procurements, the leverage of large quantity discount programs, and presents user survey results. Strategies and strengths of leading suppliers reviewed in detail. $1,285. ☐ *Microcomputer Software Packages* is a detailed review of the growth of software packages for home and business, with analysis of the market by application, ten-year projection of sales, and seventy vendor profiles. $985. ☐ *Electronic Filing* is a review of market and product trends leading to electronic filing systems in the office. Analyzes status and impact of optical disk technology, local networks, database management systems, and digital work stations. Ten-year market forecasts. $1,285.

☐ *Birdbreed* is a genetics program by Judith Kinnear that simulates color inheritance in the parakeet. Designed to complement laboratory experiments in genetics, it provides sixteen groups of birds of defined phenotypes for breeding simulation. From **EduTech** (634 Commonwealth Avenue, Newton Centre, MA 02159; 617-965-4813). $95. ☐ *EduTech Sampler* contains programs and manuals from four different EduTech series, geared to workshops and teacher groups studying the uses of computer simulation in science education. One disk and four manuals, $50.

☐ A line of cases made of lightweight Cordura are designed to transport the Apple and disk drives, fit under airline seats, and come with an adaptor that connects your computer to any hotel/motel television. Order from **Abcom Corporation** (16005 Sherman Way, Suite 105, Van Nuys, CA 91409; 213-891-3669). $92.

☐ Relocating DOS on your RAM card—and increasing usable program memory by over 30 percent—can be effected with *Amper Memory Program* from **Micro-Sparc** (Box 325, Lincoln, MA 01773; 617-259-9710). Makes more than 10K bytes directly accessible to most software. $29.95.

☐ *The Stamp Collector* and *The Coin Collector Catalog*, two database programs for philatelists and numismatists from **Andent** (1000 North Avenue, Waukegan, IL 60085; 312-244-0292), feature foreign and domestic lists, file transfer, meeting and source lists, and an additional database. $49 each.

☐ Two pocket size, accordian-style system reference cards for the Apple II and II Plus are being marketed by **Nanos Systems** (Box 24344, Speedway, IN 46224; 317-244-4078). One card is Basic only, one is for Basic and 6502; both contain complete summaries of the *Apple Reference Manual, Integer Basic* and *Applesoft Basic* programming manuals, and the 6502 programming language. Basic, $3.95. Basic and 6502, $4.95.

☐ *Magnum Isolator* from **Electronic Specialists** (171 South Main Street, Box 389, Natick, MA; 617-655-1532) controls electrical pollution and eliminates equipment interactions. Heavy-duty spike/surge suppression; for individually quad-Pi filtered AC sockets. Will control pollution for a 1,875-watt load; each socket can handle a 1,000-watt load. Model ISO-17, $181.95.

☐ Two new disk drive systems from **Interface** (20932 Cantara Street, Canoga Park, CA 91304; 213-341-7914) feature forty-track double-sided, double-density drives with half-tracking. The 5¼-inch single disk drive system has 250K of unformatted storage, drive, cable, and color-coordinated cabinet. No additional wiring required. $375. ☐ A dual drive system features 500K of unformatted storage, with an Apple disk controller, cables, and cabinets. No additional wiring. $850.

☐ High-speed communications software that allows an Apple II to emulate seven popular CRT terminals used to access applications on large host computers and timesharing systems has been released by **Softronics** (6626 Prince Edward Place, Memphis, TN 38119; 901-755-5006). *Softerm* features a 9,600-baud transmission rate and allows local, direct connection or standard modem linkage to the host computer; editing and nonediting capabilities, forty/forty or eighty-column display, file-transfer capability in a choice of modes, more. $150.

☐ Subscribers to **The Source** (1616 Anderson Road, McLean, VA 22102; 703-734-7500) can now send mailgrams direct from their machines to anywhere in the continental U.S., Alaska, and Hawaii. Messages are electronically routed to the nearest Western Union and then processed; charge of $5.15 for the first 100 words is billed with monthly Source charges.

☐ **Atlantic Cabinet** (Box 100, Williamsport, MD 21795; 301-223-8900) has extended their line of computer work stations. All

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☐ Graphics and sound effects have been added to tick-tack-toe in *Tetrad.* Sixteen squares on four levels allow seventy-six winning combinations; three levels of play between you and the computer. From **Hayden Book Company** (50 Essex Street, Rochelle Park, NJ 07662; 800-631-0856). $19.95.

☐ *Data Reporter Report* is a new quarterly newsletter for users of the database management package from **Synergistic Software** (5221 120th Avenue S.E., Bellevue, WA 98006; 206-226-3216). The first issue includes a tutorial on program operations, program modifications submitted by users, more. Subscription free with purchase.

☐ **MCR Corporation** (101 West 31st Street, Suite 2112, New York, NY 10001; 212-947-7775) offers maintenance, repair, board exchange, installation, and training services to corporate, small business, and individual Apple users. All service is performed within twenty-four hours and is guaranteed for ten days for parts and labor.

☐ The *RL-1 Relational Database Management System* from **ABW** (Box M1047, Ann Arbor, MI 48106; 313-971-9364) includes selection, projection, and joint operators. Query language, relational editor, and program interface featured. Application packages available. Requires Z-80 card. $495.

☐ Twenty thousand people are expected at the second annual **Computer Expo '83** (Box 1185, Longwood, FL 32750; 305-339-1731), planned for February 25 through 27, 1983. To be held at the Tupperware Convention Center in Orlando, Florida, the exposition is aimed at small business, professional, real estate, home, educational, and entertainment software end users. Learning seminars will be conducted.

☐ *Gusher,* an accounting package for oil and gas well operators, automates joint interest billing, calculates revenue distribution, joint interest statements, and A.F.E. reports. From **High Technology Software** (Box 14665, 2201 N.E. 63rd Street, Oklahoma City, OK 73113; 405-478-2105). Also generates oil well payout reports, tracks invoices from and payments to vendors, more. $995.

☐ More than 500 software engineering support tolls in eight classes (design, implementation, quality assurance, project management, more) are indexed and cross-referenced in *Software Engineering Automated Tools Index* from **Software Research Associates** (Box 2432, San Francisco, CA 94126; 415-957-1441). Tools are outlined by type and classification, number of installations and price, special features, and environmental needs; fifty categories in all. Three-ring binder with quarterly updates. $185.

☐ **Edu-Ware** (Box 22222, Agoura, CA 91301; 213-706-0661) announces two software tutorials for college-bound students as preparation for the antonyms portion of the Scholastic Achievement Test. *PSAT Word Attack Skills* and *SAT Word Attack Skills* contain twelve vocabulary lessons each, with review through definition, sample sentences, component analysis, and a time test. Each two-disk package, $49.

☐ A revised version of the *Capital Need Analysis* program has been released by **Vernon Tech Corporation** (Box 215, Springtown, PA 18081; 215-346-7757). New skills included are greater probing of savings objectives, addition of an emergency fund and provision for a rent fund, and the addition of an extensive supplemental information page directed at the more "feeling-finding" type of questioning. Can be converted to single or dual drive; new charts and information can be printed. $179. Update, $25. Catalog, $5.

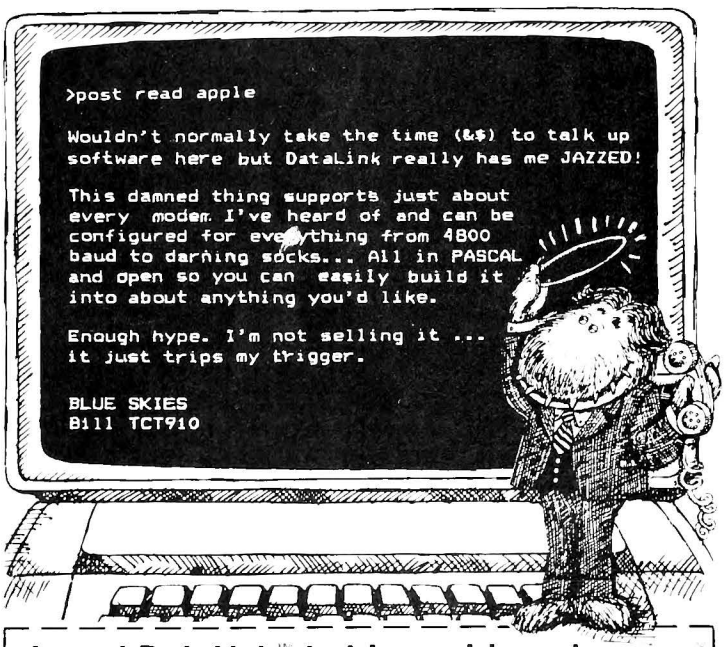
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☐ *ETC: Educational Technology and Communication* is a newsletter for school district decision makers aimed at moving schools more effectively into new technology. Contents include analysis of issues facing educators as they bring technology into the classroom, case studies of schools successfully using microcomputers, how-to advice, resources, news and information on upcoming conferences, more. Published by **Far West Laboratory** (1855 Folsom Street, San Francisco, CA 94103; 415-565-3000). Monthly. $35 per year; $60 for two years.

☐ Two new sources of business information are now available on the **CompuServe Information Service** (5000 Arlington Centre Boulevard, Columbus, OH 43220; 614-457-8600). *Money Market Services* uses weekly Federal Reserve data to forecast interest rate trends and their effect on the stocks, bonds, and commodities markets. *Small Business Reports* provides current information on capital investment and savings plans, tax laws, insurance tips, and services available to aid operators of small businesses. $5 per hour.

☐ The *Burtronix Photocard III* is a new interface for the Apple III that links a parallel chip (6522) to the hardware bus and allows the user to put custom circuits on the board and connect them to the 6522. From **Elcom Systems Peripherals** (439 Harrison Street, Suite A, Corona, CA 91720; 714-734-8220), the card comes with a twenty-six-pin ribbon connector and twenty-five-pin D-type connector; software driver on disk for link to Business Basic, Pascal, or SOS. No knowledge of bus or machine language needed. $195.

☐ *The Quikcalc Real Estate Investor* is a real estate analysis package for the evaluation of both individual residence and income property sales and purchases from **Simple Soft** (480 Eagle Drive, Suite 101, Elk Grove, IL 60007; 312-364-0752). The two programs on the disk—the individual residence and income model—analyze purchase price, financing structure, tax implications, cash flow, more. Requires 64K using either *VisiCalc* or *SuperCalc*. $129.95.

☐ Play against a world-famous poker player with *Mike Caro's Video Poker* from **Arisoft** (6709 Greenleaf Avenue, Suite 212, Whittier, CA 90604; 213-944-2024). Program has two games: *Jackpot Video Poker*, simulating video poker games in Las Vegas, and *Poker Flurry*, a competition poker game that allows you to play against another player—or Mike Caro. Written in Pascal, requires Applesoft in ROM. $39.95.

☐ **Information Unlimited Software** (281 Arlington Avenue, Berkeley, CA 94707; 415-525-9452) is shipping a revised version of *Datadex*, their database manager designed for Apple IIs with the Corvus hard disk. $300. ☐ A new phone support service for users having problems with IUS's *EasyWriter* provides a trained service technician on-line between 9 a.m. and 4 p.m. Pacific time. Single users, $100 per year; corporate, $175.

☐ *Data Perfect* from **LJK Enterprises** (Box 10827, St. Louis, MO 63129; 314-846-6124) allows the user to design a screen mask in either forty or eighty column; incorporates a utilities section, report generator, and mailing label generator. Complete formula operations and mathematical operations on and between fields. 32K. $99.95. Fully interactive with *Letter Perfect*, LJK's word processor. One or two disk drives and any printer. $99.95.

☐ Openings may still be available for the July 25 and August 8 Connecticut sessions of **Computer Camps International** (310 Hartford Turnpike, Suite D, Vernon, CT 06066; 203-871-9227). Campers can meet other nine to seventeen-year-old computer enthusiasts from the Netherlands, Japan, Kuwait, Mexico, Belgium, and Switzerland; swim, hike, play games, and receive hands-on computer education. Two-week session, $795.

☐ Connect your micro to a color television set with the *AppleVerter* from **ATV Research** (13th and Broadway, Dakota City, NE 68731; 402-987-3771), a custom modulator that plugs into the existing power/video connector inside the Apple. Operates in the high VHF band, tunable over approximately four channels; sufficient RF output (typical 18dbmv) to drive home MATV system, more. Ten-foot cable included; no assembly required. Available on one-week trial basis. $29.95. Optional switch box and cable. $4.50.

☐ *Bond Yielder* turns the Apple into a bond analysis tool that computes municipal and corporate bonds, agencies, treasuries, warrants, notes, CDs, and discounts for brokerage, insurance company, and financial institution users. Checks results with variables, such as from YTM to basic price and back; from yield after tax to YTM and basic price; from bond equivalent yield to discount and price. From **CE Software** (801 73rd Street, Des Moines, IA 50312; 515-224-1995). $149.95.

☐ *SATN*, a journal for *VisiCalc* users, is published bimonthly by **Software Arts** (Box 494, Cambridge, MA 02139; 617-491-2100). Upcoming issues will include overviews of hardware and software designed to complement the *VisiCalc* program, and a reference guide to articles on applications and techniques that have appeared elsewhere. One year, $30.

☐ The next *Robotwar Tournament* will be held in the banquet room of Los Arcos restaurant (home of the giant margarita) at 3113 West Olive, Burbank, California, August 29, with subsequent tournaments to be held about every two months. After all attendees have registered their first robot, they may take turns entering additional robots until limits are reached; five robots per person, twenty-five maximum. Tournament information available from **Frank Krogh** (Box 5337, North Hollywood, CA 91616). Entry fee, $10.

☐ A new line of precision joysticks and paddles featuring linear potentiometers, selectable stick operating characteristics, and styled enclosures has been introduced by **Kraft Systems** (450 West California Avenue, Box 1268, Vista, CA 92083; 714-724-7146). Joysticks utilize gimbal mechanisms, selectable spring return centering, or free-floating operation, with electrical centering adjustments and adaptors for dual-stick operation. $64.95.

☐ **The Wood Works** (11th and Haskell, Route 2, Box 407, Lawrence, KS 66044; 913-842-7797) has introduced a line of personal computer worktables, shelves, and printer tables, avail-

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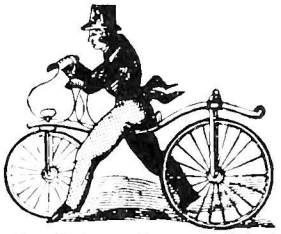
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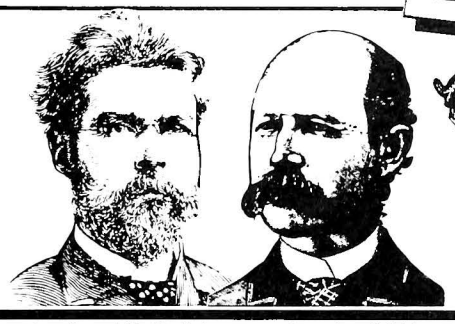
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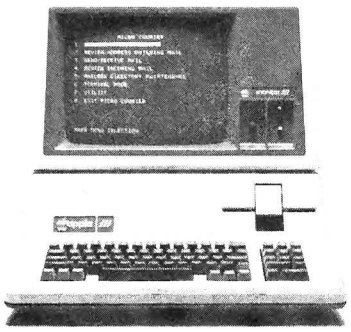
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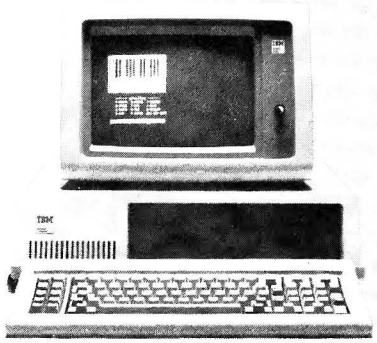
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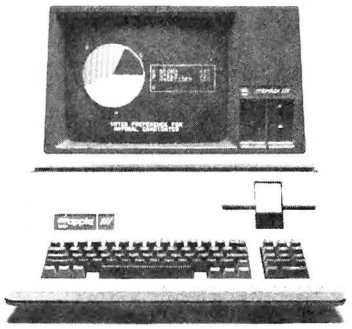
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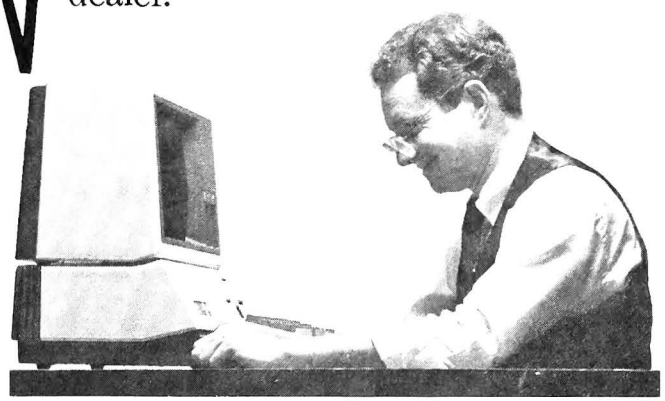
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Q. Do you have difficulty operating your printer when connected to a time-sharing computer? Are files you're trying to download too large for your system buffer? Does your host computer lose data when you send files to it?

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Q. Does your line of work involve sending written material to others? Are you a program author who would like to send work in progress to a partner or client and know that it arrived intact? What would the ability to instantly send material or programs to anyone at any time be worth to you?

A. "The Professionals" provide the ideal way to send your articles, manuscripts, reports, programs and technical documents to another computer with phone line access. Now you can work WHEREVER you want, and be assured that your data is sent to its destination quickly and error-free. In fact, compared to the fastest mail services, "The Professionals" offer immediate delivery and will save you the purchase price in just a few uses.

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Q. Are you bothered by limited access to your school's existing terminals? Would you like to be able to do your school assignments at home at your own convenience?

A. "The Professionals" allow you to access virtually any dial-up school or college computer system over standard telephone lines. This means no more waiting in line for an available terminal or hassles with malfunctioning school equipment. You can even prepare term papers or reports while off-line and send the completed work to the school computer for final printing. Best of all, you can work from home at the times most convenient for you.

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Q. Are you tired of wasting time and money sending or receiving files with inadequate, poorly designed software? Do you find yourself manually performing the same lengthy log-in procedures over and over again? Would you like to automate these procedures for yourself and others?

A. "The Professionals" allow you to send files which have been prepared in advance. They may then be transferred at any time, as quickly as possible — even to several different systems. No time is wasted reviewing information while on line; data may be captured by your computer or printer (or both) to be evaluated later at your convenience. These features assure minimum on-line time and therefore minimum on-line cost.

"The Professionals" introduce macros that are more sophisticated than anything previously seen in communications software. These "hand-shaking" macros allow you to perform complete multi-stage log-on sequences automatically; all you do is specify the system to be called. This eliminates sign-on errors and greatly simplifies operation of the entire system, not only for you, but for other less skilled operators.

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Q. Would you like to be able to take advantage of the information featured on local bulletin boards and information services such as The Source, CompuServe, Dow Jones, and others?

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☐ **Health Science Products** (Box 5545, Birmingham, AL 35207; 205-251-0500) manufactures *DataLeggett*, an ergonomically designed split-level CRT workstation, providing proper viewing position and distance from CRT, featuring frontal placement of the copy holder. Height-adjustable video display platform slants for glare control. Two widths: 26¾", $395; 30¾", $450.

☐ *AG/PAC*, a package of over eighty agricultural programs by O. Arthur Stiennon, selected from 250 of those he uses to run his Cold Comfort Farms in Dane County, Wisconsin, is now available from **Wisconsin Microware** (One South Park Street, Suite 220, Madison, WI 53715; 608-255-9020). Includes least-crop ration for beef and dairy cattle, cash crop profit matrix, crop marketing decision, commodities market, livestock raising decision, real estate investment analysis, and financing comparisons. Requires two drives and a language card. For Apple II Plus, $1,500; Apple III, $1,500.

☐ *Video Loom II*, a new version of the original weaver's program that simulates a hand-loom design and presents a hi-res color picture of the resultant textile, is available from **Laurel Software** (Suite 1234, 1310 College Avenue, Boulder, CO 80302; 303-442-6363). Machine language program sets up warp and weaving sequence; simulates thirty-two-harness loom with sixty-four treadles, varies warp and weft colors, thicknesses, and spacing between threads. Saves any design elements to disk, hard copy printouts available. Requires Applesoft in ROM. $59.95.

☐ *Elementary Basic* and *Elementary Pascal*, by Henry Ledgard and Andrew Singer, are programming tutorials that presume to present certain cases of Sherlock Holmes in which the master of deduction fed his data into an ancestor of modern computers, giving detailed descriptions to Dr. Watson that clarify the formats of Basic and Pascal, and the fundamentals of programming. From **Vintage Books** (201 East 50th Street, New York, NY 10022; 212-572-2188). Cloth, $20; paper, $12.95.

☐ The *SSD Solid State Disk Emulator* from **Synetix** (15050 NE 95th Street, Redmond, WA 98052; 206-885-4215) provides plug-in emulation of a single or dual disk drive. Increases speed up to 1,000 percent, operates in any I/O slot. Single disk 147K, $550; dual disk 294K, $950.

☐ **MicroStand** (Box 96, Tolovana Park, OR 97145; 503-436-1429) has added *Disk Caddy DC-1* to its line of computer accessories; a steel disk-storage case with 100-disk capacity. $49.95.

☐ *Accessory Bridge AB-1* shelves an Epson MX-70/80/100 or Bytewriter printer with paper tucked underneath. $39.95.

☐ Two 96-TPI flexible disk drives have been introduced by **Olivetti OPE** (505 White Plains Road, Tarrytown, NY 10591; 914-631-3000): the single-sided *FD 591* and the double-sided *FD 592*, offering unformatted capacity of 500K and 1Mb, respectively. Brushless DC motor, split-band head positioning mechanism, and fewer parts. Average access time of eighty microseconds; track-to-track access time of three microseconds. *FD 591*, $435; *FD 592*, $545.

☐ *Rainbow Graphics* is a graphics package designed to be used with joystick only. Full shape table functions, color fill, move area, clone area, six-font label function, and edit detail feature. From **Rainbow Computing** (19517 Business Center Drive, Northridge, CA 91324; 213-349-0300). Applesoft in ROM. $29.95.

☐ *The Genius*, a full-page display CRT, is now available with an Apple III interface card from **Micro Display Systems** (514 Vermillion Street, Hastings, MN 55033; 612-437-2233). Displays fifty-seven or seventy-three lines of text eighty characters across, instantly reformats during editing; 8K of high-speed buffer memory to refresh the screen. Quantity discounts. $1,795.

☐ *Practical Pascal Programs*, by Greg Davidson, converts the programs of the book *Practical Basic Programs* into UCSD Pascal. Forty programs covering finance, management de-

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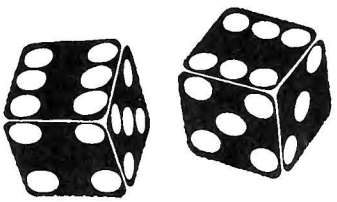
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cision, statistics, science, and math. From **Osborne/McGraw-Hill** (630 Bancroft Way, Berkeley, CA 94710; 415-548-2805). $15.99.

☐ **Soft-Link** (161 South San Antonio Road, Los Altos, CA 94022; 415-941-7553) is offering the opportunity to test software prior to purchase. A small fee allows the user to take a program home and sample it for a few hours to six months. This trial-use arrangement is possible because of *SoftLok*, an encryption process which locks up the program at a certain point. After full payment the user receives *Keycode*, the encryption unscrambler. Soft-Link products range from accounting to genealogical programs and require a Z-80 card. Preview (locked) programs, $49.95.

☐ *PlannerCalc*, the first microcomputer business software to be written in English, has been announced by **Comshare** (3001 South State Street, Ann Arbor, MI 48106; 404-634-9535). Uses spreadsheet method; procedural steps entered in English with conventional mathematical logic. Initial product in projected line of *Target Business Planning Systems*. $50.

☐ *Open Apple Gazette*, a newsletter devoted to the Apple III from **Original Apple IIIers** (Box 813, San Francisco, CA 94101), assists in locating others for interest groups, gives access to a Pascal library and to material written for and about the III, and will reprint the Third Basic series from *Softalk*. Annual membership, $25.

☐ **Starcom** (Box 592, Westminster, CA 92683; 714-898-6541), now available on Compuserve and The Source, offers programming in Basic, an electronic consumer's buying guide, a bulletin board subsystem, electronic travel reservations, inter-user mail, nationwide local access phone numbers, interactive chat between users, user directory, games, news, more. Twenty-four hour service. $3.60 per hour.

☐ **VisiCorp** (2895 Zanker Road, San Jose, CA 95134; 408-946-9000) has released a more powerful version of its *VisiSchedule* software for the Apple III, taking advantage of available eighty-character upper case and lower case display, expanded keyboard, greater internal memory, and hard-disk storage. Updates information on-screen when a change is initiated and incorporates all pertinent data including costs, available staffing, resource leveling, and scheduling constraints; displays and prints out calendar representation of start and stop dates, slack time, holidays, and deadlines for up to 300 different tasks. $300.

☐ **MECC '82** (2520 Broadway Drive, St. Paul, MN 55113; 612-376-1131), an educational computer conference, will be held December 1–2, 1982, in Minneapolis, Minnesota. Will feature practical sessions and discussions, and pre and post conference training sessions on implementing computing, programming micros, developing courseware, and in-service planning.

☐ *The Access Times*, a marketing publication for customers of **Shugart Associates** (475 Oakmead Parkway, Sunnyvale, CA 94086; 408-733-0100), has resumed publication after an eighteen month hiatus. New graphic format, more coverage of user application stories, and new column features on current developments in disk drive technology and marketing.

☐ *Free Enterprise*, a business simulation game for the Apple from **SRA** (155 North Wacker Drive, Chicago, IL 60606; 312-984-7053), features three levels of difficulty for one player against the computer or six or more players against each other. Run up to six companies, each selling in home territory, other company's home areas, and in a common market area; decide on advertising budgets, production costs, plant improvements, research and development, loans, and stockholder dividends. Based on IBM's *Management Decision-Making Laboratory* program. $60.

☐ **Advanced Operating Systems** (450 St. John Road, Michigan City, IN 46360; 219-879-4693) has released *Hello Central!*, putting the Apple in direct communication with mainframe, mini, and microcomputer systems, and accessing all database services. Upload and download messages or files using a text buffer, use as auto-dialer, display text in forty-column and route to printer in eighty-column form. Works with modem as answering machine. Editor and text handling operations let the user retrieve, edit, manipulate, and print text files. $99.

☐ **Architecture Technology Corporation** (Box 24344, Minneapolis, MN 55424; 612-935-2035) has published the *1982 LOCALNetter Designer's Handbook*, a 224-page guide to network specification and design. For professionals involved in local network specification, selection, and design; provides up-to-date overview of local network field and specific information on equipment and issues. $65 U.S.; $90 foreign.

☐ The summer game onslaught continues! From **Gebelli** (1771 Tribute Rd., Sacramento, CA 95815) comes *Lazersilk*, in which you, the spider, must capture various wandering insects and repair the damage done to your web. $29.95. ☐ *Neptune* features a speeding submarine negotiating the terrain of the ocean floor and torpedoing hostiles. Joystick or paddles. $29.95.

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☐ In *Death Race '82* from **Avant-Garde** (Box 30160, Eugene, OR 97403; 503-345-3043) you avoid obstacles and duel with enemy vehicles through ten road mazes. Paddles, either DOS. $29.95. ☐ In *Federation* you must battle a fleet of Dron Drones with laser cannons and neutrostatic tracking bombs, as well as their allies planetside. Keyboard. $29.95.

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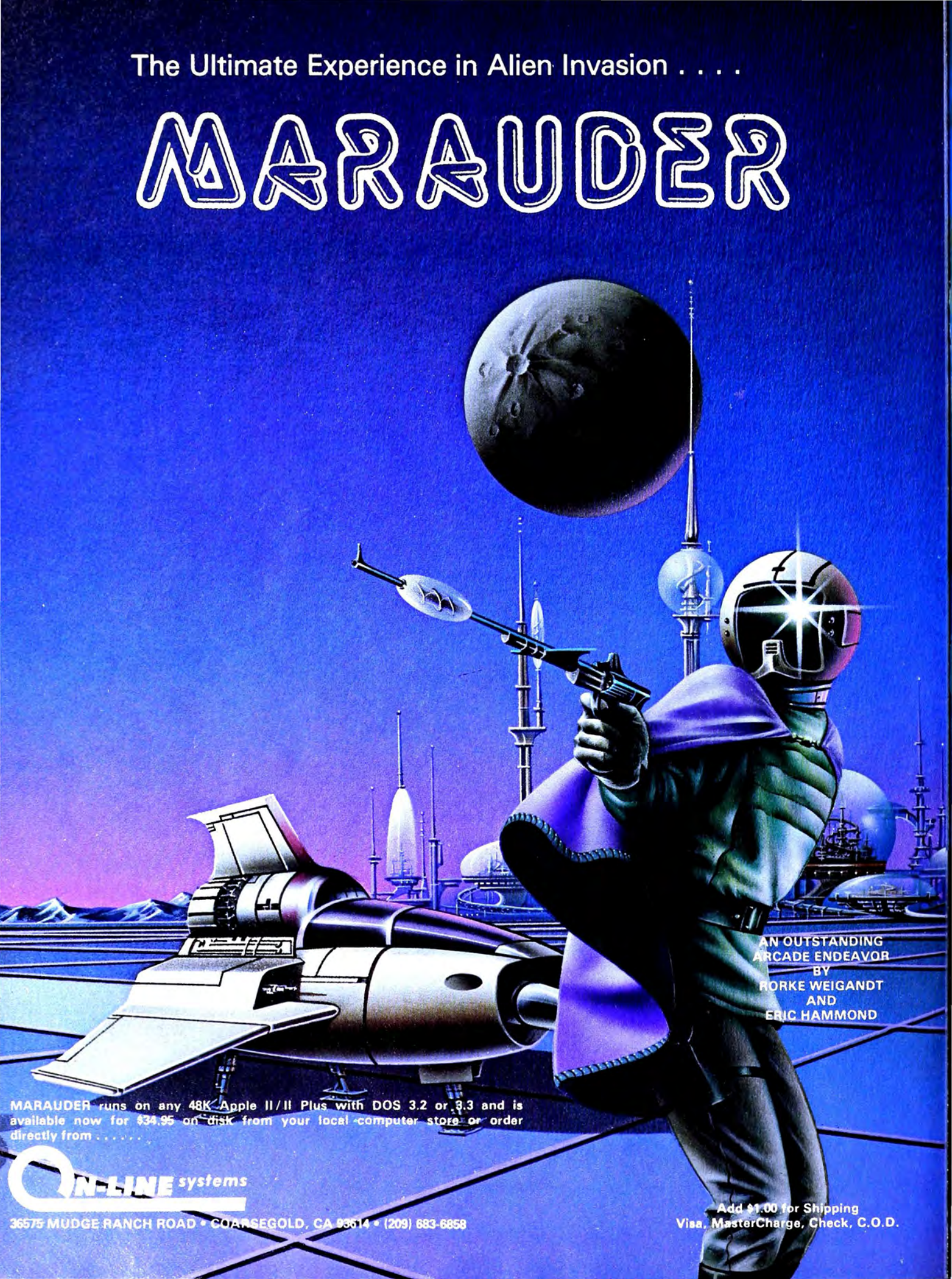
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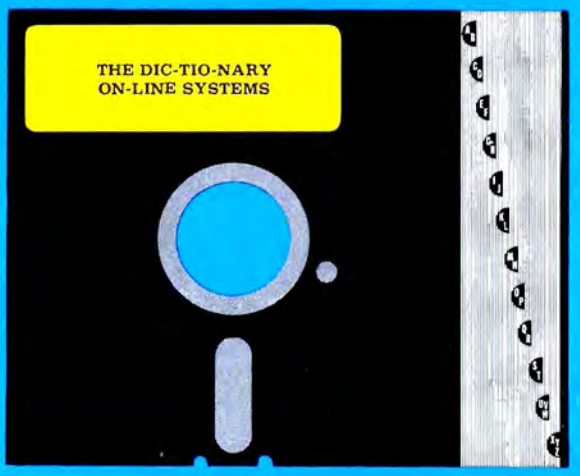
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NEWSPEAK



Cold War. In the small but profitable supercomputer market, Cray Research and Control Data are far and away the leaders. The two companies are based in Minneapolis, ten miles apart.

The similarities do not end here. Until 1976, Seymour Cray, founder and president of Cray Research, worked as a computer designer for Control Data. He left to start his own company, feeling that Control Data wasn't developing supercomputers fast enough.

Technically, a supercomputer functions at a speed of twenty million floating-point operations per second and is capable of handling a range of problems that have a database of more than a trillion words. Only forty-four supercomputers have been installed worldwide; thirty-nine are Cray Is and five are Control Data Cyber 205s.

Soon after Cray Research's inception, a rivalry developed between the two companies that continues to this day. Several times in the past five years, Control Data has accused Cray Research of practicing "one-upmanship."

Some of the bad feeling between the two companies originates from an incident that took place a few years ago in Manchester, England. After a meeting of Control Data's European customers, Cray grabbed the potential buyers as they were leaving and bused them to a different location for a look at Cray's supercomputer.

The *Wall Street Journal* (May 25, 1982) reported another Cray maneuver that brought howls of displeasure from Control Data. Control Data was set to unveil its new line of general-purpose computers when Cray took the limelight by announcing a faster version of its own supercomputer just one day before.

Although Cray did circulate a brief notice at Control Data's customers' meeting in Saint Paul, a spokesperson for the firm claims their announcement was planned for months and wasn't timed to embarrass the competition. The brief notice in question invited the Control Data customers over to Cray Research while they were in town.

Cray's unveiling was a big deal for the company, apart from any consternation it caused at Control Data. Customers and the press were taken to Chippewa Falls, Wisconsin, for a press conference in a factory. This was a first for Cray, and the media, including television, showed up in force.

"We think of ourselves as innovative and in the forefront of a new technology," says a Cray spokesperson. "We've been portrayed as concentrating on the competition, which is not really accurate and has caused a lot of grief."

The grief certainly hasn't affected Cray's share of the supercomputer market. With more than 80 percent of the supercomputer market, Cray is clearly ahead of Control Data, which earns most of its money from minis and mainframes. Control Data's total sales last year were in the billions of dollars; Cray racked up sales of about $100 million.

Cray is not the only guilty party in this corporate rivalry. According to the *Wall Street Journal*, Control Data started a short-lived rumor that Seymour Cray was leaving his company before the Cray II supercomputer's projected 1985 completion and shipping dates.

But Cray is not leaving, and the Cray II should reach a working prototype stage sometime in 1983. Until then, the Hatfields and the McCoys will probably find something else to bicker over, but the business of making computers goes on.

Knock on Any Door. A national survey recently conducted by Dunhill Personnel System sheds light on the data processing job market. The study, broken down into the eight top data processing fields by area, indicates that computer processing has weathered the recession better than any other job market, but the grass isn't as green as it used to be.

There was a time once when programmers, programmer analysts, systems programmers, and systems analysts were treated practically like movie stars. Salaries were sky-high, and if you didn't like a job there were dozens of others to choose from.

The Dunhill survey says that companies hiring data processing personnel have grown up. Hiring officials are wiser now because they know more about what they're looking for.

Results of the survey for specific markets show that oil and gas companies offer the biggest salaries. A systems programmer in these industries averages a little more than $35,000 a year. By contrast, a systems programmer in the banking industry makes a little less than $25,000. A systems analyst working in the oil and gas industries makes, on average, $30,000 a year, while a systems analyst in the insurance business makes a little more than $25,000.

The low spot on the totem pole is reserved for the programmer. On the average, programmers make $28,000 a year in oil and gas; both insurance and banking programmers make slightly less than $20,000.

When the facts are broken down by state, California comes out the overall winner. Its lifestyle may be a little crazy, but the West Coast offers computer professionals the best money. On the average, California programmers earn close to $25,000 a year, compared to those in Massachusetts who're lucky if they get $18,000 annually.

Monetarily speaking, New York, Illinois, and Washington, D.C., are the best areas after California, although salaries vary from job to job. A systems programmer in the nation's capital makes a fair bundle, but the lowly programmer/analyst could do as well in Texas or Michigan.

Unreal People. They're called "replicants" in *Blade Runner*, but don't be fooled. The baddies out for Harrison Ford's tail in the movie are plainly and simply robots.

Ridley Scott's film is based on the late Philip K. Dick's classic science fiction novel, *Do Androids Dream of Electric Sheep?* Both the film and the book are speculation on what biological humanity may have created by the year 2024. In the here and now, nothing resembling Dick's superhuman replicant is anywhere near the design stage. For the moment, humanoid robots are even more of a pipe dream than fusion power.

"The humanoid robot is to robotics what the butterfly is to flying. It's an inspirational model," explains Carl Helmers, editor of *Robotics Age*. "Needless to say, when trying for a butterfly, you may end up with a Boeing 747."

The May/June 1982 issue of the New Hampshire-based journal for intelligent machine applications and development features an informative editorial by Helmers on the relationship of computers and robots.

He writes: "A robotic engineering design which does not take into account modern computer design and application is bound for failure. Everything in robotics is intimately bound up with the use of computers—both as tools of design and as structural elements of designs."

Later in the editorial, Helmers puts it differently: "The new field of robotics stands on the shoulders of previous advances in the computer field."

Robotics also stands on the shoulders of previous advances in mechanical and electrical engineering. But computer technology is what makes it all happen, supplying the intelligence to guide me-

chanical arms and sensors.

Computers are also integral to the design of intelligent machines. A "pyramid of abstractions" illustrates how computers are used in the development of robotic systems.

At the top of the pyramid are software programs where abstract designs are born. The abstract design is then linked with generalized hardware for testing and development in programmed simulations. It's still easy to change the abstraction at this level because the simulation is mostly in the computer.

Once specialized hardware is implemented, the process becomes less flexible, and changing the design could make expensive equipment obsolete.

At the base of the pyramid, the abstract design finally enters the real world of motion systems. "The fact that we will ultimately convert some parts of the abstraction pyramid to real hardware is what keeps us honest as designers—the ultimate test of our simulation is whether or not it works in real life," Helmers writes.

Helmers compares operating systems, typical software environments, as tools of robotic development projects. The best system, he says, appears to be LISP on special hardware at a cost of approximately $50,000, with fifty megabytes of hard disk storage and 250K of main memory. UNIX on a minicomputer runs around $75,000 including ten megabytes of mass storage and 250K of main memory. The UCSD pSystem rates just behind CP/M; both are relatively cheap and require no software engineering.

Helmers believes that soon large arrays of bubbles and semiconductors will replace disks. This will benefit robotics and computer science, but like with other technological advances, there will be casualties. Helmers cites a local New Hampshire center for producing precision ball bearings that faces the prospect of losing a large market. The company makes bearings for the spindles found in many floppy and hard disk drives. Disk manufacturers will obviously be in for rough times too.

The experimental robotics version of the old Altair computer kits will appear sometime in the next nine months, Helmers predicts. This should help people learn about robotics on their own, just as the build-'em-yourself computers opened up the world of amateur computing six years ago.

Robots linked with personal computers are valuable training tools. An Apple or an IBM pc equipped with a relatively inexpensive robot arm is much more accessible to inexperienced operators than the big computer systems actually used to run most modern robots.

So where are the androids? Ask your local science fiction nut; that's the only place you'll find them today—in science fiction.

The majority of real-life robots are still in factories, welding and spray painting, not quite drinking beer yet or rooting for the surprising Detroit Tigers. Some robots are swimming underwater like fish, drilling platforms; and some are flying at incredible speeds toward the edge of the solar system.

But no robots have stood up on their own two feet and taken the first step on the long road to becoming humanoid.

Surviving the Revolution. If you've ever been up late at night and had your computer hit a bump in the road and lose your last hour's worth of writing, you've known technological frustration. Computers are just not that foolproof yet. Even personal computers are really impersonal; they have total disregard for the human being.

A computer doesn't know who you are and doesn't give a hoot about what you're up to. It'll accidentally erase data in memory whether you're the chief executive of the country or a stringer for the Hawthorne Herald. Humans are at fault, we know that. After all, we built the darned machines.

The problem is that most people in the early stages of the computer revolution are unfamiliar with and just a little bit scared of computers. With the revolution just now hitting stride, the psychological effects of computers are becoming the subject of increased investigation.

Thomas McDonald is a psychologist with Transition Associates in San Diego, California. He's very interested in the stresses and strains created by computers in the workplace and in the home. But he's quick to point out that most people seeking psychiatric help suffer from any of a million problems.

"Very rarely, if ever, will someone come in and say, 'I'm stressed because of my computer.' But in the last three years we've seen ten or twelve people in trouble, marital or work related, where computers were a complication.

"Computers can generate a unique set of stresses and strains. If these remain unaddressed, they can create problems."

According to McDonald, few people suffering from computer-related stress get anywhere near therapy or a psychologist's office; it's "the tail of an elephant." McDonald has talked to operations managers in local companies, which is where you can see all the levels of computer-related stress and strain.

McDonald believes that some of the blame rests with vendors who need to offer more help with the process of introducing computers into the work environment. By some estimates, more than half of the country's businesses will use computers by 1990. Walking into a situation with no computer experience can be very scary.

"You don't have to worry about kids so much, because they'll be exposed to computers like mother's milk. But the great swath of middle America is going to find them a whole new thing," McDonald says. "The workplace has to be computerized and humanized."

Computers are machines, and humans are not made of the same stuff. We don't think logically all the time and we're capable of burning out if a situation becomes too stressful. The computer won't burn out (most of the time). Stress in humans leads to burnout, which leads to turnover, and that is very costly to business.

McDonald defines a revolution as something that happens in a very short time, can't be predicted, and has a wide affect. Any kind of revolution—social, political, or technological—causes transitional stress. Great technical advances create pressures of adaptation and cultural shock.

Computers will be as pronounced an influence in our lives as television and cars, which have stress-causing affects themselves, but they're much easier to use. Many improvements will be needed to make computers more friendly and foolproof.

McDonald plans to help keep investigating the problems of computer stress and formulating ways to combat it. We should all be thankful that someone is bothering to look after our heads. ■

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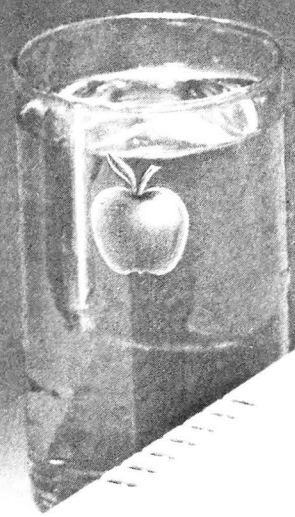
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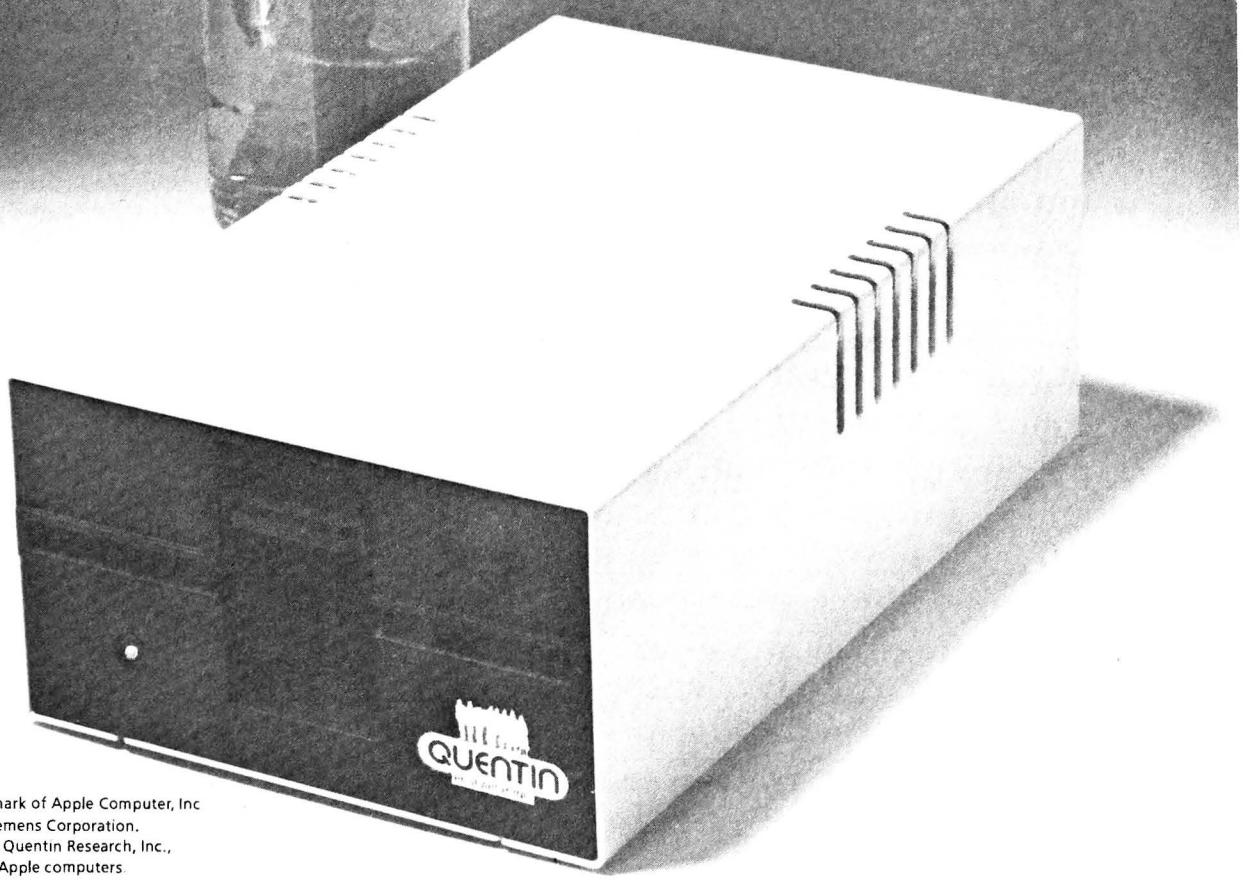
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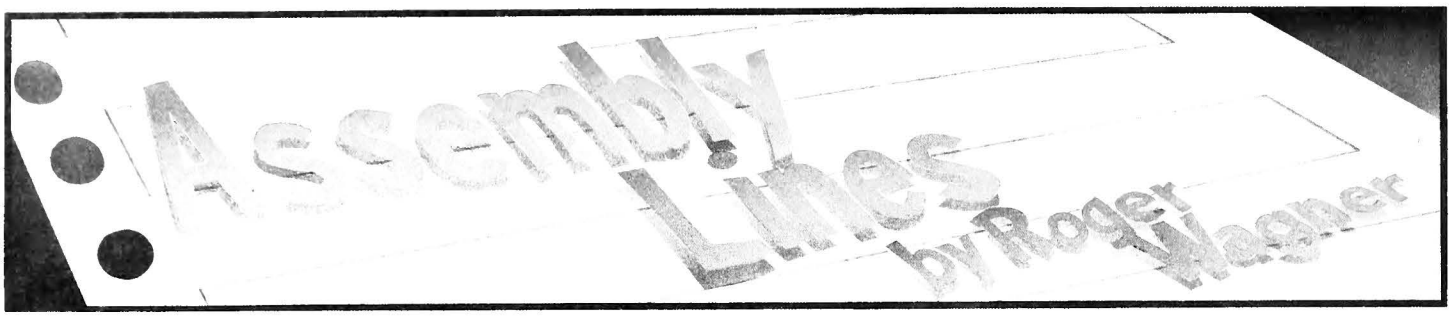
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Everyone's Guide to Assembly Language, Part 22

Last month's column concluded with a demonstration program that showed the relative appearances of a line drawn with the normal *hplot* command as well as with special 140 and 560 point mode plotting routines.

The entire plotting process was based on a model of point display in which each point on the screen corresponds to the status of a particular bit within a memory byte. For general plotting, the chart in figure 1 illustrates the corresponding color points. (For further details, consult recent installments of this column.)

The 140-point mode was created to ensure that for any *hplot*-type action, a consistent color dot would always be plotted. This consistency is not ordinarily available in the Apple's usual 280-point mode.

For instances in which color is not a concern, an alternate scheme was devised that would be indifferent to the color of the dot illuminated (as the viewer would when using a black and white monitor). An added feature of this scheme allows resolution of points at 560 dots per line. This was done by using the high-order bit of each byte to shift a given dot one-half of a position.

When the final demonstration program was run, the last line drawn was done in the 560-point mode. You may have noticed, though, that certain points on the line were rather faint. This brings us to the discussion of one of the last (?) bugs in the hi-res graphics routines.

Change last month's test program to appear as follows:

```
10 D$ = CHR$(4)
40 HOME : INPUT "BLACK1 OR BLACK2? (1 OR 2)";I
100 REM NORMAL TEST
110 HGR : HCOLOR= 1 * 4 - 4: HPLOT 0,0: CALL 62454:
    HCOLOR= 11 - 1 * 4
120 FOR I = 0 TO 100
130 HPLOT I,I
140 NEXT I
200 REM PLOT.140 TEST
205 PRINT D$;"BLOAD PLOT.140,A$300"
210 FOR I = 0 TO 100
220 CALL 768,I,I
230 NEXT I
300 REM PLOT.560 TEST
305 PRINT D$;"BLOAD PLOT.560,A$300"
310 FOR I = 0 TO 100
320 CALL 768,I,I
330 NEXT I
```

When you run this program, enter either a 1 or a 2 to specify which "flavor" of *black* you want for the background. Under normal circumstances, an *hgr* statement clears the background to *black1*, (high bit off on each byte) and plots are done using *white1*. This program changes that by using the alternate *white* for the background selected; that is to say, if you select *black1* for the background, *white2* will be used to *plot*. If you select *black2*, *white1* will be used.

Examining the listing, then, you'll notice that line 110 sets *hcolor* to *black1* or *black2*, does the required *plot*, and then clears the background to that color. A *call 62454* will always clear the current hi-res screen to the last color plotted (see page 134 of your *Applesoft Reference Manual* for a description of this).

Following the screen clear, *white* is set in the alternate mode described earlier.

Lines 100-140 draw a diagonal line point by point as was done last column, but now the line should appear to have a few faint spots in it. If you choose *black2* as the background, the line will have places where the dots appear slightly larger than you'd have expected.

Similar effects can be observed in the 140 and 560 mode lines.

Interactions between Adjacent Bytes. The entire premise of the 560-point mode was that the high-order bit of each byte affected the final display position of each bit within it. We have seen how changing the status of bit 7 (the high-order bit) may shift a given dot one-half of a position, depending on whether or not the bit is set.

Now for the new wrinkle. It turns out that for dots associated with bit 6 of a byte, the high-order bit of the *next* byte in memory *also affects the display of the first byte.*

As an example, first clear the hi-res screen with an *hgr* and then enter the Monitor via the usual *call–151.*

Now enter the following values into memory. You should see an effect similar to the description at the right of each statement.

```
*2138: 40 (plots dot. Width = 1 unit)
*2139: 80 (dot extends. New width = 1.5 units)
*2139: 00 (back to normal. Width = 1 unit)
*2138: C0 (faint. Width = 0.5 units)
*2139: 80 (normal. Width = 1 unit)
```

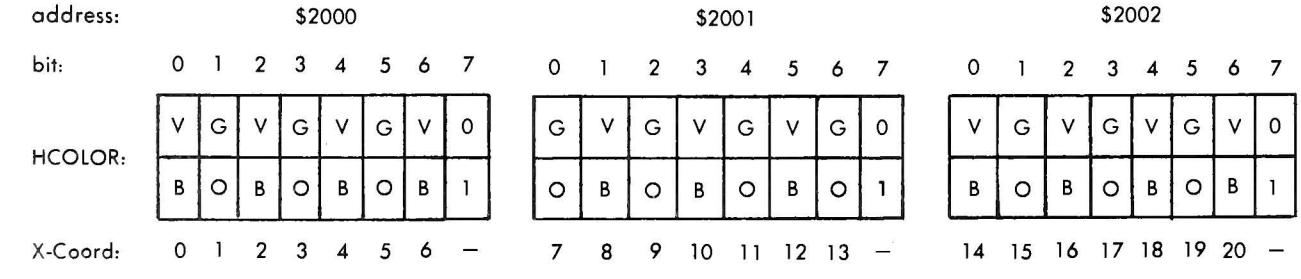


Figure 1.

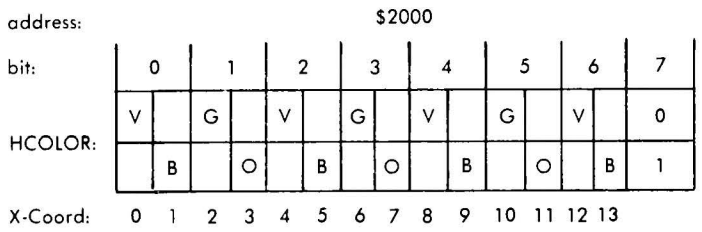


Figure 2.

The references to a *width* are an approach to explaining what happens. If you have a black and white monitor, the relative visual strengths of the dots can be related to an apparent width of the dots when illuminated on the monitor screen. On a color television or monitor, the widths aren't discernible, but differences in color and brightness can be seen.

Before any further explanations, let's re-examine the 560-point model used in earlier columns.

You'll recall that although the violet and blue dots officially occupy the same screen position horizontally, in actuality a half position shift may happen, depending on whether the high bit is set or clear. When $2138 was set to $40, we were, as such, plotting position 12 on the display. When $2138 was set to $C0, position 13 was illuminated. The flaw can be explained by imagining that the high-order bit of $2139 (the next byte after $2138) can also produce a slight shift on a dot produced by bit 6 of $2138. The general rule is that for any dot produced by bit 6, the succeeding byte of memory must have a high-order bit (bit 7) set to the same value as bit 7 of the byte being plotted.

If this rule is not observed, one of two things will happen:

1. If bit 7 of the displayed byte is clear and the next byte is set, the dot will be extended or enlarged—slightly.
2. If bit 7 of the displayed byte is set and the next byte is clear, the dot will be reduced slightly, resulting in a fainter image.

An interesting result is the conclusion that even the "normal" method of plotting (that is, *white*) will give ragged displays when adjacent bytes have contrary high-bit settings!

Some "New and Improved" Routines. Well then, that has been a lot to digest. In fact, at this point you might just want to take a break to let everything sink in, maybe fix yourself a nice cup of tea and meditate on it for a while.

Glad to see you again! One of the difficulties in presenting the material in the last few issues has resulted from the discovery that hi-res graphics is not all that logical. Much of hi-res graphics seems to be very empirical in nature. That is, it's more a matter of accepting that things are a certain way as derived from experimentation, than trying to account for the innermost workings of a seemingly random event. (In this case, the innermost workings are related to the purely electronic world of wires, video protocols, and so forth, which is mostly incidental to the programmer!)

The worst is probably over, though. At this point you should have at least a general feel of how the dots are mapped on the screen. Let's now create some final routines that encompass the various quirks of the hi-res system as it presently exists:

PLOT.140+. The first one to fix is the 140-point mode routine. For all routines the approach will be very direct:

1. Determine whether the dot being plotted involves bit 6 of the byte of memory in question. If not, don't worry.
2. If bit 6 is used, check the status of the high-order bit (bit 7) of the byte.
3. Fix the high-order bit of the *next* byte in memory, if needed, to match the first byte.

Here's the new routine to do just that:

```
                        1 ************************ *
                        2 *     HI-RES PLOT.140+     *
                        3 *                          *
                        4 ************************ *
                        5 *
                        6 *
                        7           OBJ  $300
                        8           ORG  $300
                        9 *
                       10 CHKCOM    EQU  $DEBE
                       11 FRMNUM    EQU  $DD67
                       12 GETADR    EQU  $E752
                       13 LINNUM    EQU  $50
                       14 COMBYTE   EQU  $E74C
                       15 *
                       16 X         EQU  $E0
                       17 *
                       18 HPLOT     EQU  $F457
                       19 COLBYTE   EQU  $E4
                       20 HMASK     EQU  $30
                       21 HNDX      EQU  $E5
                       22 GBAS      EQU  $26
                       23 *
0300: 20 BE DE         24 ENTRY     JSR  CHKCOM
0303: 20 67 DD         25           JSR  FRMNUM
0306: 20 52 E7         26           JSR  GETADR
                       27 *
0309: 06 50            28 CALC      ASL  LINNUM
030B: 26 51            29           ROL  LINNUM+1     ; X*2
                       30 *
030D: A9 08            31           LDA  #$08         ; BIT 3 (%00001000)
030F: 24 E4            32           BIT  COLBYTE
0311: F0 06            33           BEQ  C1           ; NO MATCH (COLOR=EVEN)
0313: E6 50            34           INC  LINNUM
0315: D0 02            35           BNE  C1
0317: E6 51            36           INC  LINNUM+1
                       37 *
0319: A5 50            38 C1        LDA  LINNUM
031B: 85 E0            39           STA  X
031D: A5 51            40           LDA  LINNUM+1
031F: 85 E1            41           STA  X+1
                       42 *
0321: 20 4C E7         43 GETY      JSR  COMBYTE
0324: 8A               44           TXA               ; PUT Y-COORD IN ACC
0325: A6 E0            45 PLOT      LDX  X
0327: A4 E1            46           LDY  X+1
0329: 20 57 F4         47           JSR  HPLOT
                       48 *
032C: A5 30            49 CHK       LDA  HMASK
032E: C9 C0            50           CMP  #$C0         ; %11000000
0330: D0 11            51           BNE  DONE
                       52 *
0332: A4 E5            53 FIX       LDY  HNDX
0334: C8               54           INY
0335: B1 26            55           LDA  (GBAS),Y
0337: 24 E4            56           BIT  COLBYTE
0339: 30 04            57           BMI  HISET
033B: 29 7F            58 HICLR     AND  #$7F         ; %01111111
033D: 10 02            59           BPL  STORE        ; ALWAYS
033F: 09 80            60 HISET     ORA  #$80         ; %10000000
0341: 91 26            61 STORE     STA  (GBAS),Y
0343: 60               62 DONE      RTS
```

The listing through line 47 should appear identical to last month's routine. Lines 48 through 62 add a check to see whether the next byte in memory needs to be adjusted according to the three-step procedure just described.

The first step is to examine location $30 (HMASK). You'll remember from last month that this is a mask used to indicate which bit position is to be set to plot the point. If bit 6 were set, this location will hold the value $C0 (binary: %11000000). Lines 49 through 51 check for this.

If a match is found, we know bit 6 was set by the plot. We must now access the next byte in memory and either set or clear bit 7 of that to match our original byte. Since HNDX ($E5) holds the offset of the current byte (usually used by combining with GBAS ($26) in the form LDA (GBAS,Y), we can load the Y register with HNDX and then increment using the

INY on line 54 to shift our attention to the next byte. The data for that byte is then loaded into the accumulator on line 55.

Now for the sleight of hand. We want to check the status of the first byte, but if we load the accumulator we'll lose the data currently held there. To solve the problem, consider this: The color mask byte COLBYTE ($E4) holds the mask used only moments before to do the *plot*. We can check the high-order bit of this value to determine the status of bit 6 in the byte accessed by the *plot*. Since it's bit 7 we're interested in, we can also use the BIT command to do the check.

Line 56 does a BIT COLBYTE. This will move bit 7 of COLBYTE into the status register, after which a BMI (branch on minus) or a BPL (branch on plus) can be used to check how the bit was set.

In this case, the BMI is used to detect bit 7 being set. If this branch is taken, the program will skip to line 60. If not, the HICLR (for high-bit clear) section will be entered. In this section, the AND operator is used to force the clearing of the high bit in the accumulator. The BPL following this operation is always taken as the sign bit of the status register and will be cleared by this action as well.

If HISET (for high-bit set) is entered, the ORA #$80 will force the setting of bit 7 of the accumulator. (If you need more information on the logical operators, you may wish to consult back issues of this column or chapter eleven of *Assembly Lines: The Book*.) Line 61 (STORE) puts the contents of the accumulator back into memory, immediately followed by the RTS which ends the routine.

PLOT.560+. This routine is also a variation on a program presented last month and again uses a check system identical to that used in PLOT.140.

```
1  ************************ *
2  *     HI-RES PLOT.560+     *
3  *                          *
4  ************************ *
5  *
```


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```
                        6  *
                        7          OBJ  $300
                        8          ORG  $300
                        9  *
                        10 CHKCOM  EQU  $DEBE
                        11 FRMNUM  EQU  $DD67
                        12 GETADR  EQU  $E752
                        13 LINNUM  EQU  $50
                        14 COMBYTE EQU  $E74C
                        15 *
                        16 X       EQU  $E0
                        17 *
                        18 HPLOT   EQU  $F457
                        19 COLBYTE EQU  $E4
                        20 HNDX    EQU  $E5
                        21 HBIT    EQU  $30
                        22 GBAS    EQU  $26
                        23 *
0300: 20 BE DE          24 ENTRY   JSR  CHKCOM
0303: 20 67 DD          25         JSR  FRMNUM
0306: 20 52 E7          26         JSR  GETADR
                        27 *
0309: 46 51             28 CALC    LSR  LINNUM+1
030B: 66 50             29         ROR  LINNUM      ;X/2
030D: A9 7F             30 C0      LDA  #$7F        ;%01111111
030F: 85 E4             31         STA  COLBYTE
0311: 90 04             32         BCC  C1          ;X=EVEN FROM LAST 'ROR'
0313: A9 FF             33         LDA  #$FF        ;%11111111
0315: 85 E4             34         STA  COLBYTE
                        35 *
0317: A5 50             36 C1      LDA  LINNUM
0319: 85 E0             37         STA  X
031B: A5 51             38         LDA  LINNUM+1
031D: 85 E1             39         STA  X+1
                        40 *
031F: 20 4C E7          41 GETY    JSR  COMBYTE
0322: 8A                42         TXA              ;PUT Y-COORD IN ACC
0323: A6 E0             43 PLOT    LDX  X
0325: A4 E1             44         LDY  X+1
0327: 20 57 F4          45         JSR  HPLOT
                        46 *
032A: A5 30             47 CHK     LDA  HBIT
032C: C9 C0             48         CMP  #$C0        ;%11000000
032E: D0 11             49         BNE  DONE
0330: A4 E5             50 FIX     LDY  HNDX
0332: C8                51         INY
0333: B1 26             52         LDA  (GBAS),Y
0335: 24 E4             53         BIT  COLBYTE
0337: 30 04             54         BMI  HISET
0339: 29 7F             55 HICLR   AND  #$7F        ;CLR BIT 7
033B: 10 02             56         BPL  STORE
033D: 09 80             57 HISET   ORA  #$80        ;SET BIT 7
033F: 91 26             58 STORE   STA  (GBAS),Y
                        59
0341: 60                60 DONE    RTS
```

Ordinarily, this would be a fine place to end this month's column, but there's one more routine worth presenting. So far what you've got is a choice between plotting a single color (PLOT.140) or taking whatever color you get in exchange for the capability for greater horizontal resolution.

Well, with just a little more effort, we can create a routine that will offer the same degree of horizontal accuracy, *and* guarantee that any dot plotted will be white.

PLOT.560–White. Normally when you specify white when using Apple graphics, you're really saying, "I don't care what color," because any attempt to plot a single point will illuminate only a colored dot, not a true white dot. This is because white is really formed by plotting two adjacent dots.

This is consistent with the examination of the COLBYTE bit pattern for acceptable bits to set combined with the given HMASK bit pattern for a specified horizontal position within the byte. This process of plotting was described in greater detail last month, but as a quick refresher, remember that this combination would successfully do the equivalent of:

```
Statement: HCOLOR=3:HPLOT 3,0
Mask Patterns:  COLBYTE:  %0111  1111  (HCOLOR BIT MASK)
                HMASK:    %1000  1000  (BIT 3 SET) (ignore Hi bit)
                RESULT:   %0000  1000  (Position 3 gets set green)
```

You might imagine that if the HMASK could have been set up to have *two* adjacent bits set, the result might have been a true white dot:

```
Stotement: HCOLOR=3:HPLOT 3,0
Mosk Potterns:  COLBYTE:  %0111  1111  (HCOLOR BIT MASK)
                HMASK:    %1001  1000  (BITS 3 & 4 SET)
                RESULT:   %0001  1000  (Positions 3 & 4 set white)
```

As it happens, this can be done, and here's the new routine to do it!

```
                        1  ************************ *
                        2  *     HI-RES PLOT.560W     *
                        3  *                          *
                        4  ************************ *
                        5  *
                        6  *
                        7           OBJ  $300
                        8           ORG $300
                        9  *
                       10 CHKCOM  EQU $DEBE
                       11 FRMNUM  EQU $DD67
                       12 GETADR  EQU $E752
                       13 LINNUM  EQU $50
                       14 COMBYTE EQU $E74C
                       15 *
                       16 X       EQU $E0
                       17 *
                       18 HPOSN   EQU $F411
                       19 HPLOT   EQU $F457
                       20 COLBYTE EQU $E4
                       21 HCOLOR1 EQU $1C
                       22 HMASK   EQU $30
                       23 *
0300: 20 BE DE         24 ENTRY   JSR  CHKCOM
0303: 20 67 DD         25         JSR  FRMNUM
0306: 20 52 E7         26         JSR  GETADR
                       27 *
0309: 46 51            28 CALC    LSR  LINNUM+1
030B: 66 50            29         ROR  LINNUM       ;X/2
030D: A9 7F            30         LDA  #$7F         ;%01111111 (WHITE1)
030F: 85 E4            31         STA  COLBYTE
0311: 90 04            32         BCC  C1           ;X=EVEN
0313: A9 FF            33         LDA  #$FF         ;%11111111 (WHITE2)
0315: 85 E4            34         STA  COLBYTE
                       35 *
0317: A5 50            36 C1      LDA  LINNUM
0319: 85 E0            37         STA  X
031B: A5 51            38         LDA  LINNUM+1
031D: 85 E1            39         STA  X+1
                       40 *
031F: 20 4C E7         41 GETY    JSR  COMBYTE
0322: 8A               42         TXA               ;PUT Y-COORD IN ACC
0323: A6 E0            43 PLOT    LDX  X
0325: A4 E1            44         LDY  X+1
0327: 20 11 F4         45         JSR  HPOSN
032A: A5 30            46         LDA  HMASK
032C: 0A               47         ASL
032D: 05 30            48         ORA  HMASK
032F: 85 30            49         STA  HMASK
0331: 20 5A F4         50         JSR  HPLOT+3
                       51 *
0334: 24 30            52 CHK     BIT  HMASK
0336: 50 22            53         BVC  DONE         ;BIT 6: CLR
                       54 * BIT 6 CLR: POSN = 0-9
                       55 * BIT 6 SET: POSN = 10-13
                       56 *
0338: 24 1C            57 CHK2    BIT  HCOLOR1
033A: 10 06            58         BPL  HICLR        ;BIT 7 TEST
033C: A9 FF            59 HISET   LDA  #$FF         ;WHITE2
033E: 85 1C            60         STA  HCOLOR
0340: D0 04            61         BNE  CHK3         ;ALWAYS
0342: A9 7F            62 HICLR   LDA  #$7F         ;WHITE1
0344: 85 1C            63         STA  HCOLOR1
                       64 *
0346: A9 20            65 CHK3    LDA  #$20         ;%00100000
                       66 *
                       67 * HMASK: %11100000 IF POSN = 10,11
                       68 * HMASK: %11000000 IF POSN = 12,13
                       69 *
0348: 24 30            70         BIT  HBIT
034A: D0 06            71         BNE  NOPLOT       ;BIT 5 SET
034C: A9 81            72 PLT     LDA  #$81         ;%10000001
034E: 85 30            73         STA  HBIT
0350: D0 04            74         BNE  FIX          ;ALWAYS
0352: A9 80            75 NOPLOT  LDA  #$80         ;%10000000
0354: 85 30            76         STA  HBIT
                       77 *
0356: C8               78 FIX     INY
0357: 20 5A F4         79         JSR  HPLOT+3
                       80 *
035A: 60               81 DONE    RTS
```

This routine starts out much like the other PLOT.560 routine. Lines 24 through 44 are identical and perform the same function of calculating what X value to hand to the normal Applesoft routine. The first difference appears at line 50, where a JSR HPOSN is performed instead of a JSR HPLOT. This is done to allow Applesoft to go through its usual preparation for a plot. This sets up the color mask and position mask bytes and also the base address calculation.

At this point, we step into the usual process to tamper with the HMASK ($30) value. As in the earlier example, this would ordinarily have just a single bit position "marked" for the upcoming PLOT. However, by using the ASL, ORA HMASK combination on lines 47 and 48, we can shift the original pattern and then superimpose the new pattern on the old.

```
Exomple: For X = 3
Originol HMASK:    %1000   1000
ASL:               %0001   0000
ORA HMASK:         %1001   1000
```

The address usually given for the HPLOT routine, $F457, includes a JSR to HPOSN. Because we've already done this, a JSR HPLOT+3 accomplishes the first stage of our opera-

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tion; namely, the plotting of a pure white dot.

Now the remaining problem is to take care of end-of-the-byte flaws. This can occur for four possible plots. For each byte, there are fourteen possible positions which can be plotted, numbered 0 through 13 (see figure 2). For positions 10 and 11, bits 5 and 6 will be set. Because bit 6 can be affected by bit 7 of the next byte in memory, a check for bit agreement must be made.

Stranger still, if positions 12 and 13 are plotted, only bit 6 is available, which would normally put us back to having plotted only a colored dot. To fix this, we have to go again to the next byte in memory and do another plot to illuminate just the very first dot of that byte.

In general then, the process will be:

1. Fix HMASK to turn on two adjacent bits where possible.
2. HPLOT with altered HMASK.
3. Check for bit 6 usage. If none, exit routine.
4. Set bit 7 of next byte to agree with bit 7 of current byte.
5. Check whether bit 5 is being used. If not, go directly to HPLOT+3.
6. If bit 5 is set, set HMASK to plot only the first dot of the next byte.
7. Make a second pass to HPLOT to plot X+1 screen coordinate, single dot only. If HMASK set to $81, only the high-order bit will be set, with no actual plot done.

If you now examine line 52 of the listing, you'll see the BIT command is again used, this time to check bit 6 of HMASK. The BIT command forces bit 6 of the status register (the overflow flag) to the same value as bit 6 of HMASK. Thus BVS (branch overflow set) and BVC (branch overflow clear) can be used to check for bit 6 set or clear, respectively. In our case, BVC will branch to the exit point, DONE, if bit 6 is clear.

If bit 6 is set, lines 57-63 set the high bit of the other color mask byte, HCOLOR ($1C), to agree with the previous plot. This color mask byte is used later by HPLOT. Because we'll be skipping the usual entry point ($F457), we have to set this byte specifically.

Once the color byte is set, another check is done to see if bit 5 is set. This is done by again using the BIT command. Since only bits 6 and 7 can be checked via the status register, we must load the accumulator with a numeric image of the bit we wish to test for. In this case, the value used is #$20 (%00100000). After the BIT command, a BNE (branch not equal) will be taken if bit 5 is set. Yes, it sounds backward, but then BIT is a rather strange command.

Given the appropriate result of the BIT test, HMASK is loaded with either #$81 or #$80, depending on whether we want an actual plot to take place.

At line 78 (FIX), we take advantage of the fact that the Y register is still set to the right value to access the current memory byte. By doing the INY, we advance the pointer to the next byte so that the JSR HPLOT+3 will make the appropriate corrections to the next byte in memory.

A Final Demo Program. To finish things off, let's try one last Applesoft program to make use of the new routines. This is an extension of the first listing presented at the beginning of this article, and will give you an opportunity to compare the relative screen appearances of different routines.

```
10 D$ = CHR$ (4)
40 HOME : INPUT "BLACK1 OR BLACK2? (1 OR 2)";I:I = I - 1
100 REM NORMAL TEST
110 HGR : HCOLOR= I * 4: HPLOT 0,0: CALL 62454: HCOLOR=
    7 - 4 * I
120 S = 1: REM SCALE FACTOR
130 K = 20: REM OFFSET VALUE
140 GOSUB 900
200 REM PLOT.140 TEST
205 PRINT D$;"BLOAD PLOT.140+,A$300"
210 S = .5:K = 40
220 F = 1: REM FUNCTION FLAG
230 GOSUB 900
300 REM PLOT.560 TEST
305 PRINT D$;"BLOAD PLOT.560,A$300"
310 S = 2:K = 60
320 GOSUB 900
400 REM PLOT.560+ TEST
405 PRINT D$;"BLOAD PLOT.560+,A$300"
410 K = 80
420 GOSUB 900
500 REM PLOT.560W TEST
505 PRINT D$;"BLOAD PLOT.560W,A$300"
510 K = 100
520 GOSUB 900
600 END
900 REM PLOTTER
930 FOR I = 1 TO 100
940 X = (I + K) * S:Y = I
950 X = X / 2
960 IF F = 0 THEN HPLOT X,Y
965 IF F THEN CALL 768,X,Y
970 NEXT I
980 RETURN
```

You'll also notice that this has the scaling factors built into it to make each line slant at the same angle. The offset factor K is used to move each plot to the right a little for appearance's sake.

By adding line 955 like so:

```
955 X = X/2
```

You can slant the lines even further to show off the maximum slant possible for the 560-point modes. You might also want to try this program with the 140 and 560 point routines from last issue to see how they perform in place of the new ones.

Parting Remarks. These routines are best used in mathematical charts, rather than in pure graphics such as pictures. The main argument against the 560-point mode is that you can't be assured that plotting one point will not affect nearby points. As we've demonstrated here, there is apparently no approach that can guarantee this will not happen. It would seem, then, a matter of your own preference which to use. Our hope is that these routines will widen your options for your own programming goals and that they've taught you a little along the way.

The usual approach in this column has been to simplify any idea when first presenting it. In the area of graphics, though, simplicity has not been easy. For the most part, hi-res graphics gives the impression of being only marginally logical. In any event, though, now you're probably starting to get a feel for how the contents of memory affect what is displayed on the screen. In the final analysis, the real challenge of hi-res graphics is manipulating the contents of memory to produce the visual effects you want.

Well, enough of the computer-side chat. Have fun with the routines and see you here next issue!

Correction to the March 1982 Assembly Lines: You may have had difficulty with the HI-RES DEMO – #1. The problem lies in line #84 of the listing. The listing should read:

```
6077: 20 05 F6 84          JSR DRAW+4
```

The DRAW routine ($F601) is normally called with the X and Y registers set to the address of the individual shape to be drawn. This can be automated, however, by first calling SHNUM ($F730). When SHNUM is called though, a later entry point to DRAW is used. Specifically, this should be DRAW+4 ($F605). Entering at $F601 by mistake can produce rather unpredictable results.

Thanks to Don Munyan of Santa Fe Springs, California, for writing about this error in the listing. ◨

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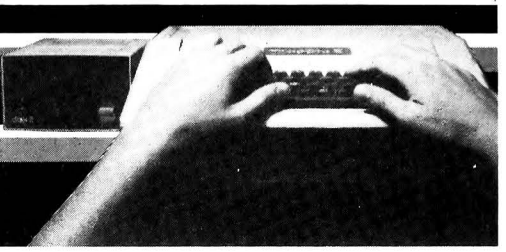
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TRADETALK



☐ **Apple Computer** (Cupertino, CA), with the aid of the San Jose Police Department, has concluded a "sting" operation resulting in the recovery of $1,068,500 worth of stolen Apple IIIs and the arrest and dismissal of four employees. Officials became suspicious several months ago when inventory started showing losses of one and two units at a time over a period of months. An undercover agent was placed in the company, and police conducted a raid the week of May 11 on the warehouse where the IIIs were being stored.

☐ **Muse Software** (Baltimore, MD) is out of the hardware business. The decision to leave retailing and return to software research and development, laying off ten employees, was made by president **Ed Zaron**, who said the Charles Street store was breaking even but required more energy than it was worth.

"It was a matter of deciding where to focus our energies. We decided to continue to do what we do best, and that is write programs."

☐ **Spinnaker Software** (Cambridge, MA) has been founded by **Bill Bowman** and **David Seuss** "to fill the need for quality software in home education." Funded by **TA Associates**, the new company is looking for educational software programmers who want a marketing outlet for their efforts. They will release their first series of ten educational games and interactive fiction programs in late August.

☐ The new mail-order software division of **dilithium Press** (Beaverton, OR) will not be called Blackbird Software, as reported in Marketalk News in May. In the interests of easy user identification, the division will now be known as **dilithium Software**.

☐ **Mary Locke** is the new customer representative for **Penguin Software** (Geneva, IL). According to president **Mark Pelczarski**, she will be handling all customer service as well as deciding whether it would help, when caught in a falling elevator, to jump just before it hits the ground.

☐ **Jon Freeman** and **Anne Westfall** have formed **Free Fall Associates**, a microcomputer game design and development firm located in Palo Alto, California. Freeman is the cofounder of Automated Simulations and designer of the *Dunjonquest* system, among others. Westfall was senior software engineer with Automated, previously having worked to establish the microcomputer products and development division at Morton Technologies.

☐ **Software Marketing Incorporated** (Cambridge, MA) is a new company formed to provide marketing expertise to software producers contemplating the introduction of a new product.

Stated president **Mort Rosenthal**, "We feel that, despite the plethora of software available, there is a distinct lack of well-marketed software products."

SMI will assist small software companies in obtaining financing, and consult with them on market planning and research, promotion coordination, design and packaging, establishment of a distribution system, and assessment of financial resources. Services will vary depending on requirements and resources of the client.



Valerie Soares, sales manager for Davong Systems.

☐ **Richard Newsome**, president of **Davong Systems** (Mountain View, CA), has announced that **Valerie Soares** has joined the company as sales manager. She will qualify new Davong dealers and OEMs, service accounts, and promote the company's product line of Apple expansion products. Soares comes to Davong from UCI, where she was a computer field sales representative. She was previously western region account representative for IMSAI.

☐ **Pear Software** (Ashland, OR) has announced sole distributorship of its initial product line—*The Manipulator, The Liberator, The Count,* and *Zargs*—through **Insoft** (Portland, OR). **Temporal Acuity Products-Micro Music Inc.** (Bellevue, WA) will serve as sole distributor of *The Uniform Master,* an automatic assigning system for inventory items.

☐ **Microcom** (Norwood, MA) has finalized venture capital arrangements with Menlo Ventures of Menlo Park, California; Welsh, Carson, Anderson, & Stowe of New York; Chatham Venture and East Tech Associates of Boston; and Coastal Nominees of England. The five companies will be providing the microcomputer communications firm with several million dollars in second-round financing to support the introduction of new products in the second half of 1982 and allow for expansion of the company's marketing organization.

Dr. Charles G. Moore of WCA&S, and **Dr. Yung Wong** of Menlo Ventures, have been elected to Microcom's board of directors, bringing the number of directors to six.

☐ **Dr. Leah Hutton** has been appointed director of the adult camps of Computer Camps International (Vernon, CT). Dr. Hutton is presently director of analytical studies at Tufts University and has worked in the computer field for the past fourteen years.

☐ **Microcon SoftwareCenters** (Watertown, MA) has announced the sale of its first retail franchise. It will be located in the Woburn Mall of Woburn, Massachusetts, classified as a type II or Family SoftwareCenter, offering off-the-shelf entertainment and educational software, computer books, magazines, and accessories.

"This is the first of many franchises," said Microcon president **Barry J. Passen.** "We plan six more in the next two months. At the rate we're going, sixty stores by 1984 seems a very conservative figure."

Passen also announced plans for a major corporate expansion in staffing and office space in order to support franchisees better. Individuals wishing information on Microcon franchises should contact **Business Concepts,** Box 219, Hatfield Road, Hopkinton, NH 03301; (603) 746-4626.

☐ **Computerland** (Hayward, CA) will open the first of its new satellite stores this summer in King of Prussia, Pennsylvania. The stores will specialize in software and supplies and will be operated as satellites of existing Computerland franchises, and be located in the same geographical area. Twenty-five are planned for 1982. Ten overseas stores are scheduled for opening in Trinidad, Halifax, England, Hong Kong, Norway, Germany, Spain, Saudi Arabia, Sweden, and France.

☐ Two midwestern computer product distributors have signed $1 million contracts with **Olivetti OPE** (Tarrytown, NY) for distribution of Olivetti printers in the West, Midwest, and South. **AID/Microrep** (Minneapolis, MN) will handle the company's line of daisy-wheel and dot-matrix printers, and **Kaltronics Distributing** (Chicago, IL) will distribute the DY 211 daisy-wheel printer.

☐ **Ben Dyer,** president of **Peachtree Soft-**

ware (Atlanta, GA), has announced that Peachtree has reached an agreement in principle with Automation Consultants to license its CP/M *Job Cost System* software package.

"Job costing is a package in great demand by our customers," said Dyer. "This system will enable microcomputer users to quickly pinpoint their most profitable jobs while at the same time immediately highlighting unprofitable areas.

"This . . . also represents an important milestone for Peachtree's new West Coast office, which is located in the San Francisco Bay Area. Increased software acquisitions are one of the major functions of our West Coast operation."

The company's overseas arm has acquired marketing rights to *COMPACCT*, a series of CP/M-based Cobol accounting packages by CSA Micro Systems Ltd. of London.

☐ **Management Science America** (Atlanta, GA), parent company of Peachtree Software, has filed a registration statement with the Securities and Exchange Commission in connection with a proposed public offering of 710,000 shares of common stock: 250,000 shares to be sold by the company, and 460,000 shares sold by certain shareholders. Proceeds to the company will be used to furnish working capital and provide capital for possible acquisitions of companies, products, and equipment.

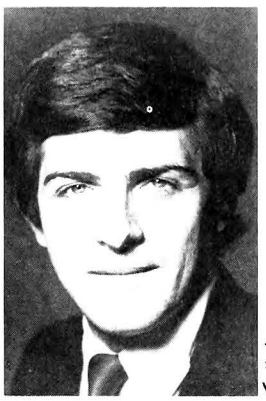
The company has reported first quarter earnings of $16.2 million, up 47 percent from the first quarter of 1981.

☐ Contending that computer retailing relies on "horse and buggy methods for selling space-age technology," **Philip Rozensky**, president of **Simple Soft** (Elk Grove, IL), has devised a five-minute "infomercial" for a new real estate analysis package his firm recently released. The purpose of the new marketing approach, consisting of a videotape information/sales presentation, is to aid retail sales, train new salespeople, and serve as a method of teaching computer technology.

☐ **Micro Co-op** (St. Charles, IL) has hired **David Albert** as full-time editor of the *Co-op Newsletter*. Publishers not on the Co-op's list for review copies should contact him about their products. New address: Box 714, St. Charles, IL 60174; (312) 232-1992.

☐ **Lewis R. Shomer**, vice president of marketing at **Novation** (Tarzana, CA), has announced the appointment of **Daryl Mayfield** to the marketing organization. He will be responsible for sales of the company's Bell-equivalent 103, 202, and 212 modems. Mayfield was previously with Racal Milgo of Huntington Beach, California, for two years as assistant regional sales manager.

☐ **Joseph O. Bentley, Jr.,** has taken the position of senior vice president and secretary-treasurer with **CCS Incorporated**, the San Antonio-based information services company. Bentley, a certified public accountant, was previously a manager with the Birmingham, Alabama, office of Arthur Young and Company.



Joseph O. Bentley, Jr., senior vice president with CCS Incorporated.

CCS is the sponsor of the Sofsearch software locator service, providing custom reports on software available for specific users needs on micro, mini, and mainframe computers.

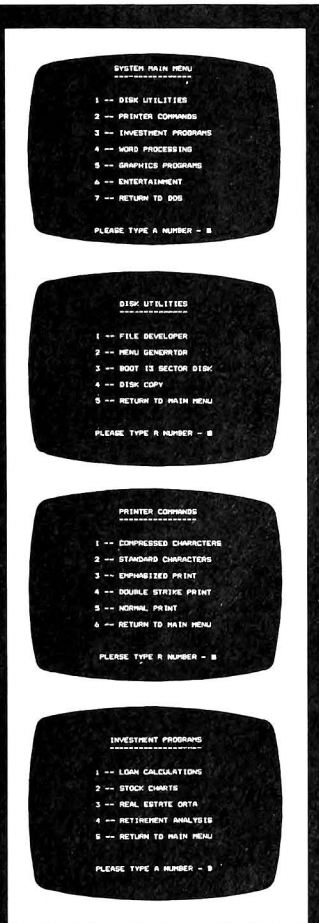
☐ **Soft-Link** (Los Altos, CA) has been founded by **Reid Rutherford, Gary Almond**, and **Joe D. Giulie** to develop, produce, and market business software. It has introduced thirteen CP/M-based programs, encrypted with a process called *Soft-Lok*, available to the user on a trial basis. If satisfied with the program, the user arranges to pay the balance of the purchase price and receive the key code which unlocks the program encryption. The programs are being distributed by **Ico-Rally.**

"Soft-Link expects to be a strong participant in the software business within six months," said Rutherford. "The business market will easily reach $3 billion by 1985. The industry's only limitation is its ability to sell the best software available in a cost-effective manner. Soft-Link's trial-use software is a major step in that direction."

☐ **Visi-Group** (Scarsdale, NY), the largest independent user group specializing in the uses of *VisiCalc*-type programs and publishers of *Spreadsheet*, a bimonthly newsletter, have changed their name to **Inter-Calc**, reasoning that the value of the group to members in coverage of formulae and applications covers a wider range now than it did when concentrating solely on the original *VisiCalc*.

☐ **MicroStand** has moved its corporate headquarters to 2000 South Holladay, Seaside, OR 97138. Their new toll-free telephone number is (800) 547-2107; in Oregon, (503) 738-9601.

☐ **Daniel R. Crooks** has been named executive vice president of **Waybern Corporation** (Garden Grove, CA). He comes to the software distributor from Anthony Industries, where he oversaw the start-up of twenty-three retail outlets and six warehouses as general manager of the retail and service division. ◨



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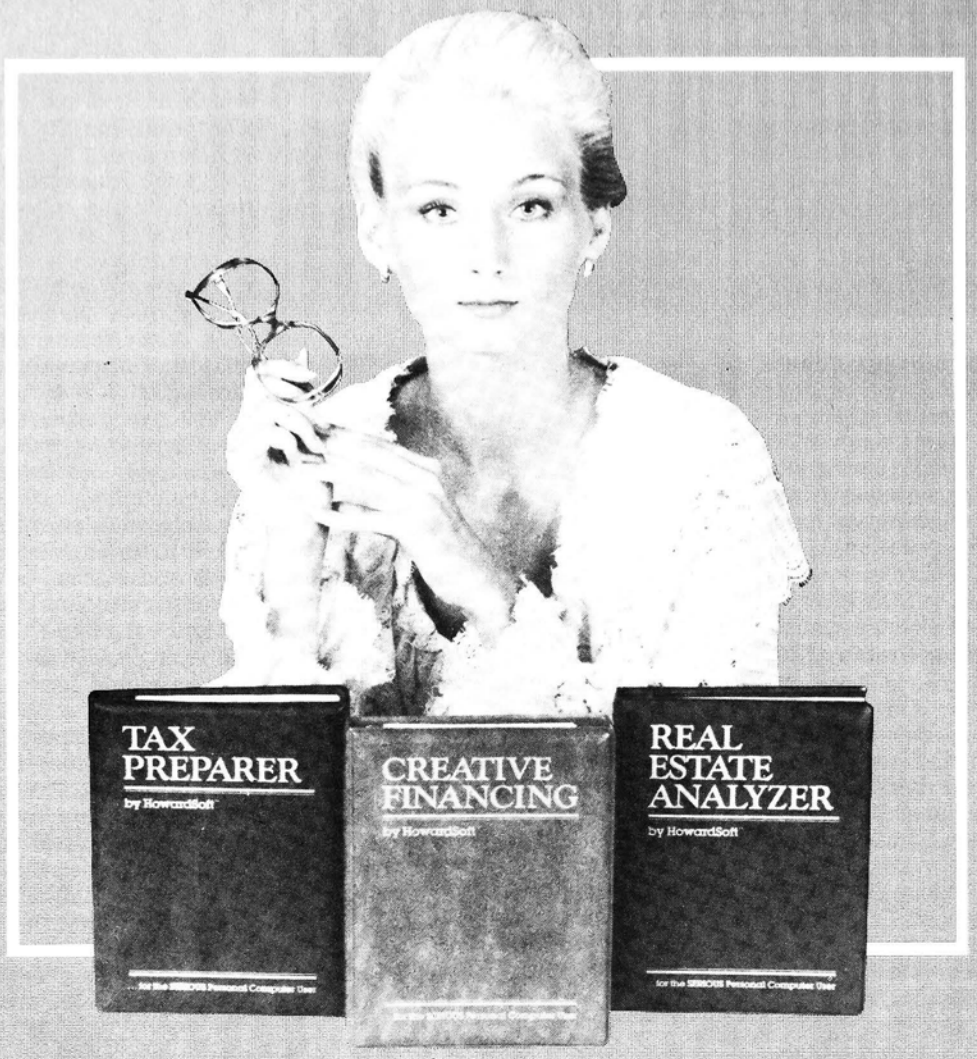
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VENTURES WITH VISICALC

BY JOE SHELTON

Once you've used *VisiCalc*, you realize you have a perfect method of analyzing and generating lots of numeric information. But, after you've spent a few minutes looking at long columns of numbers, you also realize the near impossibility of understanding what those numbers mean.

Look at a tax table. Do the tax percentages increase or decrease in proportion to gross income? It may look as though they always increase, but are there minor trends? You could use *VisiCalc* to analyze the information, but there's an easier way: graphics. It's much simpler to understand data trends in graphic format than in numeric format.

A number of business graphics products designed to convert and display data from *VisiCalc* files are available to Apple users. This month, we'll examine *Apple II Business Graphics*, *Apple III Business Graphics*, *VisiTrend/VisiPlot*, and *Apple Plot*. All of them can help you analyze numerical information. First, we'll give you a synopsis of each program's intent. Then we'll offer an evaluation of how well the programs work.

Recently introduced by Apple Computer, *Business Graphics* for the Apple II and *Business Graphics* for the III combine the ability to develop many different plots with statistical and analytical capabilities. They also allow numerical manipulation and additional analysis of numeric data.

Both programs were developed for Apple Computer by Business and Professional Software (Cambridge, MA). The II version, which requires 48K, language card, and two disk drives, and the III program, which calls for 128K and external disk drive, are very similar. Both are command-language driven. With a command language, you enter a simple two or three word English language command and the program executes it. This is a far cry from programs that require understanding menu structures and entering menu options to accomplish your goal.

Pies for Sale. Both programs are capable of plotting scattergrams; solid-line, dashed-line, area-filled, bar (vertical or horizontal, filled or outline), multibar, and pie (filled or outline) charts; and multiple overlays.

Here then are some of the features in both Apple business graphics products:

The format for the commands is *verb noun modifier*. You aren't required to use a modifier in every command. Some examples of commands are *draw pie* and *set device silentype*. Once you become familiar with the commands, you'll be able to abbreviate them to the first two or three letters, depending upon the command. For example, *draw pie* can be abbreviated to *dr pi*.

Both programs can compute and plot line, logarithmic, constant, sine, and parabola curves. You can also use them for doing statistical analysis; they compute minimum, mean, maximum, standard deviation, sum, and variance. You can perform mathematical manipulation of data sets, including adding sets, shifting, difference, subtracting, dividing, summing, and multiplying.

Both programs are compatible with Silentype and Qume Sprint 5 printers, Hewlett-Packard 7225a/b (with 17603A, RS-232 personality mode), and Houston Instruments DMP-3 and DMP-4 pen plotters.

Data interchange involves converting files from other applications so that they can be plotted. *Apple III Business Graphics* converts *VisiCalc III* print files and DIF format, Apple III Business Basic, and Apple III Pascal text files. *Apple II Business Graphics* works on *VisiCalc* (thirteen and sixteen sector) print files and *Apple Plot* (thirteen and sixteen sector), DIF format, Basic (thirteen and sixteen sector), and Apple Pascal text files.

Both programs display six colors on color television sets or monitors and plot color graphs on pen plotters.

Virtually Leapfrogging. *Business Graphics* can use data files larger than the available computer memory. Default file size is ninety to one hundred points, but you can set a virtual file on a disk, allowing a file to contain thousands of points.

A series of *Business Graphics* commands, as well as special *take file* commands, can be stored in a special file executed by a single command. This is useful if you want to make graphic comparisons of large amounts of information. You can display any number of slides (graphs) sequentially with either automatic timing or manual control.

Business Graphics permits a user to learn enough about the program to become productive and develop plots in a short time. Command language is the most obvious difference between *Business Graphics* and other graphics programs.

Depending upon the user, the command language may be experienced as a boon or a potential problem. While the command language is simple to use, it requires that the user understand it and know the commands to accomplish more complicated tasks. The sequence of commands necessary for some complicated plots can be very complex. Help screens are available, though, so you don't always have to refer to a man-

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ual for answers to your questions. The take files are also useful because they animate the process.

Device-independent programs such as these are powerful enough to use the capabilities of extremely hi-res printers and plotters. This means *Business Graphics* can expand to meet your needs. As you need higher resolution plots, you have only to purchase a better printer or plotter and a driver.

Power Trio. Three features make the *Business Graphics* packages powerful tools for analyzing and presenting numeric information. The virtual file capability allows you to enter large amounts of data into a single file. You can then select any segment of the information and display it. For example, you might have three years of daily sales information in a single file. Select any segment, one month's sales for example, and then display it.

The statistical functions permit fitting one of five curves into a data set and projecting it into the future. This can be used for sales and other types of projections. Projection and analysis are much easier in *Business Graphics* than in *VisiCalc*, because you don't have to enter your own formulas.

Take files are another useful feature. They constitute a miniprogramming language that uses all of the *Business Graphics* commands, along with a few others. Take files make it possible for you to automate plots on a plotter, do slide presentations, automate updating of files, and so on.

VisiPlot and *VisiTrend/VisiPlot*, from VisiCorp (the *VisiCalc* people), are among the best selling business products around. *VisiTrend/VisiPlot* is a combination business graphics and statistical product. *VisiTrend* is a subset of *VisiTrend/VisiPlot* for those who don't require statistical capability.

These products are designed to run on a sixteen-sector Apple II or II Plus with 48K (with or without language card) and one disk drive. Both packages are capable of plotting line, area, bar, pie, and high/low charts and scattergrams.

The products are menu driven, using an unusual type of menu that displays the options in two horizontal rows and uses an inverse box (similar to the cell cursor on *VisiCalc*). A *VisiCalc* user will find the menus simple to use.

Multiple series can be plotted. Windowing (similar to *VisiCalc*) allows simultaneous plotting of two different graphs. Up to sixteen different data series, with a total of 645 points, can be in memory at one time, and a single chart can contain up to 150 points.

VisiTrend can determine simple statistics such as mean, average, minimum, and maximum. It can also do moving averages, linear multiple regression, trend-line forecasting, cumulative, total, lead, lag, percent change, and smoothing. It permits, too, complex arithmetic operations on two or more time series.

These Visi products are compatible with the following printers: Apple Silentype, Trendcom 200, Centronics 739, NEC Spinwriter 5510, 5520, and 5530; Qume Sprint 5/45, Epson MX-80 (must include Graftrax option) and MX-100; and IDS Paper Tiger 440, 445, 460/460G (both must include dotplot option), and 560/560G (dotplot option).

Thumbnail Review. Like the rest of the Visi series, these are quality products. They offer some features that none of the other products reviewed here have, namely, they allow you more than two data sets in memory and give you the ability to display two separate graphs at the same time. For some users, these features alone could justify their purchase.

A big plus is that the DIF format permits data to be easily transferred between many of the Visi products. If you need *VisiCalc*, *VisiFile*, or *VisiDex*, this may be important. The Visi graphics products, unlike Apple products, don't need a conversion file to convert data; it stays in DIF file format.

In addition, you probably won't have to return to your dealer to have the program reconfigured for different printers. It already supports more than thirteen printers.

The Visi products can plot almost everything the Apple products can, as well as offering a high/low graph capability. High/low is especially useful to stock market analysts and persons who need to compare two values on a single point.

The unusual menu format can take a little adjusting to, but it soon becomes easy. You can plot without pressing any keys other than the arrow and return.

Apple Plot, a two-year-old program, was originally designed for business people and professionals but also proved popular in schools and homes. The first of Apple's business graphics products, *Apple Plot* was designed to run on an Apple II with 48K and one disk drive.

Apple Plot plots the most common graphs: scatter, line, bar, and multibar charts (two bars per points).

It allows two data sets to be in memory with up to one hundred points. Multiple overlays are possible, allowing many different plots to be displayed. *Apple Plot* is compatible with the Silentype and Qume Sprint 5 printers.

A *VisiCalc* file converter program on the *Apple Plot* disk permits conversion of *VisiCalc* DIF files. *Slide Show*, another program on the *Apple Plot* disk, lets you display a number of plots in a slide show format.

Apple Plot displays all of the Apple II colors but can only plot black and white copies on a printer.

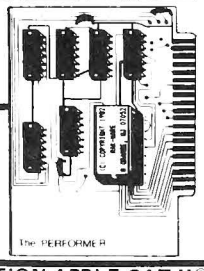
The Simple Life. *Apple Plot* has aged well but is now overshadowed by more sophisticated products. It's easy to use; in fact, it can be used almost without referring to the manual. Menu selection is also straightforward, but there are sometimes too many submenus.

Apple Plot has one glaring weakness: it only prints on Apple's Silentype and the Qume (or any Qume-compatible printer). The Qume, however, is not an ideal printer for plotting graphs. Anyone with another type of printer or plotter is probably out of luck.

Like any business graphics program, *Apple Plot* also has a *VisiCalc* conversion program. The actual conversion program is not particularly direct. You have to read the manual for this one, but it can provide an inexpensive method of plotting *VisiCalc* data.

Another minor weakness is that this is a thirteen-sector DOS program. Apple Computer no longer sells thirteen-sector

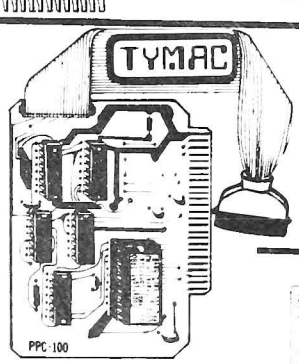
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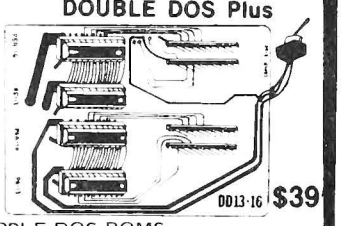
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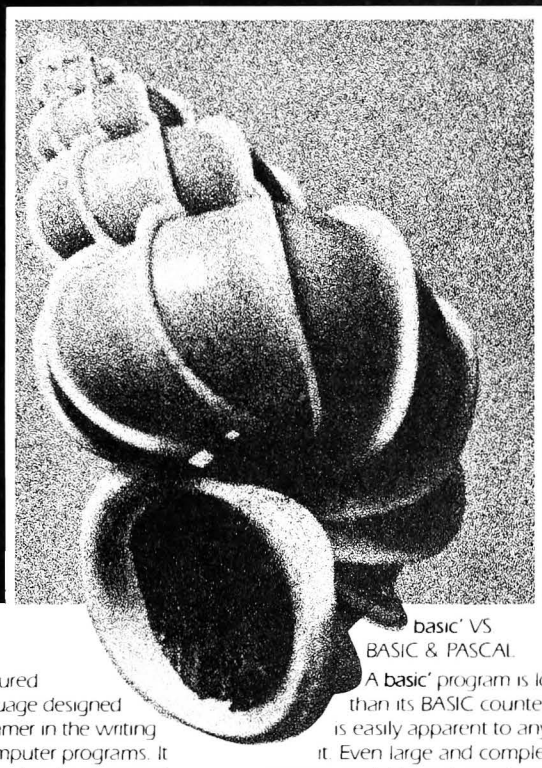


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basic' (PRIME)

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WHAT IS basic'?

basic' is a completely structured extension of the BASIC language designed to assist the serious programmer in the writing and debugging of new computer programs. It is a set of tools that facilitate the development of well-structured code which is easy to read and maintain.

Blocks of code are indicated by a unique indentation convention, eliminating the need for extraneous statements (such as BEGIN, END) and line numbers.

basic' control statements are simple, but powerful and complete, and include the usual IF, ELSE and FOR. Added statements are REPEAT/UNTIL, PROC/DO, and CASE. The UNTIL statement is very powerful since it can occur anywhere in a REPEAT block—beginning, middle or end. UNTIL can also appear in a FOR block. The CASE statement can work with any expression—string or numeric. ELSE can also be used with CASE as an "everything else" condition. PROC and DO permit the defining and invoking of named subroutines. The listing below graphically illustrates the difference between **basic'** and BASIC.

basic' VS BASIC & PASCAL

A **basic'** program is logically simpler than its BASIC counterpart. Its logic is easily apparent to anyone reading it. Even large and complex programs remain readable and maintainable.

PASCAL is a very good, if somewhat wordy structured language. However, PASCAL's great disadvantage lies not in the language itself, but in its microcomputer implementation. PASCAL is compiled, and compilers are fine for producing faster-running (although larger) programs. Compilers are deficient, however, in the area of program debugging. On the other hand, interpreters excel in debugging since they allow the programmer to query the state of the program after a bug has occurred. Professional programmers know that the bulk of software development time is spent debugging code. Since time can mean money, an efficient debugging environment is critical.

basic' uses the BASIC interpreter already available on your own microcomputer for efficient debugging. If faster execution is required, a **basic'** program can later be compiled by an available BASIC compiler—but only after it is debugged and running.

HOW DOES basic' WORK?

A **basic'** program is written via **editor'**, a full-function text file editor optimized for programming, and is then processed, or translated into a normal BASIC program.

editor' recognizes the **basic'** control statements and automatically indents the text to the appropriate level. The **editor'** display always reflects the current state of the program text. The listings produced by the processor (see below) are exceptionally well-ordered. Comments are automatically right justified for ease of reading, block indentation reveals the flow of control, procedures are separated by white spaces, and an extensive cross-reference is provided. Once the translation is produced, debugging can take place using the existing BASIC interpreter. When bugs are detected, patches can be applied to the translation. It is usually possible to correct from 5 to 10 bugs in translations before having to reprocess the **basic'** source program.

HOW CAN I GET IT?

basic' is now available for the APPLE, TRS/80 and IBM PERSONAL COMPUTER. Inquire at your local computer dealer or order direct using the handy order form below. You may also call TOLL-FREE and charge to your VISA or MASTERCARD.

If you would like more information, **basic'** documentation may be purchased separately for $10 which will be credited against purchase price.

!basic'

```
PRINT "ASCII CHARACTER TABLES"                          ! HEADING
REPEAT
  INPUT "FROM,TO: ";N,M
  UNTIL N=0 AND M=0                          ! DOUBLE ZEROES TO QUIT
  DO TABLE                                     ! PRODUCE A TABLE
END
!-------------------------------------------------------------------

PROC TABLE              ! OF ASCII CHARACTERS FOR CODES N THROUGH M
  PRINT "CODE","CHAR"                            ! PRINT HEADINGS
  FOR I=N TO M
    UNTIL I > 127                                  ! UPPER LIMIT
    PRINT I,                                           ! CODE
    IF I < 32                                    ! CONTROL CODE
      CASE I
        = 13                                   ! CARRIAGE RETURN
          PRINT "<RTN>"
        = 27                                           ! ESCAPE
          PRINT "<ESC>"
        ELSE                                       ! ALL OTHERS
          PRINT "<CTRL>",CHR$(64+I)
    ELSE                                   ! PRINTABLE CHARACTERS
      PRINT CHR$(I)

!-------------------------------------------------------------------
```

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disk drives, but continues to sell thirteen-sector products. Of course, since the disk can easily be converted to DOS 3.3 using *Muffin* on the DOS 3.3 master disk, this is not an insurmountable problem.

How Do They Compare? *Apple Plot* operates from a standard menu, *VisiTrend/VisiPlot* operates from a different type of menu, and both *Business Graphics* programs are command-language driven.

In normal operation, each program has advantages and disadvantages. *VisiTrend/VisiPlot* is slow changing from *Trend* to *Plot*, and the menu options aren't always apparent. *Business Graphics* has constant program disk access and the command language has the potential to be confusing. *Apple Plot* requires a simple but sometimes confusing data entry section. Each product can seem extremely simple—or extremely frustrating. But you can learn any of them rapidly.

The Apple business graphics packages, the Visi packages, and *Apple Plot* all have good manuals, and both *Business Graphics* and *VisiTrend/VisiPlot* offer reference cards. The Visi reference card is the best.

Apple Plot requires that you scale the axis and set up the parameters of a plot; the others do it automatically. All allow changing the scale.

All the products outlined here allow floating titles (titles you can put wherever you want). *Apple Plot* allows only two such titles, but *VisiPlot* and *Business Graphics* allow as many as you want.

Each plots the standard graph types: scatter, line, and bar. *VisiPlot* and *Apple Plot* permit only two bars side by side. *Business Graphics* permits up to five side-by-side bars.

VisiPlot handles sixteen different series in memory simultaneously, *Apple Plot* allows two, while *Business Graphics* allows only one. Both *Business Graphics* and *Apple Plot* allow you to overlay other data sets for multiple plots.

From an available file size standpoint, *Business Graphics* has virtual file, *VisiPlot* 150 points, and *Apple Plot* 100 points.

All of these products can display *VisiCalc* data. *Business Graphics* can plot data from other applications, and *VisiTrend/VisiPlot* (using DIF) can swap files with other Visi series products.

VisiPlot has the best initial printer selection. Depending on printer or plotter driver availability, *Business Graphics* is compatible with a large number of printers. *Apple Plot* is compatible with only two.

Apple Plot has no statistical capabilities. The other products all have roughly similar statistical capabilities.

Business Graphics has *take files*, and *Apple Plot* presents a slide show.

Which Should You Buy? For two of these products, there's a simple answer to this question. If you have an Apple III and want a graphics product that takes advantage of the Apple III's features, *Apple III Business Graphics* is your answer. You could use the Visi series products or *Apple Plot* in emulation mode on the III, but they might not provide you with all of the capabilities you'd have on an Apple II—and they would use none of the Apple III features.

If you are looking for an inexpensive, easy-to-use business graphics product for use with either the Qume or the Silentype printers, *Apple Plot* is clearly the solution.

When it comes to *VisiPlot*, *VisiTrend/VisiPlot*, and *Apple II Business Graphics*, the choice is not so simple. Here is a recap of factors likely to influence your choice:

VisiPlot has no statistical capabilities. *VisiPlot/VisiTrend* and *Apple II Business Graphics* are almost evenly matched. Some major price differences make the Apple product appear a bargain, provided you already have the two disk drives that *Apple Business Graphics* requires. Beyond that, the choice boils down to some specific differences. If you need a plotter, *Apple II Business Graphics* is your answer. If you need simple interchange with *VisiCalc* and the other Visi products or the ability to display two or more plots and to do high/low plots, the answer is *VisiTrend/VisiPlot*.

Your best bet is to go to your dealer and try them all. You'll like them. ■

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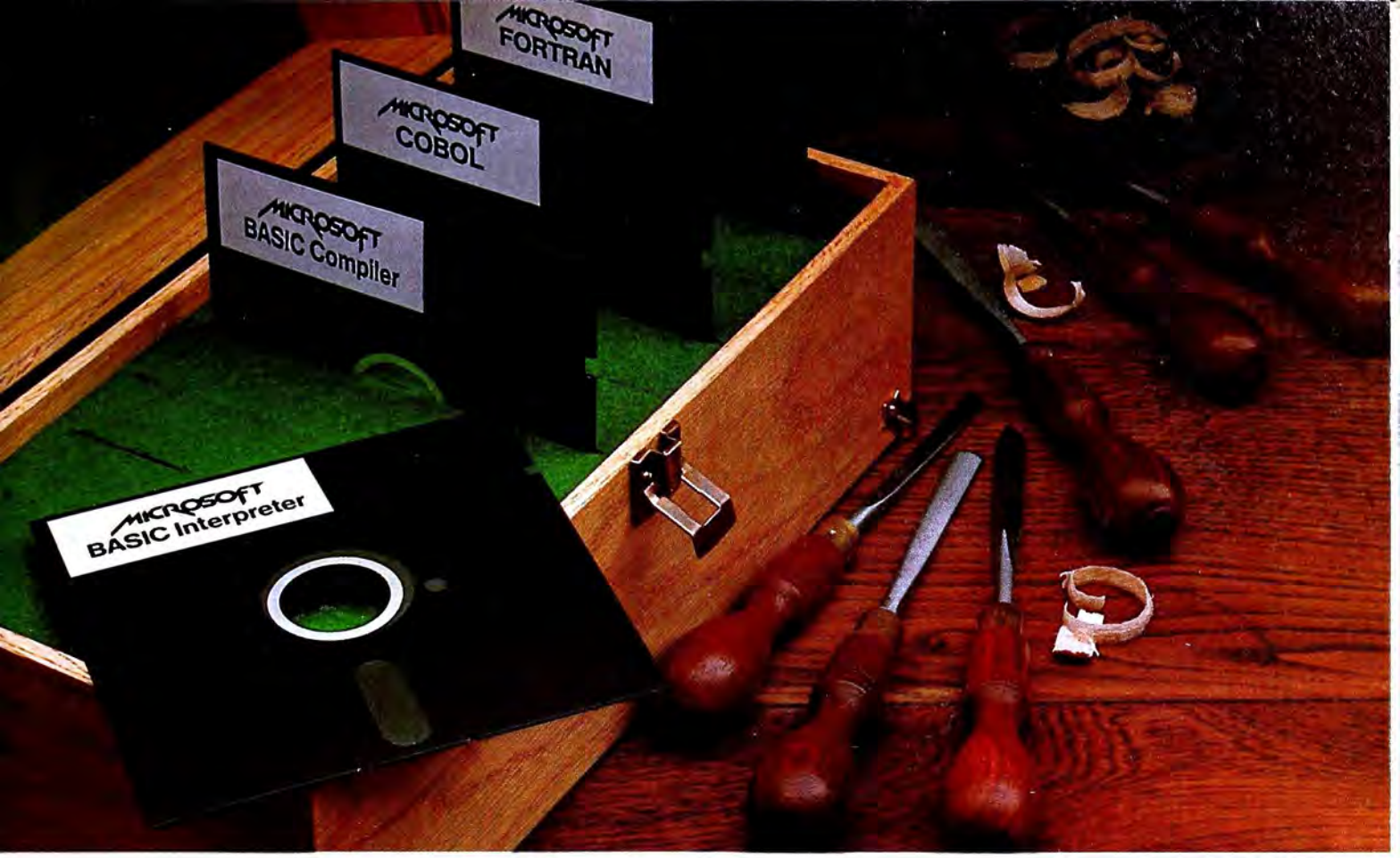
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- **Hi-Res Soccer**
- **Hi-Res Football**

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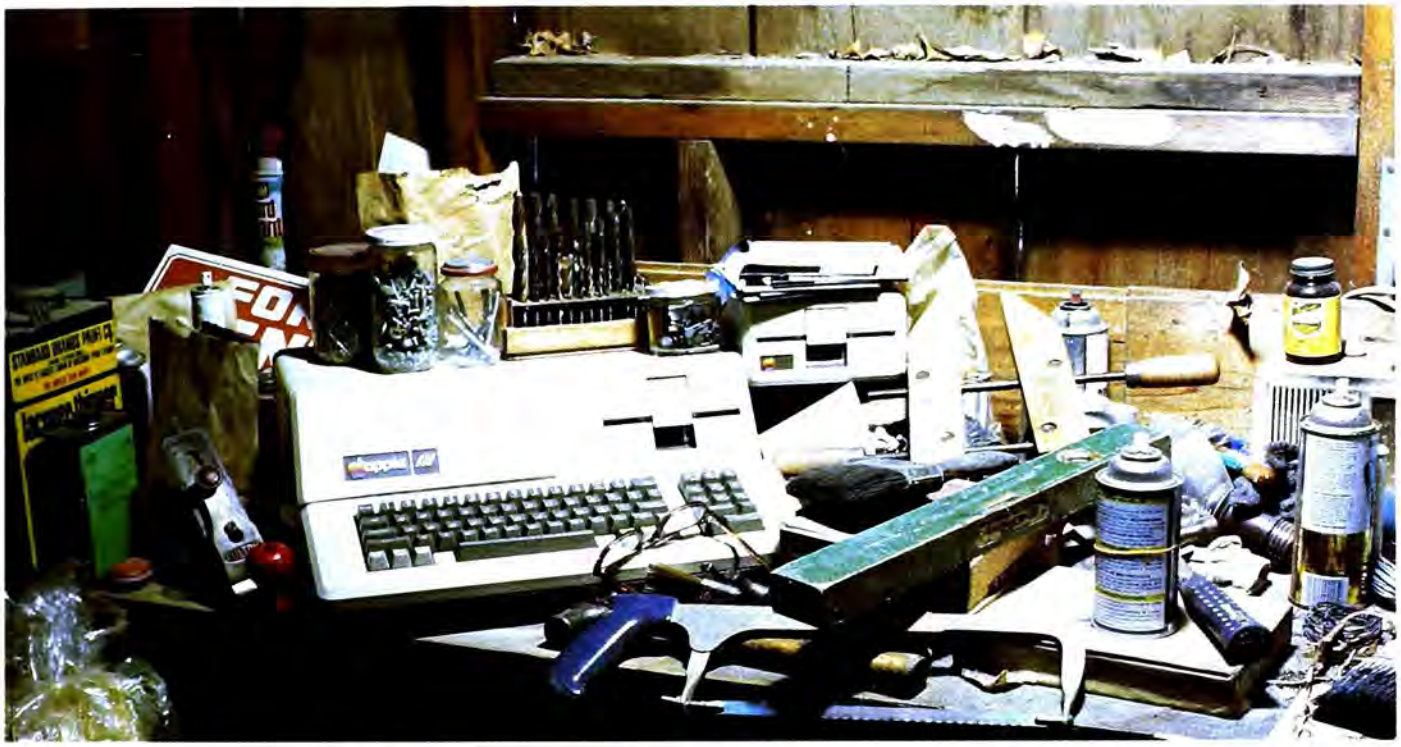
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The Apple III Workshop—Not for the Novice

BY JOHN JEPPSON

"SOS checks the vent queue only when exiting to the user environment, so if you're hung out waiting for a response from a peripheral device, events will be queued up but not processed until the read request is satisfied."

This seemingly British double talk is actually Bob Martin teaching the Apple III Technical Workshop—a three-day, Apple-sponsored whirlwind tour through the remarkable machine that lies beneath Apple III's languages and application programs.

If you want to know how it all works, this is where you find out. They tell all . . . well, perhaps not all, but a great deal. They don't actually tell you the central code sequence of the operating system itself, SOS.Kernel—that's proprietary information, a trade secret—but you won't feel cheated.

They do tell you the "logical" structure of SOS, however, and how to perform SOS calls to utilize its many routines. They tell you how to write drivers, so you can create your own interfacing for peripheral devices. They tell you how to write interpreters, so (in principle) you can write your own language. They tell you how to provide for interrupts and events and bank switching and alternate stacks and extended addressing and environments and file structures and about direct memory access (DMA) and pseudo-DMA and, when they don't tell you the source code for SOS.Kernel—well, you couldn't have swallowed another byte anyway.

Say "Sauce." The Sophisticated Operating System is the soul of Apple III. For this is a true computer system; the first, perhaps, that Apple has produced. Apple III is far more than a 6502 CPU chip and some assembly language routines. To quote the manual: "The combination of hardware and operating system software creates an abstract machine that is neither the hardware nor the operating system, but a synthesis of both. This is the machine you program." It is a machine "defined by its concepts," concepts that in turn are supported by SOS and the hardware and will continue to be supported as the present system is changed and improved. Indeed, such changes and improvements have already begun and will continue. This means that programs you write today will run properly on upgraded machines tomorrow, provided you follow the rules of the operating system. The "rules" constitute the structure of the abstract machine. They may be extended, but they will continue to be supported in future versions of Apple III.

Of course there's no one to stop you from cheating. In fact, the workshop tells you how. You can, for example, bypass SOS and write a program in which one piece of code directly and illegally accesses some other section in violation of the rules. But future changes in the system will leave you broken and bleeding. The point is philosophical but very important. Apple is against this sort of rule breaking, but it is not a moral issue. Nor is Apple worried about its trade secrets; you're welcome to write a disassembler and trace out the code paths in SOS.Kernel (it should only take you about a hundred years). The point is, when you cheat you've only got a 6502 and some assembly language routines. Playing within the rules, using the magnificent tools provided, means that your work will be part of a growing, maturing system for many years to come.

The workshop is conducted about once a month, somewhere. Generally it is held in a major metropolitan area of the United States, but within the past few months it has also been held in several cities in Europe. This fall Apple expects to conduct a workshop in Australia. Sessions on the West Coast, like the one held April 28–30, are generally held in or near the main Apple complex in Cupertino, California. Other West Coast locations for workshops are being contemplated. The times and locations are not rigidly predetermined.

Four Week Rush. Preparations for the course are organized by the regional Apple Computer offices, which maintain a file of individuals in their area who have expressed interest in attending a workshop. The optimum class size is about thirty, and Apple says they need at least fifteen to break even. When enough prospective students are available in a given area, the regional offices negotiate with Bob Martin's group to arrange a mutually possible time and site. Unfortunately, this process usually means the potential student has only about

four weeks' actual notice of when and where the course will take place. It would be considerably easier to plan one's schedule if the advance notice were three months.

At present, the course has only one instructor, Bob Martin. Martin is amazing. A professional engineer, he is dynamic, amusing, highly articulate, totally in command of his material, and just all-around brilliant. Teaching the workshop is only part of his duties. He also heads Apple's Product Marketing Technical Support Group, a ten-person team dedicated to assisting other companies and professionals who are developing applications and peripherals for use on Apple III. He says there just aren't enough hours in the day, and he is actively looking for another instructor to share the teaching load. This would mean the workshop could be given more often and in more places. He also hopes to be able to offer specialty courses in drivers or interpreters or advanced programming techniques. At the moment, there just aren't enough of him to go around.

The format of the workshop has changed several times since its inception in 1980. In its present configuration, the course lasts three full days. About two hours of the first day are devoted to a lab session that provides hands-on experience using SOS calls. The rest is lecture. Ample opportunity is provided for discussion and for further development of areas in which class members express particular interest, such as invokable modules for Apple III's Business Basic. As it happens, the class held in April wound up at noon on the third day. We were ready.

Crammed with Goodies. The text for the workshop is an enormous six-and-a-half-pound looseleaf notebook. About a quarter of it is the "beta draft" of the forthcoming *Apple III SOS Reference Manual,* which is expected to reach its final form and be published in about ninety days. There are also extensive class notes and actual source code examples of drivers and interpreters. And there are two disks. The first contains source codes of the various examples and other good stuff. The other contains *ExerSOS,* a program that provides practical experience using SOS calls and can also be used as a testing program for debugging new drivers. Of particular importance are skeleton drivers, which are a bit like form letters where you can fill in the blanks to create your own driver for a new device. These are present both as printed text and on disk. They are tremendously helpful when you're ready to start developing your own drivers. Finally, there is a twenty-three-page section describing the special procedures involved in writing invokable modules for Business Basic.

The workshop is about as intense an experience as you're likely to encounter, and it's not for everybody. In their advance notice Apple says the class is "designed for experienced professional programmers. These programmers should be familiar with assembly language for the 6502 microprocessor and should feel comfortable discussing the internal logical structure of computers." They mean every word of it.

It also helps immensely to have read, understood, and practiced the material on enhanced indirect addressing in the program preparation tools section of the Pascal III manuals. In particular, this is *not* a course in assembly language programming. Learn assembly first; then go to the workshop.

Even if you have the prerequisite knowledge, you must consider the cost: $500 payable in advance, plus whatever you end up spending on transportation, lodging, meals, and so on. (The only kindly statement to make about dining out in Cupertino is that we were probably just unlucky. For a while, we thought we might starve.) The cost is well worth it if you are in the computer business, but if you are merely curious, well, that's a lot of curiosity. On the other hand, it really is a great course.

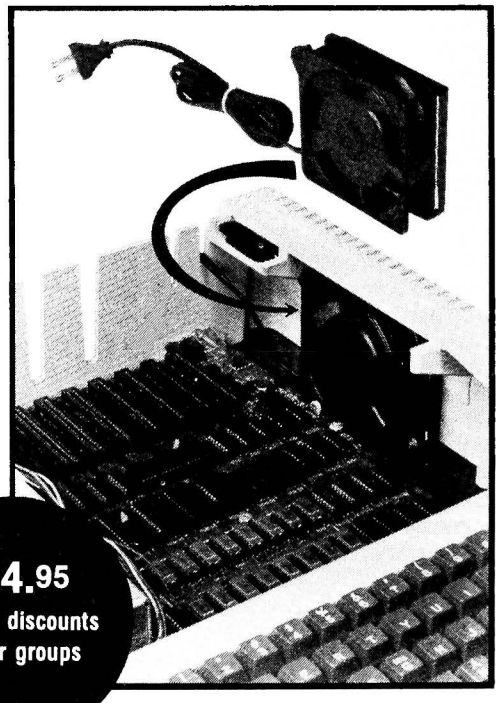
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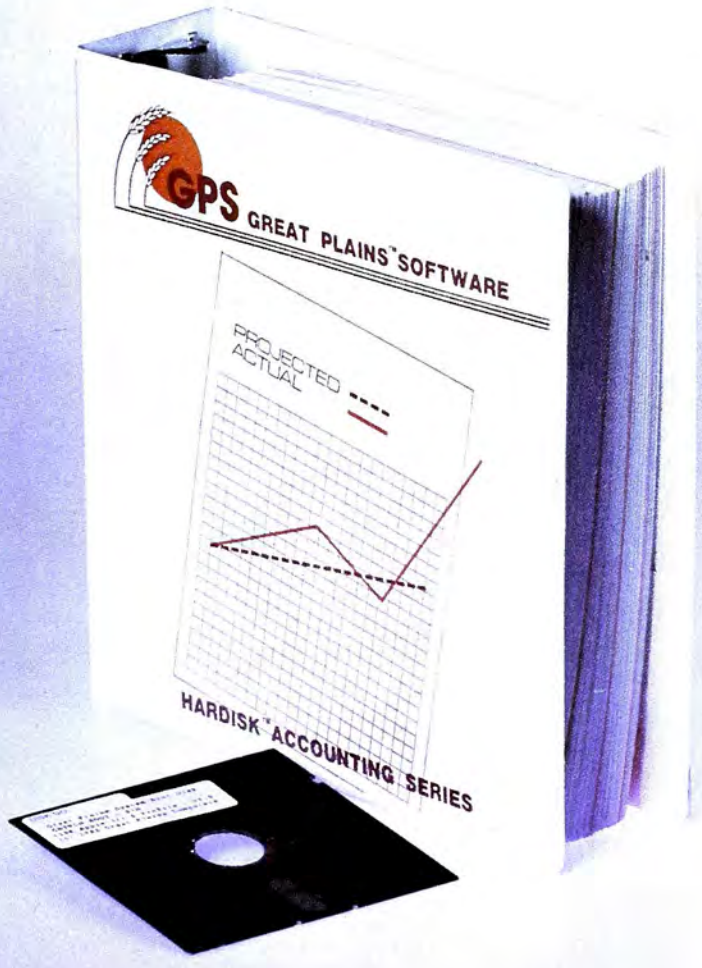
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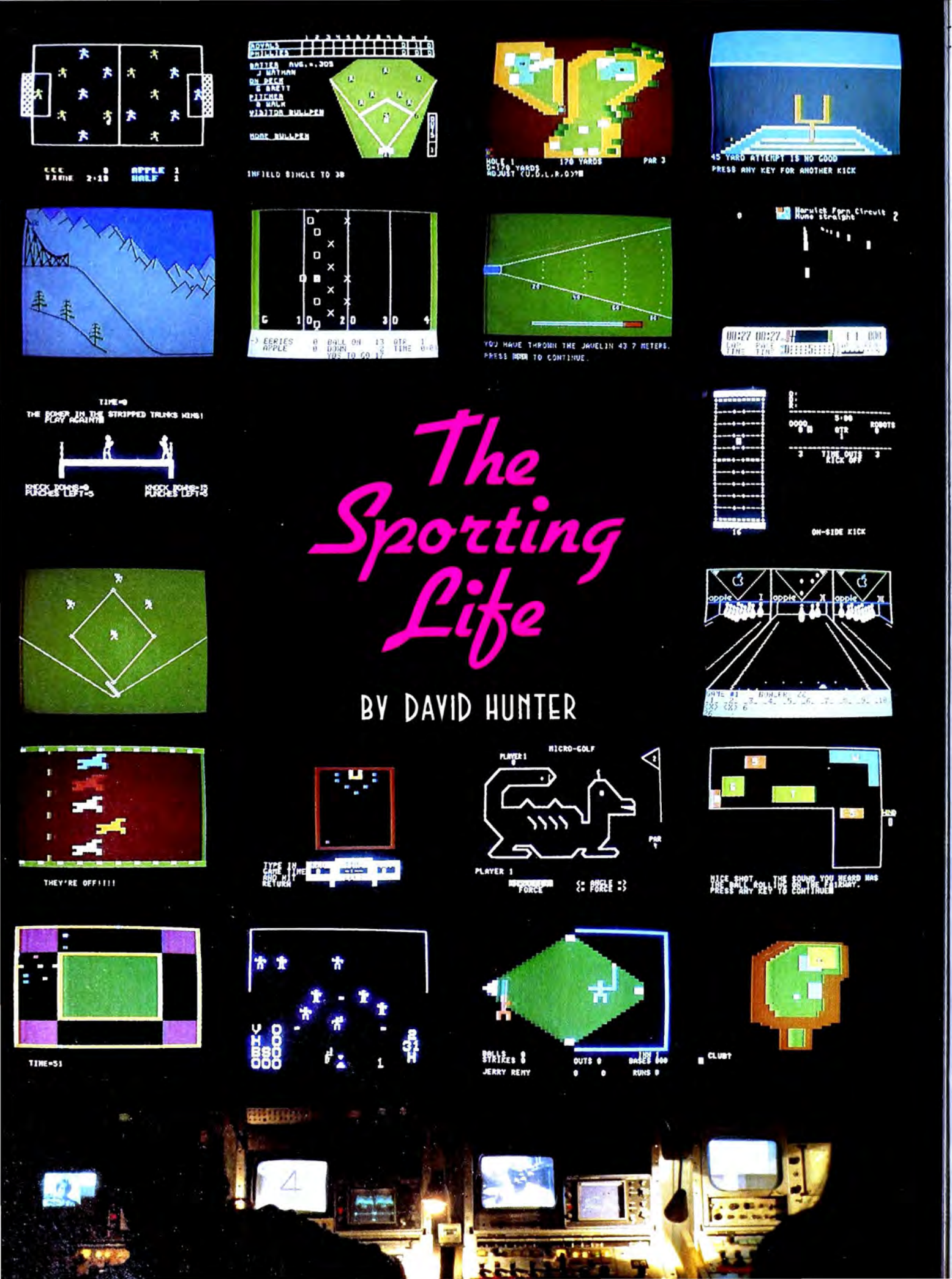
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Anyone who has ever slid safe into second base or sacked the quarterback or sliced a backhand into the far corner or made a thirty yard putt or taken the ball down the court for an unassisted layup knows that successfully forcing your bones and muscles to work together in a coordinated effort is rewarding both physically and mentally.

Competition is the heart and soul of sports. To be the very best in the world at any given sport means devoting a large portion of your life to the task. A talented few can make a living as professional athletes; the majority of the population has to seek the thrill of athletic competition on less exalted fields.

The Agony and the Ecstasy. Few people would argue that being active and healthy is good for the soul. Nonetheless, most serious athletic activity involves pain. It doesn't matter if it's Little League, the high school swim team, or the corporate softball team; don't sign up unless you're willing to hurt.

Sports can cause a lot of mental pain, too. There's nothing more discouraging than being a second stringer on a Little League team. You get stuck in right field for the eighth and ninth innings hoping someone will hit the ball your way. Then there's the day of the big race when you wake up with a cold and the weather is lousy; or the playoff game when the coach makes a bad choice and pulls you from the line-up. All your hard work can be for naught when chance or human error has its way.

But when everything goes right—the slapshot ties up the goalie, you bowl eight straight strikes, or you clear all the hurdles perfectly—sports are a mental high. Like writing, acting, performing music, and other kinds of personal achievement, sports allow you to take pride in accomplishment.

For those unwilling to suffer scraped knees, sore muscles, and athlete's foot, there're sports on television and sports on the Apple. The difference between the two is that you control the action on the Apple. Sure, it's not real, but neither is the Superbowl when you're watching it two thousand miles away. You're a participant in the computer game, and that's impossible with television.

Pushing fingers, twisting wrists, and squeezing thumbs are the only real physical skills involved with playing a computer sports game. Though it's possible to feel a rush of adrenalin, you can't exactly get in shape. But, in some games, the mental gymnastics of sports have made the translation to computers rather well.

And They're Off! The first so-called sports programs for the Apple appeared five years ago, and of those simple lo-res action games few remain. But they found an audience in their day, and we've been blessed (and cursed) with sports programs ever since.

It's difficult to decide which is more misleading: a computer game that claims to be about a sport but has only the most tenuous relation to the real thing, like Programma's *Basketball*, or a computer game that purports to be a realistic simulation but is frustratingly incomplete, like On-Line's *Hi-Res Football*.

It's impossible to cram all the variables involved in a sport into 48K, let alone 32K, 16K, or 8K, so game creators have to pick and choose among them. It's up to the software shoppers to know what they're looking for and not to buy a program without playing it first or seeing it demonstrated at a store.

Considering the technical limitations of hardware and software in mind, it's essential that computer sports games compensate for the loss of realism and sophistication.

Microsoft's *Olympic Decathlon* accomplishes this with ten different track and field events, all demanding practice hand-eye coordination, excellent timing, and even finesse. It's challenging and fun, worth the investment of time, money, and effort. But, in this game and many others, the skills required are those of the arcade rather than those inherent in the athletic activity portrayed on the screen.

For example, in *Olympic Decathlon*'s 110-yard high hurdles, you run by alternately pressing the two paddle buttons. If you fail to push a button in sequence, the runner stops. Not many runners in real life forget to put the other foot down.

Base on Balls. Other computer sports games forego attempting to provide the thrill of physically accomplishing the sport. In Strategic Simulations's *Computer Baseball,* you don't swing the bat or run the bases or throw the ball. Rather than making you learn to twist the paddle a new way, *Computer Baseball* forces you to think and win through strategy.

Sports games playable on the Apple have been more or less limited to these two approaches or juxtapositions of the two.

Unearthing the ungodly past of computer sports games for the Apple provides a chance to see where they have come from and where they might be going. These observations are not set permanently in granite. Each sports game that claims the name must be judged on its own merits. They're all different.

Scoring on the Power Play. Once there was a company called Programma International, based in Los Angeles and run by Dave Gordon, now head of DataMost. Programma will always be remembered as a software publisher that couldn't say no. If it ran, Programma published it.

Thankfully, it's tough to find any of Programma's old games these days. They were pretty bad. Programma's *Football* and *Basketball* were based on Mattel's handheld calculator games. In *Football*, you're a lone dot trying to outmaneuver a sluggish defense. It's possible to score a touchdown on every play.

Programma's *Hi-Res Boxing* is a one-punch affair. Two betrunked opponents face off and bash each other until one falls down. The fallen boxer gets up and the fight continues until one of the two is knocked out. Your choice of punches is a grand total of one, and every time you land it your opponent is knocked down. A funny thing occurs if you punch too often and don't make contact: you fall down from exhaustion without needing to be hit.

Quarterhorse Race from Programma takes you to the racetrack for a day of races and betting. Its graphics are very crude (in contrast, the firm's *Canter Downs* had hi-res animated graphics approaching today's standards) and the betting strategy is the simplest possible. Programma's *Apple Alley* is a crude bowling game that's actually pretty tough but still isn't a good simulation of the real game.

Programma's *Hi-Res Baseball* provides the thrill of fielding the ball and trying to throw a player out at home plate, but the animation and graphics are primitive hi-res. Pitching, batting, and running the bases are fun; it's possible to curve the ball and fool the batter. This game can be found under a new name, *World Series Baseball,* from DataMost. It doesn't appear to have changed any.

Shifting the Backfield. Although no company has flourished publishing only sports games, many have tried the genre. Softape, between card games in 1979, tried baseball, and golf.

Softape's *Baseball Fever* by Peter Meng is actually a fun little program, though not very sophisticated. The 1979 Boston Red Sox and New York Yankees are the opposing teams. You make line-up changes and can incorporate very limited strategy. Like Programma's *Hi-Res Baseball,* the most fun comes with pitching and batting. You can actually pick the placement of pitches and try to fool batters. In the one-player ver-

A healthy sampling of the old and the new. From left to right: Top row, Hi-Res Soccer (On-Line), Computer Baseball (Strategic), Fore! (Automated Simulations), and Tuesday Morning Quarterback (Automated Simulations); second row, 3-D Skiing (Continental), Hi-Res Football (On-Line), Olympic Decathlon (Microsoft), and International Gran Prix (Riverbank); third row, Hi-Res Boxing (Programma), and Computer Quarterback (Strategic); fourth row, Baseball (Muse) and Apple Bowl (Apple); fifth row, Quarterhorse Race (Programma), Basketball (Programma), Micro Golf (Creative Computing), and Hi-Res Computer Golf (Avant-Garde); sixth row, Derby Downs (Roff-Croft), Hi-Res Baseball (Programma), Baseball Fever (Softape), and Pro Golf (Softape).

sion, the computer pitches a lot of balls, and it takes a good eye on the part of the human player to see them coming.

Jim Wells's *Pro Golf* from Softape was the first in a line of steadily improving golf games for the Apple. The selection of clubs is small, and the physical hazards on the course are not what you find in Avant-Garde's *Hi-Res Computer Golf* or Automated Simulations's *Fore!* Still, it must have been welcomed by pro golf fans in 1979 as something to do during the long winter months.

One of the best sport games to appear early on was produced by Apple Computer itself. Charlie Kellner and Eric Larson's *Apple Bowl,* released in 1979, is still the best bowling game available. Using the paddles to control speed and direction, you can successfully complete splits (seemingly impossible in Programma's *Apple Alley*). You also have to wait for bowlers in the lanes next to you, definitely a feature of the real sport. The animation and hi-res graphics are superior, and the game uses accurate engineering to give a reasonable simulation of the real thing.

After the first wave of sports games, the scene could only improve. The years 1980 and 1981 saw a slew of games emerge, though not all were great improvements on what had been published before.

On-Line Systems released Jay Sullivan's *Hi-Res Football,* a woefully inadequate representation of the game that nonetheless enjoyed some market success. Offering the ability to control the game in real time, Sullivan's program suffers from a dearth of offensive and defensive plays, and the teams are made up of only seven players instead of the regulation eleven. Playing against the computer, you never lose. If the computer gets the ball, it gives it right back and you start another set of offensive downs.

Hi-Res Football is a good example of the double nature of some sports games. As a simulation of football, the game is frustratingly awful. Not as bad as Programma's Mattel-like *Football,* but not at all good.

On the other hand, if you forget that it's supposed to be football, *Hi-Res Whatever* is a challenging two-player game offering its own excitement. Sullivan's *Hi-Res Soccer,* also released through On-Line Systems, is in the same boat. As a realistic simulation, it stinks; as an arcade-type game, it has its moments. (It's interesting to note that Sullivan, once he digressed from sports, went on to produce *Crossfire,* possibly the best home-arcade game extant.)

Downhill Thrills. Another game that is fun but not really a good simulation is Continental's *3-D Skiing* by Jeffrey Stanton. The slalom portion of the program is mostly arcade-style with some realistic aspects. Ski jumping calls for practiced timing, but it's too simplified and a tad unrealistic. On very long jumps you land on flat ground and survive.

But both parts of *3-D Skiing* are rip-snorting good fun if you're in the right mood. The ski jump animation is hilarious. Crashing a jumper rivals putting the shot backward in *Olympic Decathlon.*

A good sports program not only gives you a reasonably realistic simulation of the game but also teaches you something about how the game is played in real life. The early Programma games, with the exception of *Hi-Res Baseball,* fail on both accounts. *Hi-Res Baseball* at least teaches you the value of throwing a curve.

Creative Computing's *Micro Golf* is not very educational. You don't have a choice of clubs. The ball ricochets off the sides of the course like miniature golf. It's a fun game, but not for the serious golfer— and it certainly won't help the novice understand the real game.

Swinging through Woods and Wedges. Much better are Avant-Garde's *Hi-Res Computer Golf* by Stuart Aronoff, and Automated Simulations's *Fore!* by Jeffrey A. Johnson.

In Aronoff's fine program, you actually swing the club. Although it is essentially an arcade-game feature, swinging the club gives you some idea of good golfing form. Showing what happens when a ball is sliced or topped, *Hi-Res Computer Golf* helps you learn from mistakes. This is a tough game to master, frustrating as all get out, but well worth the effort.

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When you get to the putting green, it's sloped like a real course. Just aiming the club at the hole doesn't mean it'll go in. Wind also plays a big part in the proceedings, as it does in the real game. *Hi-Res Computer Golf* brings new challenges at every turn and ranks as one of the best sports games available.

Fore! is similar to *Hi-Res Computer Golf* without the fun of swinging and the education of missed shots. With the largest selection of clubs, Automated Simulations's game features several tough courses with some killer holes.

Take Me Out to the Apple. Strategic's baseball game is rich in variables. You are given a real team to play with. The choices include recent teams and classic World Series matchups, like the 1906 Chicago Cubs against the 1906 Chicago White Sox. You pick the starting line-up, fielding positions, and batting order from a twenty-five man roster. To make up your mind, you're given batting averages and pitching records.

In *Computer Baseball,* gone is the chance to KO Carl Yastrzemski on a called third strike like you could in Softape's *Baseball Fever.* Except for real time input, the only things missing are hot dogs and peanuts; so stock up.

Before each play you control how the players will react with a number of offensive and defensive options. But, like the game itself, chance plays a big part in the proceedings.

The visual representation of action in *Computer Baseball* is simplified to the bare minimum, showing the movement of only the ball. But it's not really important to show the pitcher's windup or the batter's swing. The important thing is the outcome of these actions in relation to strategies employed and the game as a whole.

Strategic Simulation's *Computer Quarterback* is another game that is short on visual representation but long on sophistication and game detail. The program allows you to choose between semipro or pro ball. The professional version has thirty-six offensive plays and twenty-four defensive plays.

Like *Computer Baseball,* the action of the game is contained on a rectangular field, occupying about one-third of the screen. You see the movement of the ball, but not much else.

Fourth Down and Long Yardage. Automated Simulations's *Tuesday Morning Quarterback* takes a different approach. The strategic aspects of this amusing game are similar to *Computer Quarterback*'s, with fewer available plays. The difference lies in arcadelike portions of the action. When it's time to kick a field goal or to punt, you have to pick the right moment. It's like *Apple Bowl,* where you line up a moving arrow with the place on the lane where you want to release the ball.

Tuesday Morning Quarterback also gives you the option of changing the line-up around. You're given a full complement of NFL teams to choose from and you can doctor rosters.

The strategic aspects of *Tuesday Morning Quarterback* may not beat the competition, but other features of this game make it unique, if not a bit weird. The action of the game is relayed in an exciting sportscaster style: "Tarkington drops back, he stumbles, he's getting pressure, he lobs it . . . incomplete"—something like that. When half time comes you're treated to the "marching dots" show, a cute, colorful, lo-res graphics routine that might go on forever if not interrupted for the second half.

One of the most dangerous sports is Grand Prix racing and Riverbank Software's simulation of the high-speed action is terrific. The graphics are nothing to write home to mother about, but they get the job done. Using a simple 3-D effect, *International Gran Prix* gives you some idea of what it's like to drive at 205 miles an hour.

The game is detailed and challenging, with five complete courses to choose from, including real ones like Monaco and the Karlskoga Circuit in Sweden. You steer by turning the paddle knob and change gears and accelerate with the paddle button. It takes a little practice. Thankfully, in this game, no harm is done when in fifth gear you scream toward Creek Corner on Australia's Warwick Farm Circuit with no chance in heaven of making the turn.

The Sport of Kings. In our investigations, we could find no games that actually sat you down on the horse, but a couple good horse racing programs are out. Usually, you're just a spectator at the racetrack with a wad of money in these games. Yet they're interesting and educational, even though they're essentially gambling games like cards or roulette.

Raff Craft's *Derby Downs, A Day at the Races* is a nifty little program that offers the kind of superior challenge found in good strategy games. Before placing bets for one of six races, you're given all kinds of useful information on the horses' and jockeys' previous races. For those unfamiliar with the racetrack, this program can be very informative.

Derby Downs teaches you to read the racing form. The Form Sheet option shows you a horse's most recent races (up to twenty) and the jockey that rode each race. Detailed information is given about each race, including lead lengths from the frontrunner at the quarter, half, three-quarters, and finish. Another program option displays each jockey's complete racing record, displaying wins, places, and shows.

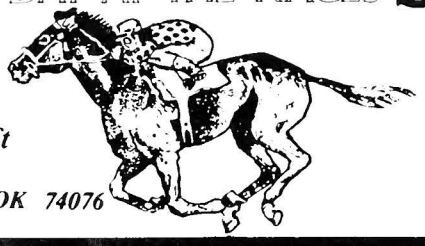
Another horse racing and betting game is *Derby* from Bi-Taction, in DOS 3.2. A number of players are given $200 cash to bet on ten races a day; each race has eight horses. The variables are not as diverse as in Raff-Craft's *Derby Downs,* but the jockey's performance, the weight the horse is carrying, and track conditions all figure in the outcome. Odds are given for each horse in a race, with a full range of betting options—everything from the daily double to the perfecta and trifecta.

Sportsware, a small company in Gretna, Louisiana, has released *A Year at the Races.* In this program you handicap top horses through an entire season, updating statistics as you go along. The results are fairly realistic, and Sportsware has more sports statistics programs in the works.

Fleecing the Profit Prophets. Ken Perry of Systems Design Lab has fattened a few wallets with his three-point spread and handicapping prediction programs. These aren't games but qualify as sports programs for our money. They're educational and provide the thrill of winning or losing cash—certainly an important aspect of sports in some people's minds.

SDL's *Win at the Races, College Football,* and *Pro Football* are famous for outpredicting the odds makers. These are complicated programs that are not complicated to use.

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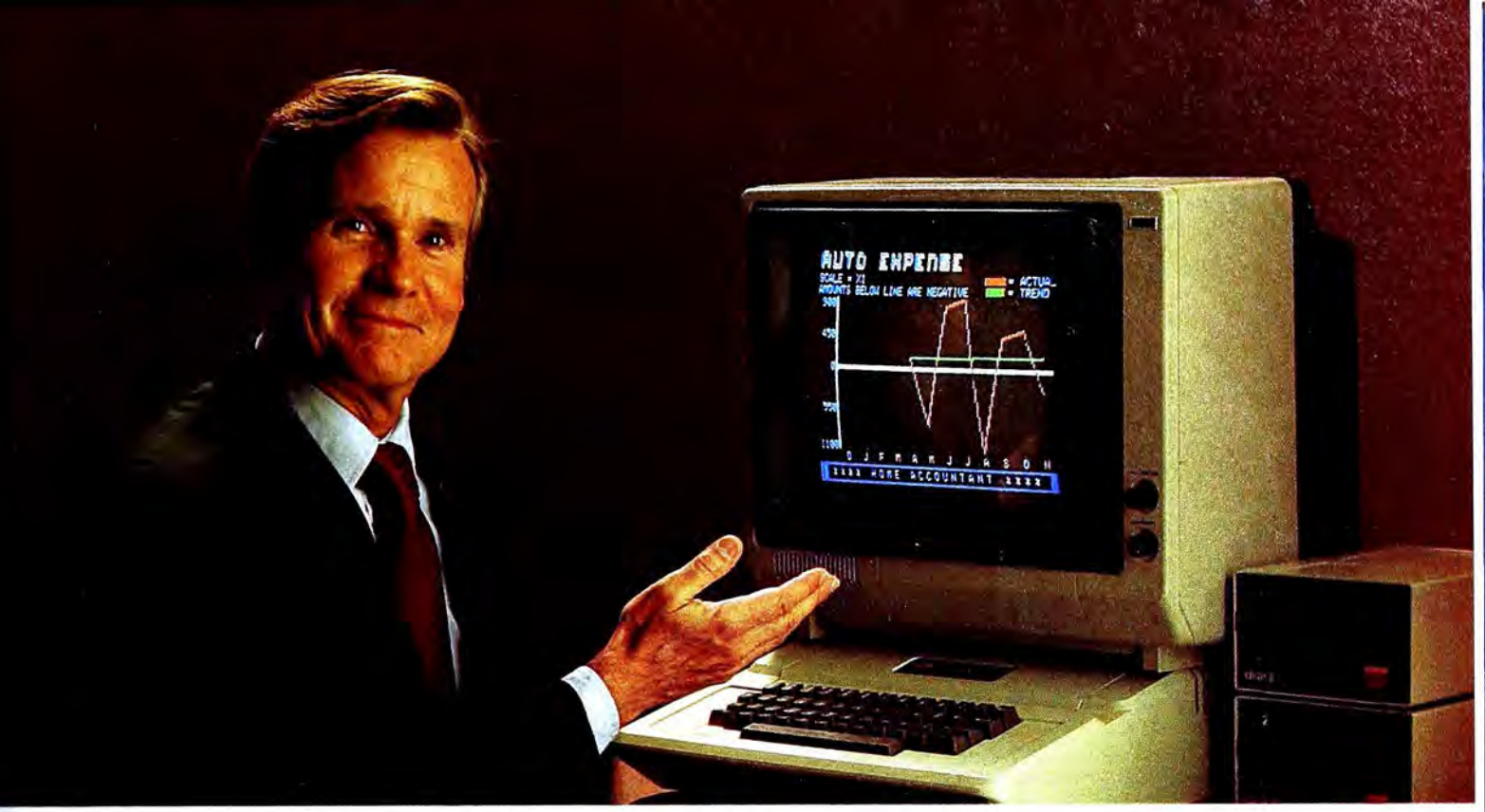
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You have to be patient, and don't look for any real results in football betting until the sixth or seventh game of the season. By then, the football programs should have enough information to make very aecurate predietions. Perry's latest pro football program, *The Gold Edition*, is brand-new.

Probably the all-time bestselling sports game is Mierosoft's *Olympic Decathlon*, and it's easy to see why. The game incorporates areade game ehallenges but its many parts and variety are enough to get people involved. The ten events require praetiee but the ability to move among them keeps you from getting frustrated; if you're having trouble with the diseus throw, there's always the pole vault.

In terms of animation and graphies, *Olympic Decathlon* is tough to beat. Alone, they're worth half the admission priee. Pole vaulting, long jumping, high jumping, and running the 110-meter hurdles are all a blast onee you get the hang of them, and the graphies for eaeh are worth a good ehuckle.

But if *Olympic Decathlon* falls short on realism, it more than makes up for this in total effect. You really feel like you've aecomplished something after struggling through all ten events. Strategic Simulations's games have the same effect. You feel like you're partieipating in something larger than life—a response that, given the miniaturization of the sports, eould only be accomplished on a eomputer.

Where's the Good Doctor and Magic? Limited input from the player will always make eomputer games a poor substitute for the real thing. Paddles, keyboard, joystiek—it doesn't matter. You just ean't lob a football with a eomputer. But with inereased memory it should be possible to inelude many of the variables that go into a fast-aetion game like hoekey or basketball.

In a hypothetieal basketball game, you eould have two human players on eaeh team for a total of four participants. Each human eould eontrol two or three players of his team, making it possible to work plays, ineorporate strategy, and keep the speed and exeitement found in the real sport.

A Sporting Chance on the Future. At their best, eomputer sports games offer the ehance to learn about and appreciate the skills involved in athletie eompetition. The day will come when a viable alternative to watehing a boring out-of-state college football game on television will be playing an exeiting one on the Apple.

And with a little luek, you'll have fun while playing. Now, that wasn't too painful, was it?

Apple Bowl. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. $25, 13-sector disk.

Batter Up! Hayden Book Company, 50 Essex Street, Rochelle Park, NJ 07662. $15.95.

Computer Baseball. Strategic Simulations, 465 Fairchild Drive, Mountain View, CA 94043. $39.95. Separate data disks of real teams available for $15 each.

Computer Quarterback. Strategic Simulations. $39.95.

Computer Status Pro Baseball. Microcomputer Games (Avalon Hill Game Company), 4517 Harford Road, Baltimore, MD 21214. $30.

Derby Downs, A Day at the Races. Raff-Craft, Box 1754, Stillwater, OK 74076. $30.

Fore! Automated Simulations/EPYX, Box 4247, Mountain View, CA 94040. $29.95.

The Gold Edition. Systems Design Lab, 2612 Artesia Boulevard, Suite B, Redondo Beach, CA 90278. $199.95.

Hi-Res Football. On-Line Systems, 36575 Mudge Ranch Road, Coarsegold, CA 93614. $39.95.

Hi-Res Soccer. On-Line Systems. $29.95.

Hi-Res Computer Golf. Avant-Garde Creations, Box 30160, Eugene, OR 97403. $29.95.

International Gran Prix. Riverbank Software, Smith's Landing Road, Box 128, Denton, MD 21629. $30.

Micro Golf. Creative Computing Software, 39 East Hanover Avenue, Morris Plains, NJ 07950. $19.95.

Olympic Decathlon. Microsoft, 10700 Northup Way, Bellevue, WA 98004. $29.95.

Pro Golfer and Golf Architect. Software Emporium (formerly from Shafer Software), 4500 El Camino Real, Los Altos, CA 94022. $50.

3-D Skiing. Continental Software, 11223 South Hindry Avenue, Los Angeles, CA 90045. $29.95.

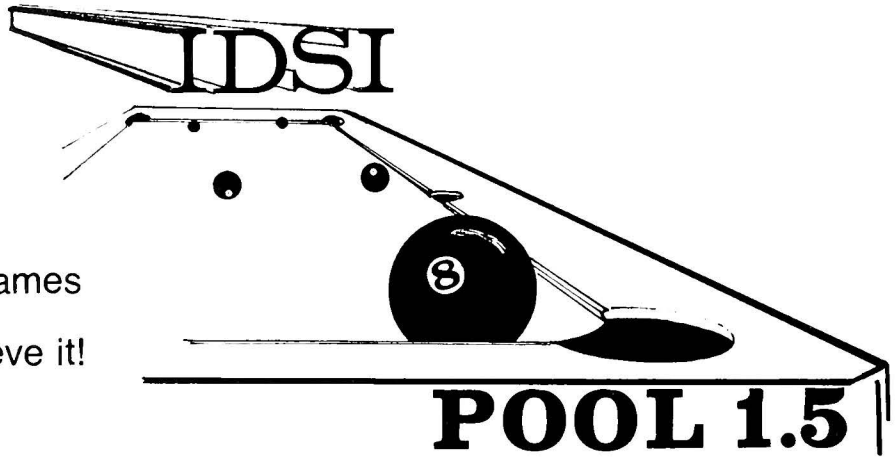
Tuesday Morning Quarterback. Automated Simulations/EPYX. $29.95.

World Series Baseball. DataMost, 9748 Cozycroft Avenue, Chatsworth, CA 91311. $29.95.

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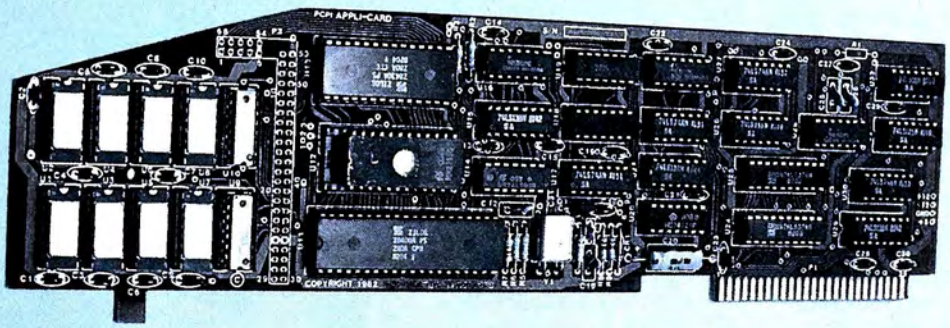
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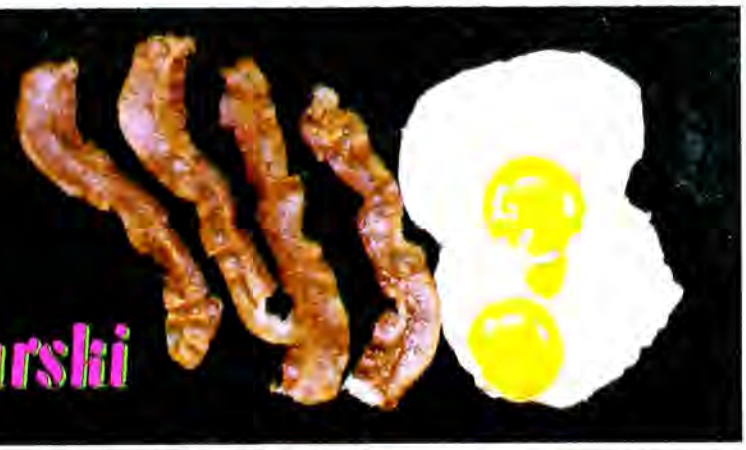
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Graphically Speaking

by Mark Pelczarski



Hi-res graphics are not an inherent part of the Basic language. When the folks at Apple introduced hi-res graphics to the language, they added new commands that deal with *vector shapes.* A vector shape is one composed of lines; the lines, or *vectors,* define the shape saved. Before vector shapes, shapes were saved only by the lengthy point-on, point-off definitions.

An example of a vector shape definition is something like "plot a line up one unit, plot a line left one unit, plot a line down one unit, plot a line right one unit"—that would give you a square.

A group of vector shapes saved for use in a program is a *shape table.*

All these commands are built into Applesoft.

The advantages of defining shapes by the vectors are the abilities to scale and rotate the shapes easily. To scale, you just have to multiply the lengths by a number. To rotate a shape, you change the directions by some offset. The disadvantages of this type of shape are that it is too slow for smooth, fast animation, and that the shapes are limited in color and detail. (Before anyone jumps all over that one, yes, it is possible to create a very detailed and multicolored vector shape, but doing so eliminates the advantages of vector shapes: rotation and scaling. Rotating and scaling destroy any intricacies of color and detail. There are better solutions.)

There's one other advantage, though. Because there are commands built into Applesoft for dealing with these shapes, vector shapes make a very good learning tool for beginning animation.

Creating a Shape. The first step in working with a shape table is to design a shape. If you look at pages 92–96 in your *Applesoft Basic Programming Reference Manual,* you might be able to bumble through and define a shape. Most people, however, see that section, find binary numbers and arrows mixed with hexadecimal digits, and their eyes glaze over. After a few more of these columns, yours may too. But for now let's pretend we're all beginners.

The program in figure 1 is a sweet little Basic program that lets you draw a shape and store it in a single-shape table. (Shape tables can store multitudes of shape definitions, all accessible by number, but to keep things simple we'll go with our table of one.) The programming details will be left to those who like to read the incomprehensible; the program basically accomplishes what the Applesoft manual tries to explain. (The routine itself is actually half-lifted partially out of context from a set of programs called *The Complete Graphics System* by Chris Jochumson and Mark Pelczarski—with permission from the authors.)

Type in the program, *save* to disk (call it *Shape Maker* or something like that), then *run* it. The hi-res screen clears, and several controls are available to you. Your joystick or paddles control the scale and rotation of the shape you draw. (If you don't have either paddles or joystick, change line 30 so that *S = 1 and R = 0,* instead of the formulas given.) The I,J,K, and M keys are your direction keys. I is up, M is down, J is left, and K is right, just as on the keyboard. Try using them; you should see your shape being drawn. If you keep the rotation set to zero, and the scale to one, you'll see the shape as it will be stored. Scaling and rotations can be used again later. Other controls are the Z and X keys, to turn the plotting on and off. Type F when you finish, name your shape, and it will be saved to disk. It's crude but effective; besides, it's definitely easier than hexadecimal and cheaper than buying a package just for drawing simple shapes.

```
10  L = 24576: POKE L,1: POKE L + 1,0: POKE L + 2,4: POKE L + 3,0:L = L + 4:
    POKE 232,0: POKE 233,96
20  P = 4: POKE L,0: POKE L + 1,0: SW = 1: HGR : HOME : VTAB 21 : PRINT "I J K
    M Z X F"
30  S = INT ( PDL (0) / 256 * 25) + 1: SCALE= S:R = INT ( PDL (1) / 4): ROT= R:
    VTAB 22: HTAB 1: PRINT "ROT:";R;" SCALE:"; S;"      "
40  XDRAW 1 AT 140,80
50  IF PEEK ( - 16384) > 127 THEN 100
60  IF R <    > INT ( PDL (1) / 4) THEN 90
70  IF S <  > INT ( PDL (0) / 256 * 25) + 1 THEN 90
80  GOTO 50
90  XDRAW 1 AT 140,80: GOTO 30
100  GET A$: IF A$ = "F" THEN 300
110  XDRAW 1 AT 140,80
120  IF A$ = "Z" THEN P = 4: GOTO 30
130  IF A$ = "X" THEN P = 0: GOTO 30
140  IF A$ = "I" THEN M = 0: GOTO 200
150  IF A$ = "M" THEN M = 2: GOTO 200
160  IF A$ = "J" THEN M = 3: GOTO 200
170  IF A$ = "K" THEN M = 1: GOTO 200
180  GOTO 30
200  V = M + P
210  IF SW = 1 THEN SW = 2:V1 = V : POKE L,V: POKE L + 1,0: GOTO 30
220  IF V + V1 = 0 THEN POKE L,88:L = L + 1: POKE L,0:V1 = 0 : GOTO 30
230  IF V = 0 THEN POKE L,V1 + 192:L = L + 1: POKE L,0:V1 = 1: GOTO 30
240  V = V * 8 + V1: POKE L,V:L = L + 1
250  SW = 1: POKE L,0
260  GOTO 30
300  IF SW = 2 THEN POKE L,V1:L = L + 1
310  POKE L,0
320  HOME : VTAB 21: INPUT "SHAPE NAME : ";A$: ONERR GOTO 320
330  PRINT CHR$ (4);"BSAVE";A$;",A24576,L";L - 24575
340  TEXT : PRINT "DONE"
```

Figure 1.

Using Your Shape in a Program. There's a group of commands designed strictly for drawing shapes from a shape table from a Basic program. The first is the command that loads the table into memory so the program can use it:

```
10 PRINT CHR$(4);"BLOAD name,A24576"
```

This is a binary load of your shape table, with whatever name you used, from disk to memory (RAM), starting at RAM address 24576. After that, you have to *poke* in two pointers that will tell your program at which address you loaded the table. For location 24576, used above, the *pokes* are:

```
20 POKE 232,0 : POKE 233,96
```

If you want to know where those numbers came from, read the

next two paragraphs. If you'd rather come back to it later instead of hitting confusing issues now, skip ahead.

The numbers correspond to the way addresses are usually stored in the computer. You may remember that in any single byte of memory you can store the numbers 0 to 255. To fit a larger address, you need two bytes. One byte holds the number of ones, the other holds the number of 256s. A simple example would be in base 10. Imagine you've got two slots that can only hold two digits each. The number 1587 could be broken up as 15 and 87, with 15 being the number of hundreds and 87 being the number of ones. You get the number for the first slot by dividing by 100 (lopping off the first two digits of a four-digit number) and the number for the second slot by taking the remainder. As long as you remember which is which—so you don't get the number 8715—you're okay.

With the Apple, instead of dealing with hundreds, you divide the number by 256s. The address we used to load our shape table at, 24576, divided by 256 is 96, with a remainder of zero. Therefore, 96 should be put in the high-order byte, and zero in the low-order byte. The only other item that may be confusing is that most of the time the addresses are stored in low/high format. Notice that with the two *pokes* above, we put zero (the low byte of the address or the remainder after dividing by 256) into location 232, and 96 into location 233. The first location gets the low byte, and the second location gets the high byte. Weird, maybe, but it's pretty consistent.

Two Paragraphs Later. The commands that affect the plotting of shapes are *hcolor, rot* (rotation), *scale, draw,* and *xdraw. Draw* draws a shape at the coordinates you specify. Once a shape table is loaded and the address is *poked* into the necessary locations (232 and 233), you can use *draw* for any shape in the table. To wit:

```
20 DRAW 1 AT 100,150
```

draws shape one in the table at the coordinates 100, 150.

Hcolor sets the color for all subsequent *hplots* and *draws,* meaning that you can set the color in which your shape is drawn to any of the six standard hi-res colors.

Rot controls the rotation that subsequent *draws* will use. *Rot* = 0 is normal, *rot* = 16 is 90 degrees rotation, *rot* = 32 is 180 degrees, *rot* = 48 is 270 degrees, and *rot* = 64 is a full 360-degree rotation. Intermediate values give varying angles between those listed, depending on the scale used. The higher the scale, the more points of rotation you have available.

Scale sets the scale of the subsequent draw commands. *Scale* = 1 is normal, *scale* = 2 is double size, *scale* = 3 is triple size, and so on.

Xdraw looks like a draw command but it doesn't use a color. It just reverses everything on the screen where the object is being drawn. If the background was white, the shape is drawn in black, and vice versa. *Xdraw* is sometimes nice because a second *xdraw* at the same location erases the shape and restores the background to its original state.

Simple Animation. Moving one object at a time around the screen works all right with shape tables. The lack of speed really starts to show when you try to move more than one object. One object, though, gives us enough to start some simple animation.

Create a shape with the *Shape Maker* program, then type in the program in figure 2. That program goes through the basics of animation. First you need to initialize all your information. From then on, it's a simple cycle: draw the shape on the

```
9  REM Initialize
10  INPUT "SHAPE NAME : ";A$: ONERR GOTO 10
20  PRINT CHR$ (4);"BLOAD";A$;",A24576"
30  HGR : POKE - 16302,0: POKE 232,0: POKE 233,96
40  ROT= 0: SCALE= 1
50  X = 100:Y = 80:XC = 2:YC = 2
59  REM Draw Shape
60  XDRAW 1 AT X,Y
69  REM Compute new caordinates
70  XL = X:YL = Y
80  X = X + XC:Y = Y + YC
90  IF X > 279 THEN X = 279:XC = - 2
100  IF X < 0 THEN X = 0:XC = 2
110  IF Y > 191 THEN Y = 191:YC = - 2
120  IF Y < 0 THEN Y = 0:YC = 2
129  REM Erase Shape
130  XDRAW 1 AT XL,YL
139  REM Repeat
140  GOTO 60
```

Figure 2.

FREE GAME

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Calc-Man

by Dan Tabias

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```
9  REM Initialize
10  INPUT "SHAPE NAME : ";A$: ONERR GOTO 10
20  PRINT CHR$ (4);"BLOAD";A$;",A24576"
30  HGR : POKE - 16302,0: POKE 232,0: POKE 233,96
40  ROT= 0: SCALE= 1
50  X = 100:Y = 80:R = 0
59  REM Draw Shape
60  XDRAW 1 AT X,Y
69  REM Compute new coordinates
70  XL = X:YL = Y
80  X = X + INT (( PDL (0) - 128) / 26):Y = Y + INT (( PDL (1) - 128) / 26)
90  IF X > 279 THEN X = 279
100  IF X < 0 THEN X = 0
110  IF Y > 191 THEN Y = 191
120  IF Y < 0 THEN Y = 0
129  REM Erase Shape
130  XDRAW 1 AT XL,YL
132  R = R + 8: ROT= R: IF R > 64 THEN R = 0
134  SCALE= 6 - ( ABS (X - 140) + ABS (Y - 96)) / 50
139  REM Repeat
140  GOTO 60
```

Figure 3.

screen, update the coordinates, erase the shape at the old coordinates, and repeat. Draw, update, erase, draw, update, erase—ad infinitum.

Notice that lines 10-50 initialize everything. Line 10 lets you input your shape's name, and line 20 *bloads* it into the location we want. Line 30 sets the hi-res graphics screen, and *pokes* the necessary pointer locations with the address of the table. Line 40 sets the rotation and scale to normal, and line 50 sets the starting x and y coordinates for our animation, and sets **XC** and **YC** (x change and y change) to two each. Each time we go through the loop in this example, we'll use **XC** and **YC** to update the coordinates.

Line 60 begins the animation cycle by drawing the shape at location x,y. Lines 70-120 save the old coordinates in **XL, YL** and update them. Line 130 erases the shape by *xdraw*ing again at the old coordinates, **XL, YL**. Line 140 causes the sequence to be repeated.

Why draw-update-erase and save the old coordinates, instead of draw-erase-update? Because the update part of the cycle is the one that takes the most time, and during that time you want your shape on the screen. By erasing before the update, you'd have more time with your shape off the screen and a lot more flickering would be apparent.

Looking at the update cycle, notice that we use **XC** and **YC** to change the x and y coordinates. That's just an arbitrary formula; try playing around with various ways of modifying x and y. Notice, though, that in lines 90-120 we check the range of the new x and y coordinates. If either is less than zero, or if x is greater than 279 or y greater than 191, trying any *draw, xdraw,* or *hplot* command will result in an error. Use lines like 90-120 anytime you're not positive that the result of a computation will be within those bounds.

The last example is a simple animation program similar to that in figure 2, spiffed up just a little. Instead of using **XC** and **YC** as the x and y offset, we'll use the joystick (or paddle) values to determine which way to move. We'll also add a couple of optional lines that play with the rotation and scale of the shape. Note that figure 3 varies at lines 50 and 80 from figure 2, and that lines 90-120 are shortened. Lines 132 and 134 are optional and can be added or deleted at any time to demonstrate their effect.

As always, try whatever variations you want. You won't break the computer trying.

Note: In the first part of this series, there was an inset about binary numbers. Somewhere between here (where I type now) and there (the magazine you read) some exponents disappeared. All those 10s and 2s on the top rows of the examples should have had tiny exponents floating slightly above and to their right. The rightmost 10 or 2 in each row should have an exponent of zero, the second from the right should have an exponent of 1, the third from the right should have an exponent of 2, and so on. ■

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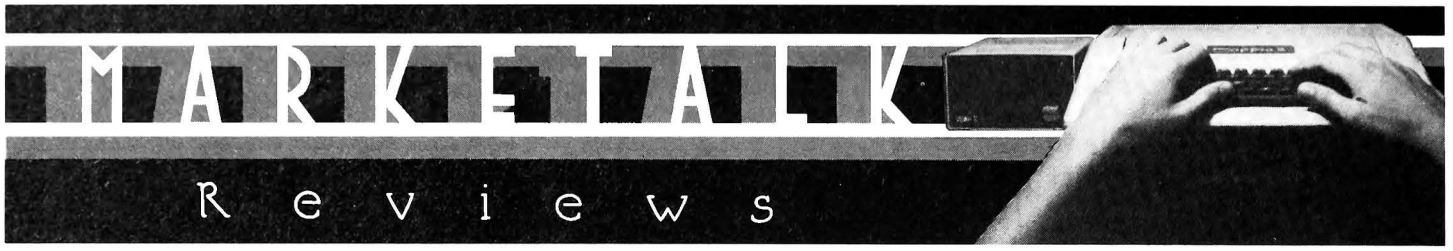
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Summertime Apples: beeping happily through the long, lazy days . . . booting a tall, cool one . . . burning EPROMs in the back yard. . . . Once again the Apples of the free world have time on their keys and are obligated to keep their owners engrossed at greater length than at any other time of the year. To do that, they know they'll need new programs—lots of them, in wide and varied array. Softalk obliges with its annual expanded Marketalk Reviews section, this year extended into August, taking the guesswork out of summer program purchasing so your Apple can just lie back and enjoy.

The New Step By Step. By John Victor. This is a "teaching program" that teaches you Basic—but that's an understatement. This one is to most teaching programs what *Wizardry* is to *Adventure*; it makes learning Basic more interesting, and more fun, than some of the games out there!

Calling it a "teaching program" is an understatement for another reason—you don't get just a program, you get a whole "teaching environment." The package contains two program disks, two audio cassettes (you'll need a cassette player), and an excellent workbook containing fifty pages of lesson summaries and practice problems. The creators call this package an "interactive course," and that describes it very well.

In essence, the program works like this: the Apple displays examples and demonstrations while a taped voice explains them. Every few minutes this process stops and you are asked some simple questions about what you have just learned. If you answer correctly, you are rewarded with a random pattern of musical bleeps and the program continues.

This is an excellent teaching technique. You hear a point explained, simply and clearly; you see it demonstrated, often with well-designed animation, in one or two sample programs; then you answer questions about it, and you must get them right before you can continue. The questions are not difficult. Their purpose is not to challenge you, but simply to make you *do* something with what you have just learned. If you can *use* the learning to answer a question, then you have truly learned the item or concept and can go on to something else.

If not, you get to keep trying until you find the right answer—and that, too, will teach you something!

But that won't happen often. Usually you will know the answer as soon as you see the question or will at least see how to figure it out. The program is well designed in that respect: you always have enough information to answer the questions; you just have to put the information together.

And what controls all this activity? What synchronizes the lectures, demonstrations, questions, and so on? Why, you do, in reponse to various signals. A high-pitched beep from the tape tells you to press a key on the Apple which calls the next display, and a lower-pitched, bell-like tone tells you to stop the tape and answer a question on the computer. When you get the right answer, the Apple's speaker chirps a reward, and the screen tells you to start the tape again.

You soon get into the habit of controlling the system without having to think about it. And that control gives you one great advantage: you can choose your own learning speed. If you start feeling rushed you can just stop. Answer a question and then *don't* restart the tape when it tells you to. That will give you a chance to think about what you've learned before you have to deal with the next thing. You can't do that in a classroom!

Speaking of classrooms, this interactive course includes two familiar classroom drags—quizzes and homework (they call it "practice problems")—but they're not so bad here. The quizzes are made up of the same kinds of questions you have been answering during the lesson. Any that you miss are a useful tip-off that you didn't get something as clear as you thought you did (look it up in the lesson summary). And the practice problems are simple but interesting, rather like hobby or game programs scaled down to the student's level.

A good teaching program must do three things. It must cover the necessary material; it must teach so the student remembers and can use the material; it must make all of this interesting and preferably entertaining. This interactive course scores close to one hundred on all three counts.

If you want to learn Basic or would like a little guidance and encouragement added to what you already know, then the way to go is *Step By Step.*

The New Step By Step, by John Victor, Program Design (11 Idar Court, Greenwich, CT 06830; 203-661-8799). $79.95. IR

Choplifter. By Dan Gorlin. As the fence marking the border of the Bungeling Empire passes below you, you ease back on the throttle of your trusty helicopter and ponder the mission before you. Somewhere out in that desert are four buildings where your fellow countrypersons are being held hostage by the merciless Bungelers (Bungelings?). All you have to do is swoop in and pick them up—providing that you can locate them. You've been warned about the patrolling tanks, and you watch the sky for the occasional jet fighter. Below you the featureless terrain slips by.

Suddenly you see a tiny figure waving at you from below. Some of the hostages must have escaped. You push down on the throttle and drop gently to earth, your recently assembled chopper bouncing slightly as you wait for the running figure to clamber on board. More hostages are dashing toward you when you hear the rumbling of a tank and are rocked by a nearby explosion. Can you tough it out any longer?

The decision is yours, but no matter what you decide, there are more tanks awaiting you at every touchdown. And should you destroy a hapless tank or two, there are plenty of lethal aircraft and the dreaded drone-homing mines to keep you on your toes.

Choplifter is a delightful mixture of arcade excitement and graphics whimsy, executed with a realism seldom found in entertainment software. From the helicopter with its twirling main blade and spinning tail rotor to the frantic yet polite hostages who wave goodbye after you drop them off, *Choplifter* is a kick.

Your base of operations is a post office, complete with Old Glory fluttering in the breeze, beyond the border of the Bungeling Empire. It's something of a sanctuary, for neither the tanks nor the jets will follow you there. The same does not hold true, however, for your friends the drone mines.

If *Choplifter* has a failing, it's that it's over too soon. There are only sixty-four hostages, and you can carry sixteen per journey. You are given three helicopters to complete the task. With some practice, you will learn to survive the mission, but the real challenge is getting as many hostages as possible back alive. Therein lies the true heart of the game. You are not trying to rack up a high score in this one; to do so would be distracting. You don't get points for destroying the enemy, nor is getting the hostages back to safety rewarded in any symbolic fashion. You simply must try to get as many back alive as you can—the only score is the tally of hostages dead and rescued.

That almost pushes *Choplifter* into the realm of simulation.

You may inadvertently land on one of the fleeing hostages during the excitement of dodging tank and/or aircraft fire. Doing so kills the hostage as surely as any enemy action. And it hurts: you failed in your mission. And the hostages are so, well, personable. Not only do they wave, but if you land next to a building containing several, none will venture out until they see someone else clamber aboard. Then there's a mad rush to get picked up. And they're so grateful when you drop them off.

All in all, it appears a good deal of thought went into the details of *Choplifter*. Playable with joystick only, it's a step beyond the mindless (although diverting) shoot-'em-ups that populate the arcade field. The thoughtfulness is welcome; the game itself is fun. What's the next step?

Choplifter, by Dan Gorlin, Broderbund (1938 Fourth Street, San Rafael, CA 94901; 415-456-6424). $34.95. DA

Sheila. By Brian Fitzgerald. In one corner are the home-arcade game enthusiasts: proponents of blazing battle action, high-scoring coordination, and tricky mazes. In the other corner are the adventurers: weavers of arcane spells and practitioners of mind-twisting logic on the slow, interactive trek to glory. In struts a seductive new game called *Sheila*, splitting the warring factions down the middle. Wolf whistles come from both sides; a new breed has entered the arena. Built with some of the best features of both sides, she's got crossover appeal.

Right off, it's apparent that *Sheila* favors the arcade aspects of computer gaming—chomping monsters, hand weapons, bombs, and intricate mazes. Adventure game aspects—finding tools and weapons, earning spells, rescuing Sheila—have been added to this, expanding on the action with imagination and success.

Sheila makes you fight your way through creatures on four levels while you hunt for transport pills, spears, bombs, and a shrinking device, all stashed in rooms and dead ends of each maze. When you get over 500 points, you can start earning spells like plague, get weapons, and defuse that make your quest a touch of a key easier. Your final goal in the game is to find the four parts of a key hidden in alcoves on level four. You must deposit these, in order, in the four corners of the tower room to release Sheila from her penthouse prison.

If you fail to get to the top with at least one of your first ninety-nine lives, *Sheila* may capriciously grant you a resurrection, but don't count on it. What you can count on is hearing *The Godfather* theme and "Greensleeves" if you lose a round.

You can acquire more than two hundred spears per game as you work your way to the tower. Teleport pills are what you're really after, however; they're what actually get you from level to level. Finding them seems simple enough at first, until they change locations. Then, well . . . good luck. The same chicanery applies to spears and bombs.

When the game tells you you have rescued Sheila (and, no, she is not the duck), don't expect to stop for champagne and promises. You still have to fight your way back through the four levels and out the front door of the castle before you are out of trouble.

Sheila is totally keyboard controlled. Four keys give you movement, four keys give you firing direction, and each spell has its own casting key. Consecutively higher skill levels are provided; unfortunately, you can't save a game to disk. Maybe next time.

New quests, spells, tools, and buildings are promised in updated versions of the game. The graphics in this first installment are a bit rough, but this in no way detracts from the enjoyment of playing.

Here's to *Sheila*, the bigamous bride of adventure-arcade games, and the mother of many enjoyable mutant offspring sure to come.

Sheila, by Brian Fitzgerald, H.A.L. Labs (4074 Midland Road, Suite 23, Riverside, CA 92505; 714-359-8480). $23. MF

MicroFinesse. Quick! What's the name of the oldest spreadsheet program for microcomputers? Trick question? You bet. But when you unpack the manual for *MicroFinesse*, a Pascal-based spreadsheet program from England, and read the first sentence, all thoughts of seeing another *VisiCalc* clone flee the mind: "*Finesse* is a financial modeling program that was developed in the early 1970s for the P-E Consulting Group in England." This is the grandfather-apparent. So you dive back into the package, come out with four disks and a very serious look-looking protection device for the paddle socket and press on.

The program offers all the usual financial forecasting routines, plus built-in hi-res color graphics abilities which include pie charts, histograms, and graphs. And if that's not enough, you can create a set of sixteen color slides and put on a self-timed slide show for your presentations. In addition, you can have resident up to fifteen user-defined report formats, and also consolidate models or expand them, all without reprogramming. This is the stuff of mainframe heaven, all available right there in your Apple.

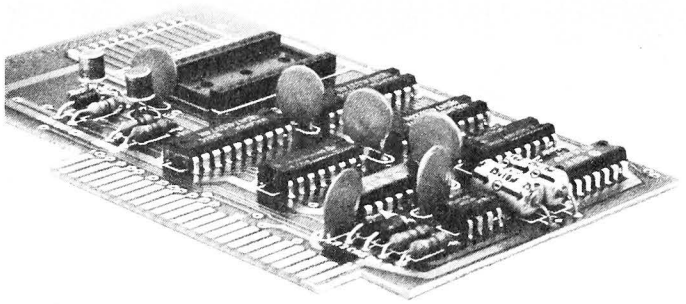
The program can handle a model of up to 5,000 cells. Your model could have dimensions of 50 x 100 or 125 x 40 cells.

To give you an idea of the program's capabilities, consider this. A major feature of spreadsheet programs is known as the "what if" function. What if costs go up 12 percent, or what if taxes are lowered 20 percent (ha ha). In the other programs we've seen, you input the new value into your model and run it. Then if you want to see another "what if," you do it again. *MicroFinesse* has automated this process so you can say, "Show the results for a cost increase of 1 to 20 percent by steps of 1 percent." You then sit back and watch it do all the work—which is why you bought the computer, right?

Suppose you want to know what your maximum labor cost can be, at the present sales level, to allow you to earn 9 percent, after taxes, on sales. Once again you push a few keys and watch the computer figure it out for you. And remember, it can do all this without changing your basic model. Nothing is altered in any cell unless you direct it to be done.

The performance of the program is at least as good as the manual and sales literature promises, and in some cases, you will be surprised by the sophistication of features for which the documentation doesn't prepare you.

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There is a brief tutorial but the program has so many possibilities that a thousand pages could not do it justice. The best way to approach *MicroFinesse* is to let your imagination fly and search the index to find the way.

While the program is not cheap, it contains most everything that the Visi programs offer as extra cost additions and some they don't have at all. This makes it quite a bargain.

It is quite easy to use. You can move just a part of your model to another disk or consolidate it with or into another model by simply following screen prompts. The slides are easy to construct and need no keyboard input if you are using information from your model. The graphics disk can be used alone to make up hi-res slides of anything you can type at the keyboard. This includes text slides with a choice of seven background colors and either black or white lettering.

While this program uses the Pascal language, it is transparent to the user. You would not need to enter the Pascal system except to transfer an occasional file from disk to disk.

Problems encountered were of a minor nature and in each case were caused by changes in the program that the manual did not yet reflect. One may be occasionally halted by the British terminology, but, after a spot of tea or some such, one should be able to press on. A little research in the index should answer all your questions.

If you have the Pascal system and are considering purchase of a spreadsheet program, you would be well-advised to look into this one before making a decision.

MicroFinesse, by P-E Consulting Group Limited, Osborne/McGraw-Hill (630 Bancroft Way, Berkeley, CA 94710; 800-227-0900). $495. RJR

Condor 20. By Robert Cohen. *Condor 20* is a relational database management scheme (DBMS). It has none of the limitations of a personal filing system, and it has extra properties of its own. Record length and file size are virtually unrestricted, you can design your own forms or model them after existing ones. You can add or delete variables *after* a database has been created, and you can join several databases into one.

Most of *Condor*'s work, sorting and accessing files, is done behind the scenes. Frequently, the ultimate end user—a manager, a secretary, a policeman, or a shipping clerk—is completely unaware that a *Condor* database manager is in use.

Condor will appeal to all present and potential consultants. With the aid of just a few of *Condor*'s simple but powerful English-like commands, it is possible to create a variety of data management systems. The starter system alone, *Condor 20-1*, comes with three preprogrammed applications: mailing labels, client tracking, and project control.

Typical uses for *Condor*-created databases include maintaining personnel, property, sales, and vehicle maintenance records and tracking loan applications and sales performance. One of the most extensive applications is a *Condor*-based system used by the National Broadcasting Company for tracking syndicated television series. The NBC data management system uses eight separate databases.

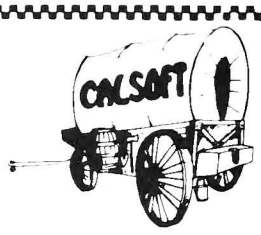
These data management systems, apart from the three preprogrammed applications noted above, do not come out of the box ready to go. In each instance more experienced users have been responsible for developing the DBMS into a DMS. However, these include an ex-film producer and an ex-police chief, suggesting that with *Condor* at least, the transition is not that difficult.

A database management scheme has three principal parts: a forms generator, a database manager, and a report writer. *Condor* wins top marks for the first two. A failing grade for the built-in report writer becomes a top mark with the purchase of

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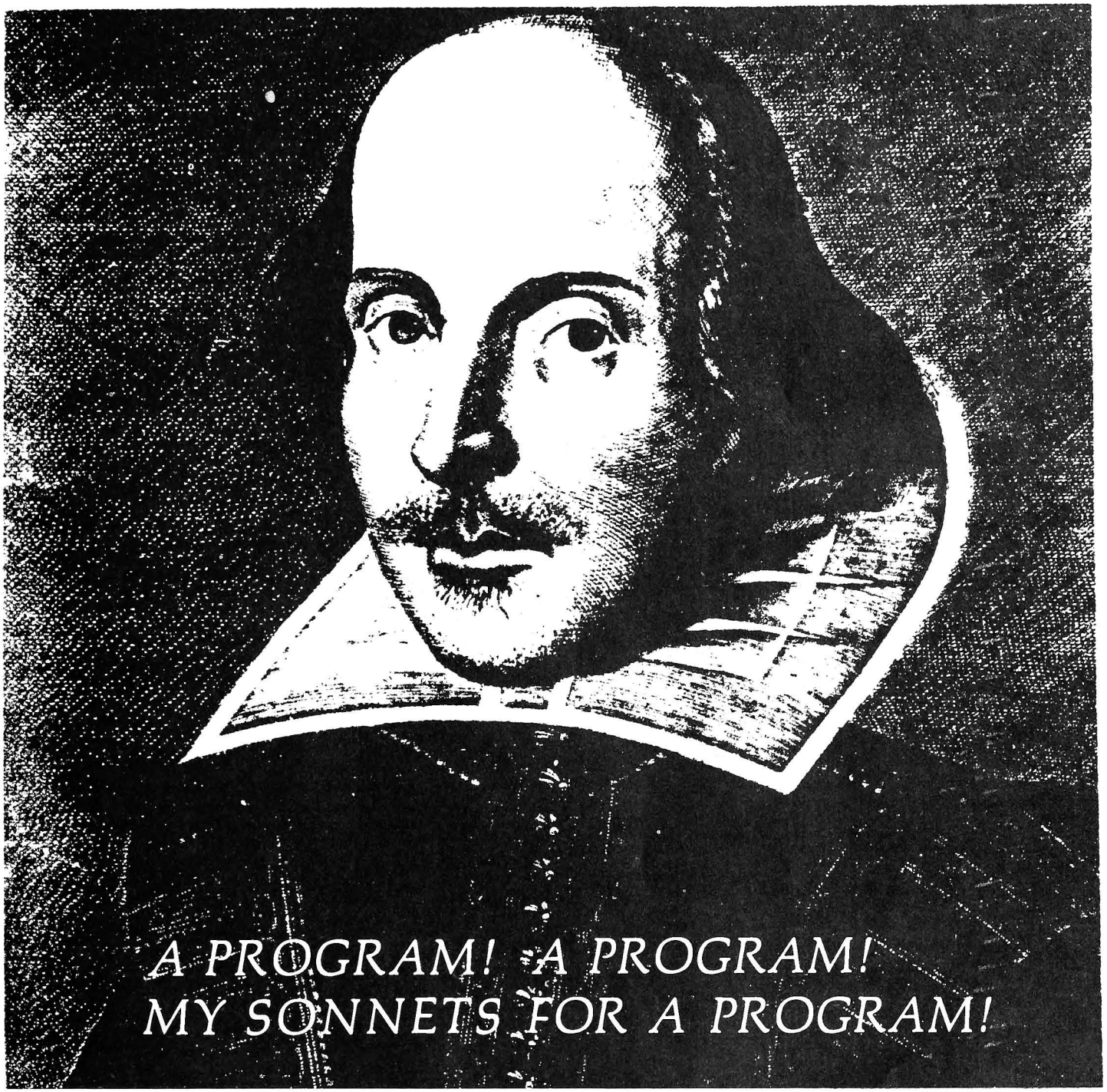
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Thou should know'st that life was doubly sweet in Stratford. Peacefully the Avon flow'd nearby, reflecting brightly the morning sun and the evening stars. England flourish'd in fine splendor, its citizens members of a far-flung empire. Royalty would oft come to view mine meagre scribblings come to life upon the stage.

Amongst all this bounty, alas, there eixst'd the bane of Basic. Wherefore art the man who could'st master the mysteries of GOTOs, GOSUBs, and all sorts of other ill-manner'd constructions? How oft I labor'd with Basic, knowing full well the price to be paid in debugging.

Yearn'd I then for the software tool to ease mine burden. A tool that would afford the ease of use of more base languages such as English. But then, time is a slave to no man, mine poverty was not eased. Forsooth, 'twas not until the introduction of the Program Writer/Reporter for thine Apple II that this burden could be lifted.

This Program Writer/Reporter can'st do all manner of writing, though it's not yet been known to put pen to a play or sonnet. Know'st thou that this program can'st even create interactive files so data can flow from one to the other even as the Avon flows gently past mine place of leisure to another destiny.

With this software 'tis possible even for Falstaff, that man of no serious purpose, to write code as good as a Budge. Shylock, he of the mean spirit, would'st give his money purse for such a tool as would'st make him as powerful as a Stone.

Layman! Look your last at despair! Let Program Writer/Reporter write your code. Let not pride of authorship stand in thy way. Code by any other source will run as sweet.

W Shakespeare
Author

There are separate Program Writer/Reporter programs for your Apple II or Apple III. The Program Writer/Reporter generates programs using interactive data files for efficiency, speed, and data compaction. For more information, contact your local dealer or write:

Vital Information Inc.
7899 Mastin Drive
Overland Park, KS 66204
(800) 255-5119

Condor 20-R, a highly flexible report writer which provides for fixed as well as variable-length records.

Condor lets the user adapt existing forms like an invoice or an order entry blank for use in a computerized business or laboratory system. The adaptation of existing forms makes it easier to create and to implement a computerized system—there is less for employees to learn and unlearn.

Each form and each field on a form can be validated before it is entered into the database. Data entry clerks can't enter a letter when a number is required. They can't skip over fields that must be filled in. A field may be required to lie between specified limits such as $1 to $5. The average time to compose a screen, even with cross checks and verifications on each field, is less than fifteen minutes.

Condor will please the systems developer because of short development time, flexible command structure, compact data storage, and satisfied end users. It permits crashless data entry by relatively unskilled personnel, compact data storage with fewer disks to change, quick access to needed information, and flexible report formats.

Sets of commands include those for database creation and maintenance, information input and update, information processing and report writing, operation aids, interfaces, and utilities.

Condor files are compact partly as a result of its relational nature. The use of two databases keeps files conveniently managed, yet they can be combined with a single command.

Condor 20 is a big system that uses all the Apple's potential. You'll need a CP/M SoftCard, a 16K RAM card, an eighty-column generator, and at least two disk drives. A hard disk is recommended to get the most from *Condor 20-2*.

Condor 20, by Robert Cohen, Condor Computer Corporation (2051 State Street, Ann Arbor, MI 48104; 313-769-3988). *20-1*, $295; *20-2*, $595; *20-R*, $295. PC

Bandits. By Tony and Benny Ngo. *Pow! Pow! Pow!* "Here comes another wave!" *Pow! Pow!* "Oh no! They're dropping napalm!" *Pow! Pow! Pow!* "Quick . . . shields up!" *Pow! Pow!* "Come back with that orange! Aargh . . . shields out! No! No! *Aaarrgh!!*"

So ends another game of *Bandits*.

Bandits is a variation of the age-old invaders-type game, but with enough new twists and innovations of its own to make it one of the better of this genre—possibly the best.

In *Bandits*, you are left to guard the supplies on our closest satellite, the moon. These supplies are grapes, oranges, wrenches, and a whole variety of other items. Every criminal in space is out to steal your goodies and disintegrate you in the process. At your disposal are five mobile laser guns per game, with an unlimited supply of ammunition and a limited amount of shield energy. Bonus guns are awarded every 5,000 points. Your shields should be used sparingly at first; the game gets quite hectic as play progresses. A gauge at the bottom of the screen keeps you informed of your shield's remaining energy at all times. Shield energy is completely replenished with each new gun, and is slowly replenished during the life of each gun in sustained play.

The game starts out simply enough. Phalanxes firing streams of bullets make several passes at you, either singly or in groups. Any of them you miss will steal your supplies that are stacked on the right of the screen, and return with them to their mothership at the upper left. If you succeed in blasting away the entire batch of marauders before they make off with your cherries, bonus points are awarded for the supplies saved. Then a whole new flight of baddies try their own uniquely devious ways to put you under and continue their plunder. Some of these are centipede-like Torrents with napalm bombs, Carriers that drop bouncing balloons on you, and the deadly Menace with its highly accurate heat-seeking bullets.

Bandits has twenty-eight levels of play, each with a different group of items to protect and a unique combination of bandits that go after your goods. This is where the game really gets frantic. With several different types of bandits attacking simultaneously, wise shield use, strategy, and a keen eye with a laser cannon separate the pro from the novice.

Bandits, by Tony and Benny Ngo, Sirius Software (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195). $34.95. SP

Solar System Astronomy. By Mark Cross. This program is hard to define. It's more than an "introduction," but less than a complete course; more than a textbook-on-disk, but less than a fully interactive teaching program. It's rather like a series of illustrated lectures—except that you read the "lecture" off the screen, rather than hearing it.

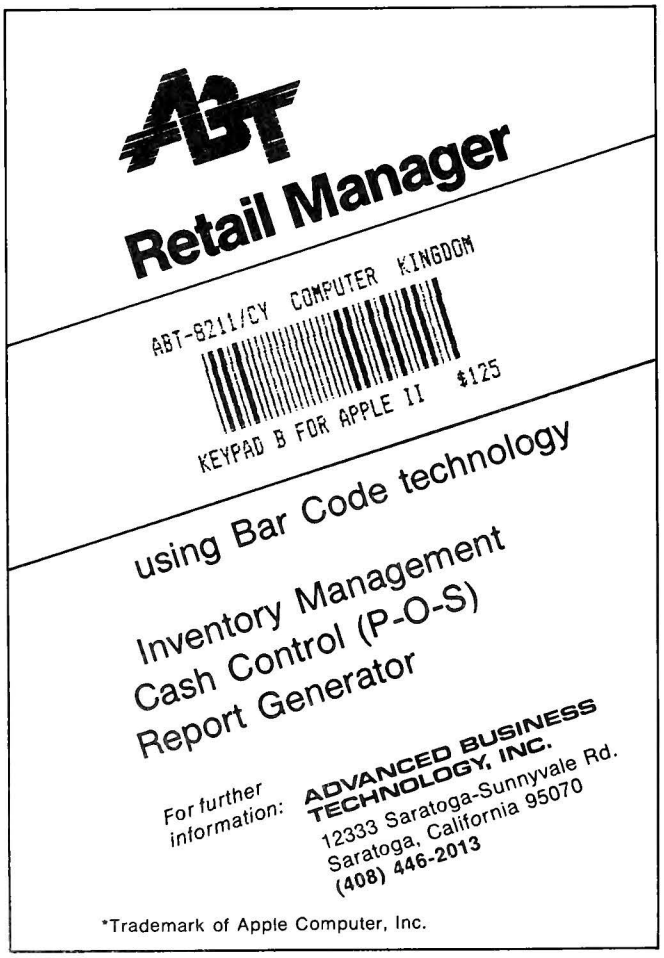
As a rule, you get a picture of the planet and its two satellites, in hi-res color, filling the upper half of the screen. Below this is a block of text describing the planet—typically twenty or thirty words. When you have read that, press any key and the text will be replaced by a new paragraph, while the picture remains. The total amount of text is about 200 words.

The information is nicely organized for teaching purposes, and it's presented one idea at a time. Also, some of the sections use several pictures and/or simple animation to get their points across. All of this makes it easier to understand the material, and thus helps in learning it.

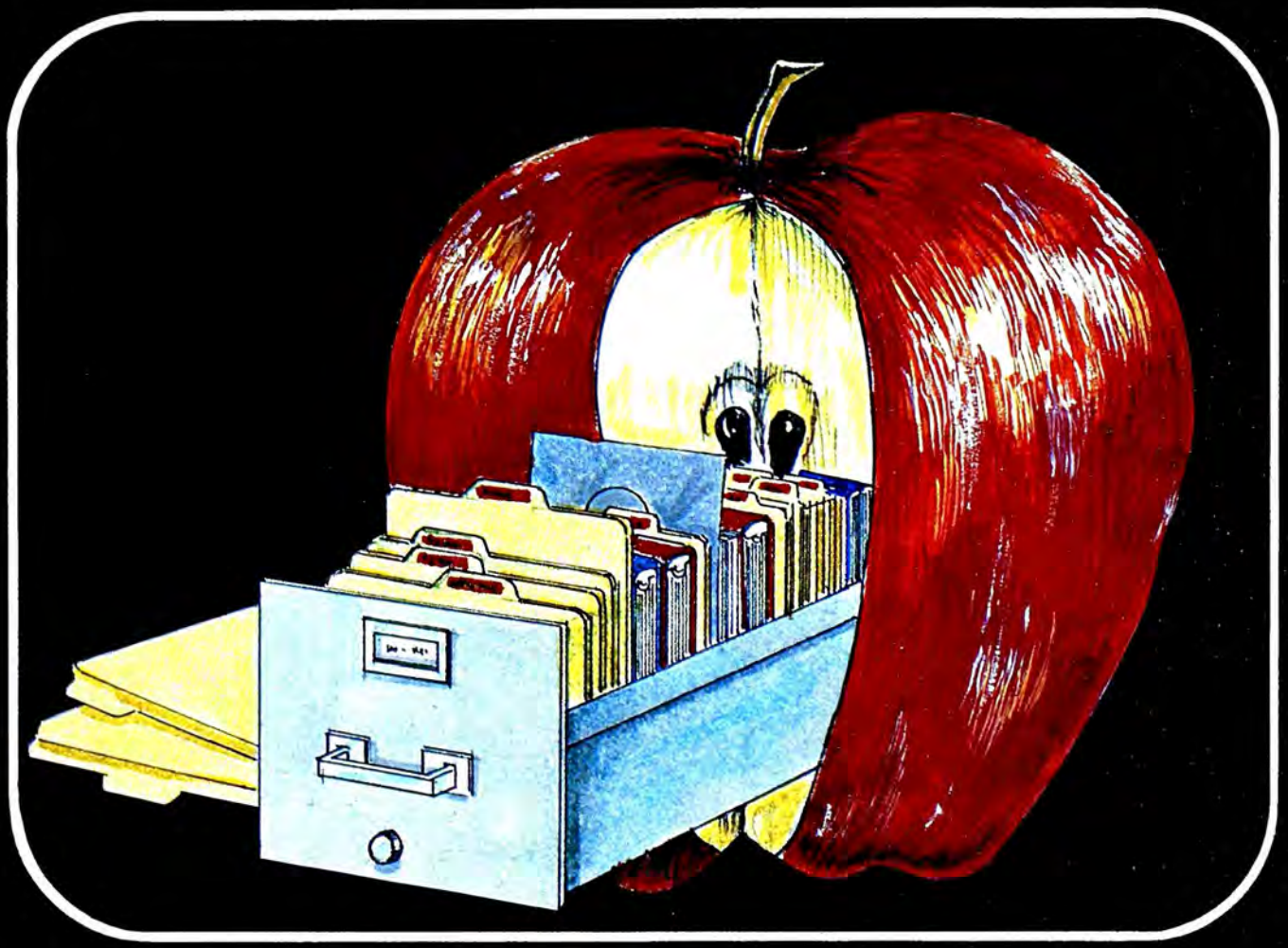
The text presentation includes a couple of surprises. For one thing, it appears slowly—one character at a time, at about normal reading speed—accompanied by a series of ticks from the speaker to simulate the sound of typing. This is not as distracting as you might expect, and in fact seems to add a kind of warmth to the program—a subliminal suggestion that, even though you are studying alone, the teacher is there with you.

Also, the text is in mixed upper and lower case, just like a textbook—an unusual sight on the Apple screen. The program includes a special graphics driver, which also permits intermixing text and graphics; thus labels and explanations can be included in the pictures. This flexibility makes for pictures which are easier to understand and teach more effectively than the usual Apple graphics.

The program includes a section on each of the planets (the latest information available as of 1981), the History of the So-



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lar System (nebular hypothesis), Life in the Solar System, Comets, and the Greenhouse Effect. The coverage of each topic is limited—only a couple of hundred words—but it's very good within that limit. No words are wasted.

In short, this program will not replace a school course in astronomy, but it will give you a good idea of what such a course is about. And if you are already taking such a course, or planning to take one (late high school or early college level), the program could be an excellent study resource for outside work. JR

Solar System Astronomy, by Dr. Mark Cross, Cross Educational Software (Box 1536, Ruston, LA 71270; 318-255-8921). $30.

Cannonball Blitz. By Olaf Lubeck. The cover of the package of *Cannonball Blitz* features a soldier firmly ensconced on the tail of his cannon, joystick in hand, a Budweiser at his side.

Despite what you might think, however, *Cannonball* isn't a shooting game. It's a combination of capture the flag, dodge ball, and ladder climbing. The resulting amalgam is highly entertaining.

The object of the game is to capture enemy flags by scaling various heights. The first level is a set of sloping floors, complete with trap doors and springboards. You have a trio of characters trying to liberate the flag. You can control the little person with either joystick or keyboard (you can define the keys).

The joystick button or space bar sends the character aloft. Why? Well, there are the bombs that roll down the slope after the giant soldier at the top kicks them. You must leap over the bombs or lose a character. The graphic representation of this bereavement is an unlucky acrobat sitting there with stars whirling about his head.

Springboards are placed at various strategic points on the slopes. If you can position your character at the springboard before a bomb falls through a trap door, the resultant Newtonian principle of motion sends you up to the next level.

After various adventures and mishaps, you'll finally reach the top level. Right above that is the flag. Your only chance to get it, however, is to catch a ride on a balloon that comes and goes. If you're on the top sloping level without a balloon, you must leap all the bombs the giant kicks your way until the balloon floats back up.

When you capture the flag, you begin the next screen of play. This is a series of six level floors patrolled by malevolent cannons that can go up and down the ladders connecting the floors. The five upper floors each have two trap doors that are opened when your character runs over them. Two of these floors have little hammers that can only be used on those floors and will destroy the cannons. You must spring all five traps in a vertical row so that the giant soldier patrolling the top floor will fall through.

If you avoid the cannons and the cannonballs, don't step through an open trap, and don't get stepped on, you'll capture the flag. The third level is much like the second, except that there are elevators to assist your ascent.

Points are earned by jumping cannonballs on the first screen; hitting a cannon with a hammer or opening a trap door on the second screen; and hammering a cannon, jumping from platform to platform, and jumping from platform to elevator on the third screen. You'll earn bonus points for capturing the flag, and garner an extra character after completing the second screen.

There isn't any way to restart the game if you should lose your first galloper early on. It also takes a few moments to reload each time. High score isn't saved.

The fife music and sound effects can be turned off, and there's a pause feature. The graphics are simple but good.

Your timing has to be impeccable, however; there's very little margin for error.

Cannonball Blitz, by Olaf Lubeck, On-Line Systems (36575 Mudge Ranch Road, Coarsegold, CA 93614). DOS 3.3. $34.95. DA

VC-Loader. This is a utility program that allows you to transfer data from almost any source to *VisiCalc*, *VisiTrend*, or

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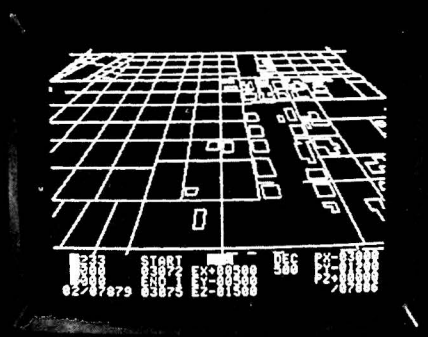
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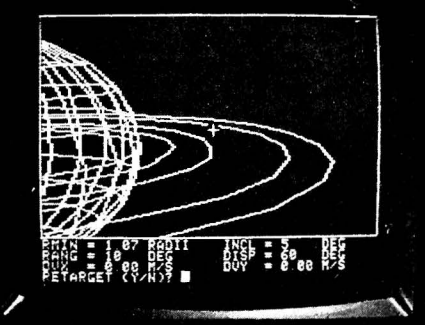


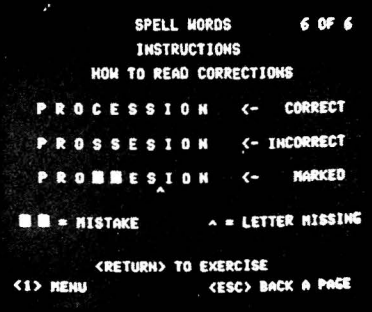
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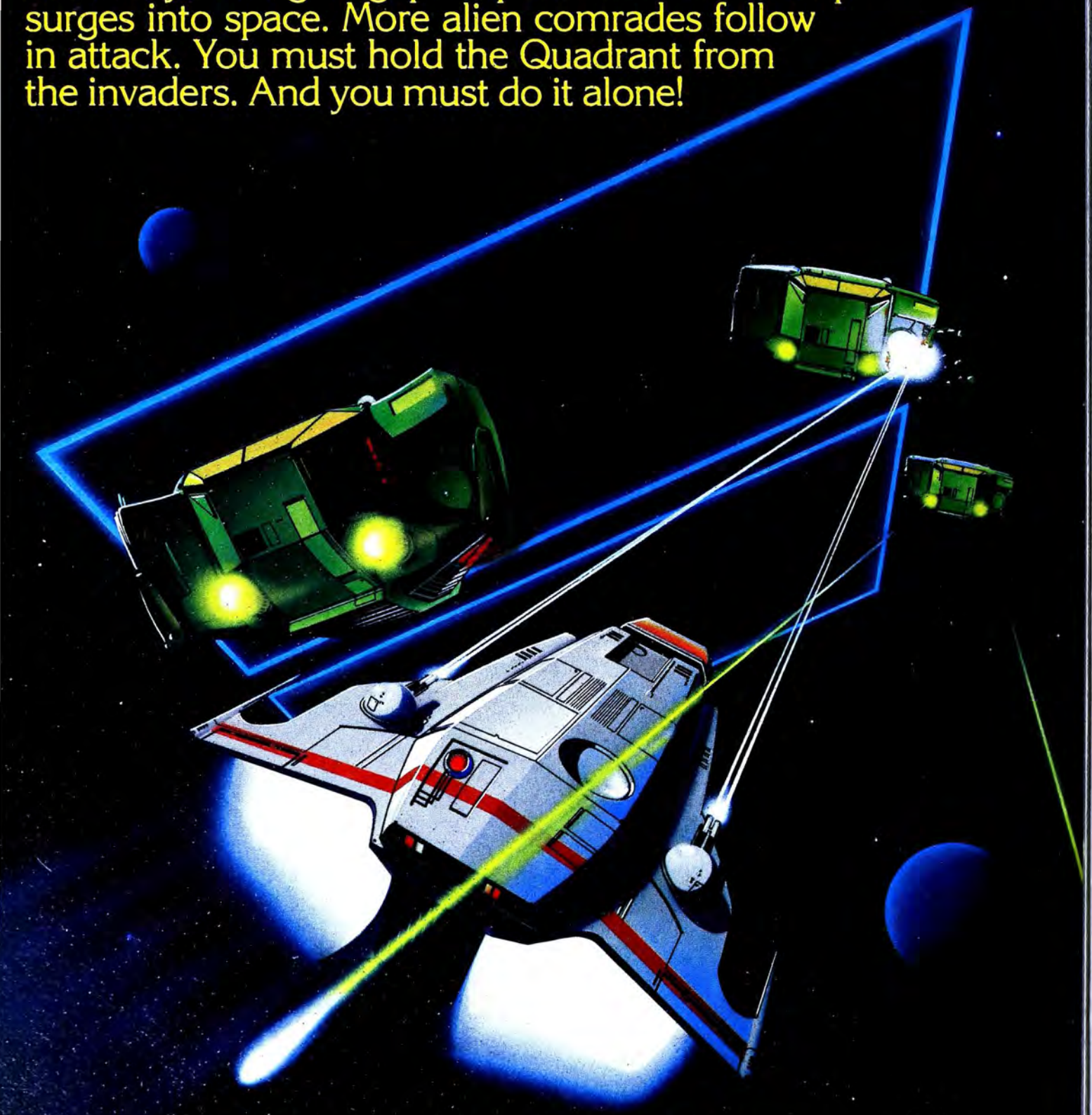
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VisiPlot without having to retype the information manually.

The program does this by converting suitably formatted text files into DIF files which can then be loaded into a model in the Visi program of your choice. The major constraint is that *VC-Loader* must have a text file as input, and these input files must be uniformly formatted or the troubles that arise will consume much more time than might be saved by using the program. The files to be converted can be from a time-sharing system such as the Source or Dow Jones, reports from software packages that do not produce DIF files but that will save reports to disk as text files, or reports from other personal computers in direct communication. Text files can be captured from time-sharing systems or other computers using communications programs such as *VisiTerm* or *Data Capture*.

The appearance of the program on the screen when booted is much like *VisiCalc*. The commands are also similar to *VisiCalc*, using the / as the signal to the program that the next character is a command. The method of operation is to place a *VisiCalc*-type long cursor over the information that you wish to place into a single cell. You then hit return and the program accepts the digits marked by the cursor as a cell of information for insertion into your model. You then move to the next column of information and repeat this procedure until you have marked all the columns. You then issue a command to save the file and the program scans each line of your file and assigns the information in it to the relative model cell.

There is also an automatic mode that attempts to define the positions across the model by using each encountered space as the cell marker. You may choose the occurrence of 1, 2, or 3 contiguous spaces as a key.

In downloading a group of Dow Jones stock prices and attempting to place them into a *VisiCalc* model, *VC-Loader* is able to take the fractions that Dow Jones uses in stock prices and convert them to decimals so that *VisiCalc* will treat them as values, not as labels. Were this not done, it would not be possible to do any calculations with the information.

The program's error handling is quite good—nothing, apparently, can crash the program. At worst, you could make a mess of the file in memory and have to reload and start over.

The documentation is quite sparse (5½ pages), so if the user isn't proficient with *VisiCalc* the potential for trouble abounds. Additionally, the user registration card is printed on the back of a page that has information on it that most users would want to retain.

As far as customer support goes, the program comes on a protected disk without a backup; a backup is available by mail for $15. This is a policy that is subject to question.

In terms of cost, time, and effort, *VC-Loader* is probably suitable only for the user who deals with large volumes of well formatted information.

VC-Loader, Micro Decision Systems (Box 1392, Pittsburgh, PA 15219; 412-276-2387). $65. RJR

Guardian. By Tom and Jerry. Wanted: heroes and high nooners to play suspenseful home-arcade space oater. Blazing ray gun combat against creeping aliens that close in on you, move when you move, and strike with uncanny accuracy.

In a startling departure from its previous game form, Continental Software has leapt into the rabid competition for home-arcade bestsellerdom. Their hi-res, fast-moving, smoothly animated entry is *Guardian*.

This episode of the *Guardian* saga is a blast-and-escape race against time down six progressively lethal levels. Guardianship of the Emerald of Syrinx has been entrusted to you. After an optional briefing, it's your one man against the monsters, with only one minute per sector to gun a path through them and get to the next level. A flashing striped square that appears in alternating corners of the screen is your only ticket out of each maze.

The first two levels of the game, five and six, are harmless in themselves; but three and four get lethal, as the walls are as deadly to the touch as the creatures that are corralling you within them. In levels two and three you barely stand a ghost of a chance—the walls will disappear in five seconds and you are in the dark, with only a memory of the maze to guide you.

Each sector opens with menacing munchers circling a simple maze, waiting to close in for the kill. From the moment you get off your first shot, the grungy mob (two alien threshers, a robot, two insectoids, and a yo-yo) begins crunching, slurping, wiggling, and oozing their way into your heart. Cute as they are, they are even more dangerous—the threshers can ooze right through the walls. If one of the deadly denizens gets so much as one dot too close, you're kaput; flat on your back, kicking your legs, dying one of the hammiest deaths in gamedom. You have two resurrections per game; each one puts you right back into the center of menace.

There is one odd piece of logic to *Guardian*: If you happen to kill all the aliens on any level as well as make it to the teleportation square, you are returned to that same level against a full deck of attackers with only the remainder of your original match time left. So remember to leave a monster or two behind you before you split. One would think there would be a point bonus for such a feat of total demolition as well as escape, but that's not the case in the dungeons.

Guardian defaults to joystick but can be played on keyboard as well. Nine keys are needed to maneuver and nine more are needed to fire; nimble fingers are advised. Normal or expert play modes are offered. Expert play will require several hours to master. Normal play is fast enough fun for the average gunslinger. Be ready to bite the bullet when you boot this one, partner.

Guardian, by Tom and Jerry, Continental Software (11223 South Hindry Avenue, Los Angeles, CA 90045; 213-417-8031). $29.95. MF

Electric Duet. By Paul Lutus. Music on the Apple is nice, but haven't you often wished you could produce two-part harmonies as well? Sure, you could set two Apples side by side and play them simultaneously, but arranging simultaneous execution would be a problem. Besides, that could get pretty expensive. Or, you could purchase a music board, install it in slot



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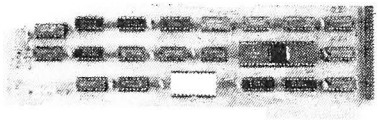
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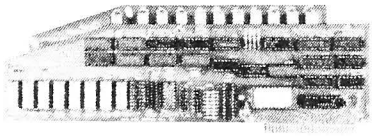
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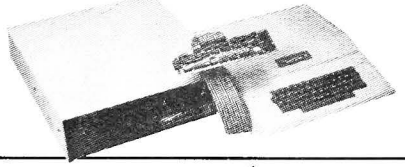
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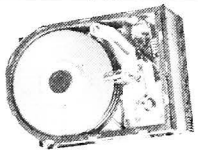
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3, and be on your way. But that still runs into some hefty dollars. Hmm . . . what to do?

At last, the solution is here. *Electric Duet* allows the user to produce two-part harmony with no hardware. This concept is surpassed only by the superb sound quality of the program. The demo files included on the disk, which range from Bach's "Jesu, Joy of Man's Desiring" to Scott Joplin's "The Entertainer," demonstrate the possible musical variations one can create with the program.

Input of musical notes is slow, but simple. You can either type in the notes directly (4,3G# = quarter note, G-sharp in the third octave), or there is a "play" mode which transforms the Apple keyboard into a quasi-piano keyboard. In this latter mode, when you press the piano key desired, the editor tells you what the note is and enters it into your composition. *Duet* does not allow you to use the repeat bar as you would in sheet music, which means if you wish to repeat a phrase or a strain, you must input it twice. Needless to say, file listings can get pretty lengthy.

After the notes are entered, you need to adjust the length of each note (quarter, eighth, sixteenth, et cetera). Once you do this, you have yourself a nice piece in two-part harmony.

One of the most powerful features of the program is its transposition ability. A single command will change your musical file to another key, anywhere from a half-step (F to F#, for example) to a whole octave or more. In addition to note transposition, *Duet* will also adjust the tempo. One advantage of the transposition command is that it allows you to compose in a familiar key, like B-flat, and then move it to a more difficult one. If you're the type who has trouble with more than four flats or sharps, you'll find the transposition command a definite plus!

Duet saves your pieces as binary files, which allows you to insert one musical file into another or use them in your own programs by *bloading* them to memory and then calling them when desired.

In addition to two-part harmony, *Duet* allows you to use several different voices in your compositions. Six voices are possible; however, four are normally used on the Apple. This is especially useful to create an aural illusion of more than just two parts. Some of the jukebox pieces that come with the program utilize this feature well. "Jesu," for example, changes voices when moving from one phrase to another, giving the impression that it is adding two more parts, rather than just changing tonal quality. While enjoying this demo file, you will swear E. Power Biggs is playing Bach in the Thomaskirche right from your very own Apple.

The program's price would be reasonable if its features stopped here. They don't. Lutus also gives you a way (if you're creative enough) to insert accelerandos and decelerandos for variation of tempo within a piece. *Duet* can also differentiate up to fourteen different pitches between half-steps in the lowest octave (fewer in the upper octaves), which makes glissandos and "sliding" possible. By using techniques described in the manual, you can also produce fuller, richer tones, especially in the bass, by combining two notes just a fraction apart from each other.

There are a few minor shortcomings in *Duet*. Every note must be entered in terms of the shortest note at that point. In other words, if you have four eighth notes in the melodic line accompanied by a half note in the lower line, the half note must be written as four consecutive eighth notes as well. However, *Duet* cannot figure out whether you want four eighth notes or one half note, and therefore reads them as written. The result is that instead of getting one continuous note, you get a "half note" interrupted by three quick breaks in between. The same is true when you do want several consecutive notes at the same pitch; the notes are not separated and sound the same as a long note.

A second deficiency is that although *Duet* allows you to edit and insert notes within the file, finding the trouble spot is a trouble in itself. Unless you can look at the file listing and know where you are by identifying the notes (and remember long notes sometimes look like several short ones), this is difficult. What the program allows you to do is play each note as you scroll down the listing. This makes finding your place a little easier, but you will be tempted to wish the listing scrolled by while the piece played, so you could see where any errors occurred.

Another unwanted feature of *Duet* is the presence of a piercing, high-pitched carrier frequency, like that of a television set, that emanates from the speaker during the playing from the jukebox. It is negligible while music is present, but during the rests it can be annoying.

The program comes with an easy-to-follow seventeen-page manual that leads you through in a friendly manner. Though the backup is made on the reverse side of the disk (who ever heard of the sun melting one side of a disk?), replacements of damaged disks are available for a nominal fee.

Paul Lutus has given us the pleasure of hearing two-part music, sans hardware. *Electric Duet* is a utility no Apple music hobbyist should pass up. If you can't afford a music board, this is definitely the way to go.

Electric Duet, by Paul Lutus, Insoft (10175 Barbur Boulevard, Suite 202B, Portland, OR 97219; 503-244-4181). $29.95. MTV

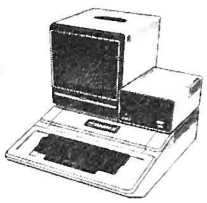
Rendezvous. By Wesley Huntress, Ph.D. For those who watched the Enterprise shuttle flights and thought, "Why that's so easy, even I could do it!" now is your chance to prove it. Edu-Ware has once again introduced an incredible educational tool, titled *Rendezvous*. Although a lot of fun at times, it is definitely not an arcade game. The program starts off at launch and you have to achieve orbit around the earth. If it is not stable, you burn up after one revolution. Once you have mastered this relatively easy task, then you have the tedious task of matching orbit with the space station. This is not easy, as space is large, and both of you are small. Subtle changes in angle of thrust and the amount of thrust over many orbits bring wide variations in position. A lot of patience and a good



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grounding in basic astrophysics (trig will do) is very helpful.

When you have gotten the shuttle into the same part of space as the station, then you enter phase three, the approach. Utilizing either the keyboard or a joystick, you must maneuver to within two kilometers of the station and reduce your speed to twenty meters per second or less (almost drifting). The fourth and most difficult phase is the actual docking in the station landing bay. On "Battlestar Galactica," it looks so easy when the fighters swoop full blast into the tiny bay opening. Just try it! The approach corridor for the space station is a cylinder 32 meters in diameter and 42 meters long. The shuttle must be in exact sync with the station in all three axes, with no sidewise drift, and matching speed. Only when all these conditions are met and the shuttle is in the corridor do the docking doors open.

Now the real fun begins! You must bring the shuttle to "distance=0" from the hangar; the heading, pitch, and bank must not exceed two degrees; and the shuttle must be within two meters of the approach line. Otherwise you crash into the station. If you can really do all this, the program will grade your performance and assign you a rank from Swab to Fleet Admiral. If you have any lingering doubts as to the difficulty of this program, look in the manual at what they expect keyboard users to do with each of their fingers.

As a serious professional educational program, *Rendezvous* is one of the best to date. The pupil gets a real feel for the difficulty of space exploration and a healthy appreciation of what those astronauts are going through.

Rendezvous, by Wesley Huntress, Edu-Ware Services (Box 22222, Agoura, CA 91301; 213-706-0661). $39.95. RRA

Quest for the Holy Grail. By Thorne D. Harris III and Mark Ben Hattier. This is a fantasy adventure game in the tradition of *Wizardry* and *Hellfire Warrior*. It's much simpler than those two and in many ways not as good, but it has some nice features of its own. It also has one great advantage over nearly all games of this kind—but we'll come to that later.

The scenario of the game is the classic quest story: You create a character (random numbers determine his bravery, fame, virtue, wisdom, and wealth) and send him to visit seven different monasteries scattered over a map of Britain, seeking the Holy Grail and having adventures. Before starting on his quest, your hero can hire various companions (if he can afford them): a friar, a barber (skilled in the healing arts), a jester, and a minstrel.

Some of the monasteries to be visited hold clues to the location of the Grail, which will help your hero in his search. However, the monasteries also contain hazards of various kinds (including a foxy lady or two), which can reduce one or more of the hero's characteristics. Also, your friar may choose to join the monastery rather than stay with your group—which leaves your party one man short.

The monasteries are separated by dark and dangerous forest paths teeming with killer rabbits, man-eating trees, and other nasties—including an occasional fire-breathing dragon. You can lose party members here, too. Or your hero himself can be killed—the screen displays the ominous warning, "Your powers are failing. . . ." But if he has a magic potion, and a companion to administer it, he may yet survive to reach the next monastery.

On the other hand, if you manage to defeat a monster, some of your characteristics may improve—particularly fame—and you may also find a chest with a few gold pieces in it, improving your wealth.

The scenario of the game is very good: it provides lots of action and quite a few surprises, and it all fits together smoothly. There's not much in the way of graphics—most scenes are described rather than pictured—but the descriptions are good enough to make it work.

The "play" of the game—the mechanics of playing it in terms of what actions you can take in any given situation—is less satisfactory. You are always offered a choice of actions, but your selection often doesn't affect the result of the encounter. Even if you make the same choice in a given situation every time that situation comes up, the results may vary unpredictably: win one time and lose the next, with no apparent pattern. It can be frustrating.

But you can fix that. And now we come to the great advantage mentioned earlier: this game is *not* copy-protected, bless Mr. Harris and company. As it says on the cover, this game is "fully listable and modifiable."

So if you ever get tired of playing it from the outside, you can open it up and play around with the insides! Custom-tailor it to your own preferences, or use it as a starting point to build your own game. Or just learn from it.

If you're really into fantasy games, you shouldn't miss this one.

Quest for the Holy Grail, by Thorne D. Harris III and Mark Ben Hattier, Superior Software (4312 Arizona Avenue, Kenner, LA 70062; 504-468-2273). $24.95. JR

Fly Wars. By Duane Later. *Fly Wars* releases the spider in all of us in a home-arcade game that requires both reflexes and foresight. At first the game seems like a throwaway, but given half a chance it will grow on you. The basic idea is to trap fly-fighters in your web. Each time you destroy one, a caterpillar appears. Trap them to produce a cocoon. Finally, you must push the cocoon to the top of the screen, where it explodes in a cascade of points. As you rack up points, the action speeds up, making it harder at each of the eight levels to trap either the flies or the caterpillars.

To make life interesting, a can of Raygunite bug spray appears with increasing frequency on the sides of the screen, dispensing bursts of noxious vapors lethal to your octopedal alter ego. And then there's a web-munching beetle that can make your life exceedingly difficult. Finally, in a touch of ultimate silliness, caterpillars revert to their true terrorist nature by hurling an occasional bomb at you.

As the spider, your only weapon is your web. You can string it up or travel without it. Should one screen get too cluttered with strands, you can clear it by running off the edge with your spinneret turned off. The beetle and the bug spray are always deadly, and all you can do is try to evade them—not always a simple task. So you reside in the middle of a food chain; stronger than some, prey to others. An unenviable position, but far from hopeless. The key is planning ahead. Preparation in the earlier, slower levels pays off when things get hectic—if you survive that long. Although you have three spiders per game, the death of one clears the screen of trapped victims.

After the disappointment of some of Sirius's last few games, *Fly Wars* is encouraging. It may slip by unnoticed in the plethora of new releases, but it deserves better than that. Perhaps its 3-D cover will catch the buyer's eye and the news that this one plays well—very well—will spread.

Fly Wars is addicting without being frustrating—and that's nothing to swat at these days.

Fly Wars, by Duane Later, Sirius Software (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195). $29.95. DA

Eliminator. By John Anderson. In the grand tradition of *Defender*, your space ship weaves and bobs through the sky above your planet firing at a variety of alien enemies. Unlike *Defender*, however, in the Apple version of this game you are not defending anyone. There is nothing on the planet that the aliens are trying to pick up. All the action takes place in space, and there is plenty of it for the action lovers. There are ten levels of intensity, which are selectable at the beginning. You can also change levels by surviving the previous level.

An interesting innovation is the introduction of a real time clock that regulates how much time you have on each level. There are fifteen waves of aliens per level, so your score is dependent on the number shot down in the allotted time. To add to the fun, forward and background scrolling is possible. Therefore, the aliens can reverse direction off screen to make sneak attacks.

Another novelty is the launching of missiles from the alien ships. If sixteen of these missiles hit your ship, your screens are destroyed. Not only do you have to avoid the aliens' deadly fire, at times the screen is so littered with missiles that it looks like a blizzard.

Eliminator is a challenging entry-level arcade game that

will be enjoyed by all age groups.

Eliminator, by John Anderson, Adventure International (Box 3435, Longwood, FL 32750; 305-862-6917). $29.95. RRA

Trailblazer. By Zeta Systems. Metagaming, one of the major forces in the role-playing game world, has made its debut in the microcomputer field. *Trailblazer* is Metagaming's highly successful interstellar trading and mercantile empire-building game. It has been developed and marketed for the Apple by ZSI and was introduced at the May Applefest in Boston.

One can sharpen one's trading strategies in the solo mode, but it was primarily designed as a multiplayer game. Each of the four players is given limited capital, a home office on Earth, and a branch office on another planet. Each round of the game is divided into three modules. The first module is the auctioning of trade items, with designated products of each planet going to the highest bidder. On different planets each product is worth different values. These values shift with supply, demand, and advertising. A master strategy can be destroyed because a competitor beat you to a planet and glutted the market. Thus, the successful trader must devise a strategy of buying low on one planet and immediately, on the next turn, selling high on another planet. Easier said than done! Overhead costs and taxes make this very difficult. The cost of maintaining fleets of scout and transport ships and supporting new offices can rapidly eat up moderate profits.

Once all the buying is done, the ships are allocated into fleets and the cargo for each is loaded. Then the fleets are assigned destinations. Lone scouts are ordered into the void to discover new planets, which bring in hefty cash bonuses. Fleets can sometimes get lost in hyperspace and disappear forever.

Amidst all the text, there is one nice hi-res animated picture that shows your ship arriving at a planet and a shuttle going down to the surface. In the second module, the cargo is unloaded and sold on the planet. Within the third module, fleets are reorganized, offices are opened and closed and the advertising budgets allocated. Finally, a profit-and-loss statement for the round is shown. At the end of each round a bulletin is issued from the Free Traders Association which proclaims the top trader of the round. The game can be played for a preset number of rounds or until one player has bankrupted all his opponents.

Metagaming has a fantastic catalog—let's hope more of their games will be adapted for the Apple. Rumors that ZSI will bring out *Fantasy Trip* in hi-res graphics surfaced at Applefest, much to game-players' delight.

Trailblazer, Zeta Systems (1725 Adelaide Boulevard, Akron, OH 44305; 216-784-7366). $29.95. RRA

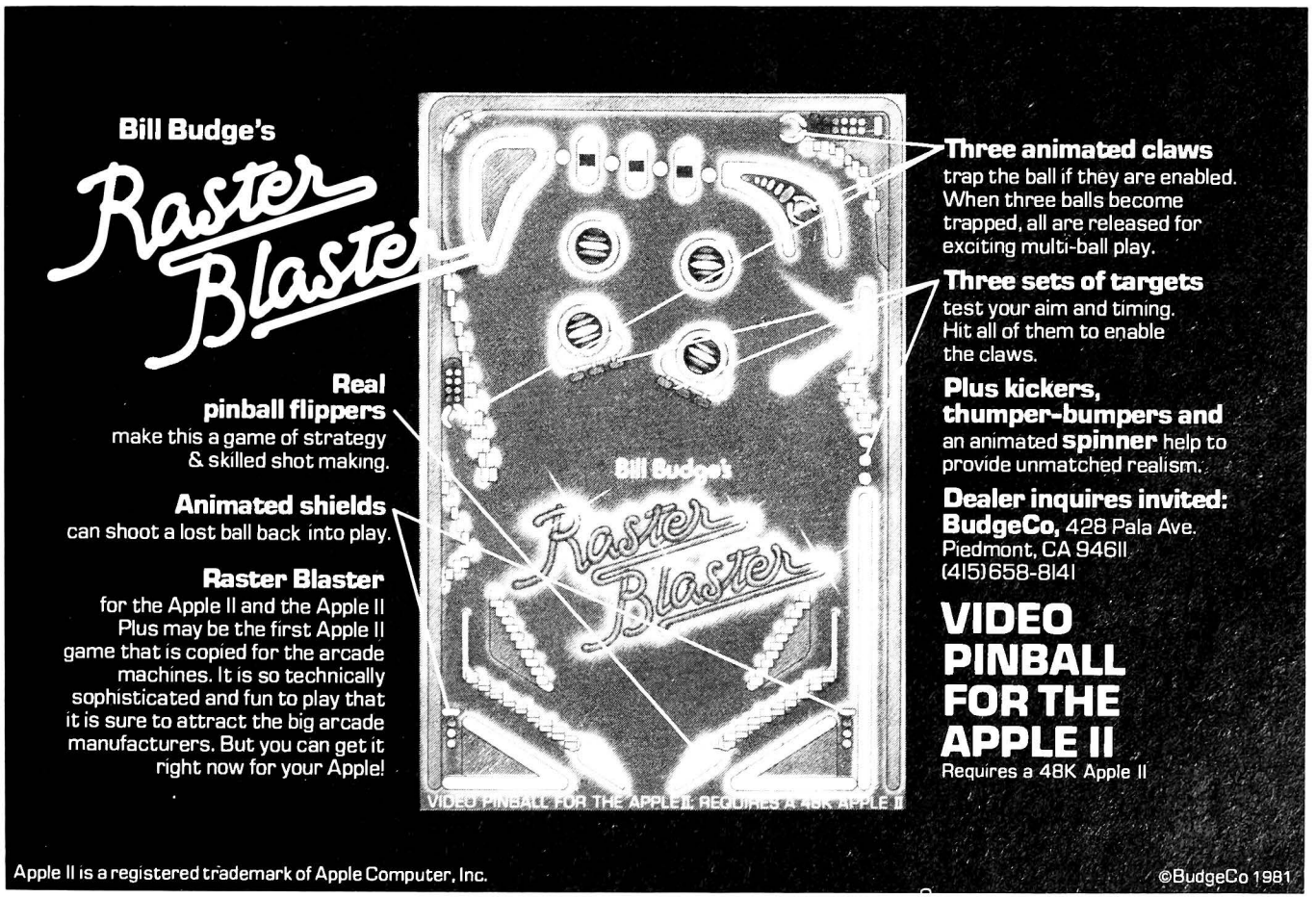
S.A.G.A. #1-12. By Scott Adams. Certainly one of the cleverest marketing gambits of the year has been Adventure International's revamping of the *S.A.G.A.* (Scott Adams Graphic Adventures). One of the growing number of companies to utilize the exceptionally diverse graphic programs of Penguin's Mark Pelczarski, A.I. is re-releasing all twelve of the famous Scott Adams text adventures with hi-res graphics.

Obviously a tremendous amount of marketing research was done in preparing *S.A.G.A.* for re-release. The final product line has many sought-after features. Each *S.A.G.A.* supports the Votrax voice synthesizer, giving you an adventure that talks. The program also supports lower case and allows for the graphic mode to be turned off for speed in playing. The disk is double-sided, which allows hi-res pictures utilizing a special palette of over one hundred colors.

A.I.'s new commitment to hi-res graphic adventuring sounds the death knell for pure text adventure games. The mighty tide of the consumer market has so dictated, and A.I. has been perceptive enough to try to ride the crest of the wave.

S.A.G.A. #1-12, by Scott Adams, Adventure International (Box 3435, Longwood, FL 32750; 305-862-6917). $29.95. RRA

Knight of Diamonds. By Robert Woodhead and Andrew Greenberg. *"It was in this very tavern—or one like it—I talked to ye some years ago, warrior," said old Sanforn, his slim, greedy fingers wrapped around the flagon of ale. Near the small group at the side table, scores of rough men and strong women drank and laughed.*



"I told ye then ye'd not come unscarred from the temple of Apshai. Indeed," he chuckled, "ye've some fine new notches on yer armor."

"Why do we waste time on this knave, Eleazar?" blurted the priestess. "Patience, Hathor, patience," the grizzled lord murmured. "Sanforn can tell us more of the knight of diamonds than most."

The drinker choked on his mighty gulp of ale. "Knight of. . . ." He looked at the trio through one gimlet eye. "So, ye're about that, are ye? The temple of Apshai wasn't enough. Ye had to test the wizardry of Werdna in the mad overlord's dungeon. Now the knight of diamonds. Pshah, ye're mad."

The rasp of stone on steel stopped his mouth. "Yer tongue is too sharp, ancient. Perhaps ye'd like to have some of it shaved smoother?" the voice of the dwarf Oden purred gently as he added another touch to the edge of his sword.

"Nay, I meant nothin' by it," sneered the oldster. "I used to be a hero once meself." He cackled with mirth and drained his ale.

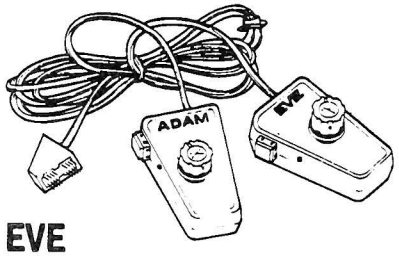
"Enough of this blather," said armored Eleazar from his spot against the wall, right thumb endlessly polishing the gem on the hilt of his unsheathed sword. "Tell us of the knight of diamonds."

"Ah, well, my throat's a bit dry for all that talking," said Sanforn. He searched his pockets without success, then grinned at Eleazar, who gave a chill smile and ordered a fresh round. After a gulp from a fresh flagon, Sanforn began to talk. "Ye're all experienced, better than thirteenth level, from what ye did in Wizardry. Ye must be, to enter the city of Llylgamyn.

"Years ago, the city was protected by the staff of Gnilda. Nothing from outside—neither magic nor force of arms—could disturb the city as long as it held that staff. Men and women of good will could come and go as they pleased.

"Ah, but its creator never thought of the enemy within. A traitor of Llylgamyn sold himself to dark forces. He seized the staff and slaughtered—he thought—the entire royal family. It was a dark deed, darkly done."

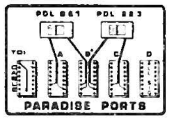
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Shaking his head, Sanforn drank yet another draught. "What the traitor didn't know was that two youngsters of the royal family escaped through passages known only to the family and a few trusted fighters. I was one.

"Ye scoff," Sanforn spat at the dwarf, "yet 'tis true. After the slaughter, the traitor was cocksure he'd destroyed the family. The young prince and princess, with my help and that of a few others, recovered the armor of the knight of diamonds, a hero the traitor thought was but legend.

"With the armor, and the staff of Gnilda, the prince led us against the traitor," Sanforn's youthful fingers danced in the air as he continued.

"We others battled the forces of the dark lords while the young prince and the traitor struggled. Well, the traitor fell at last, but his dying curse destroyed the prince and the castle. Those of us left alive searched for days but found nothing.

"Now again the city is threatened. Gnilda's staff is there in one of the six broken corridors under what's left of the castle. The armor of the knight of diamonds is there as well, and—it's rumored—can defend itself better than any warrior."

"Indeed," said Eleazar, "it needs that strength if it is to defend itself against the strange species of beasts and vermin said to be there. Well, I grow bored of the usual haunts. I have a band of fighters, priests, thieves, mages, and other magic users who're lusting for more adventure. We go to Llylgamyn."

"I would go with ye," said the one-eyed figure. "I know those narrow halls. For example, only three fighters may go abreast. Wise leaders post magic users behind this iron front wall."

"Ye'd be naught but a nuisance," sneered the dwarf.

"Let me buy the next round of ale, and I'll prove ye wrong." Again Sanforn searched his robes, this time successfully. He paid the serving man with a peculiar iron coin.

"Odd," said Odin, peering at the coin. "That's dwarfgelt. I see little of that above our lands. Where'd ye come by it?"

Sanforn laughed. "From yer pouch. I stole it as I talked."

With his left hand, the dwarf reached up deep inside his iron breastplate where he carried his pouch for safety.

"Why you old . . ."

His sword roared through the air and smashed the chair Sanforn had been sitting on. From behind him came the man's voice, stronger and quieter.

"After the prince died, I became a thief. He and I were like brothers, and the city held naught for me with him dead. But I see my death now dimly, and I would return. I will do so as yer friend and compatriot, or alone—it matters little to me. I'll die in the place I was born.

"I'll drink in the adventurer's inn again, have Boltar's son Boltac sell me potions, maybe even leave a few coppers (mine or not) at the temple of Cant. I will return to Llylgamyn with or without ye."

Eleazar stood and placed his hand on the dwarf's shoulder to calm him.

"You can come with us, and welcome. But first, return Odin's pouch to him."

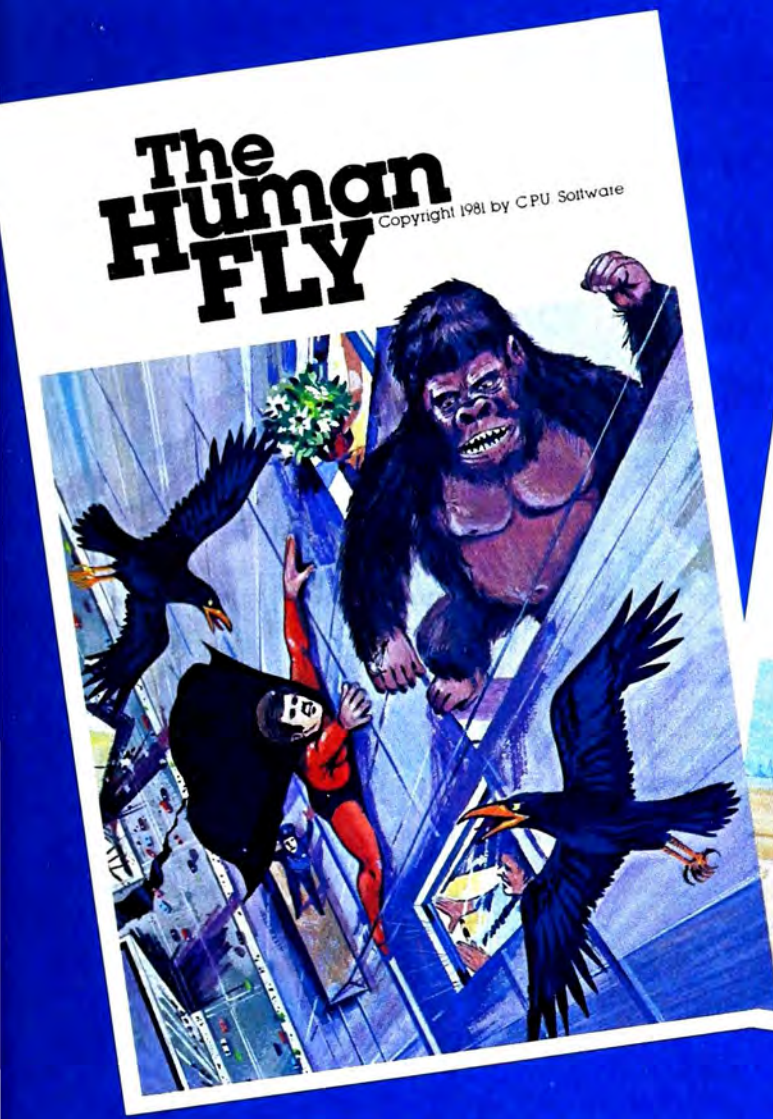
"That?" laughed Sanforn. "It's back inside his iron drawers, as safe as it was before. It's only a wee bit lighter to pay for our drink on leaving. . . ."

Three-dimensional maze, mappable, in run-time Pascal. As many as six level-thirteen or better characters developed in the *Proving Grounds of the Mad Overlord* can band together to find adventure and treasure. Note: disk drive speed is vital on this or any other game in Pascal.

Knight of Diamonds, by Robert Woodhead and Andrew Greenberg, Sir-tech (6 Main Street, Ogdensburg, NY 13669; 315-393-6633). Requires original *Wizardry* to run. $34.95. DA

Unless otherwise noted, all products can be assumed to run on either Apple II, with 48K, ROM Applesoft, and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card. Many Apple II programs will run on the Apple III in the emulator mode. ◨

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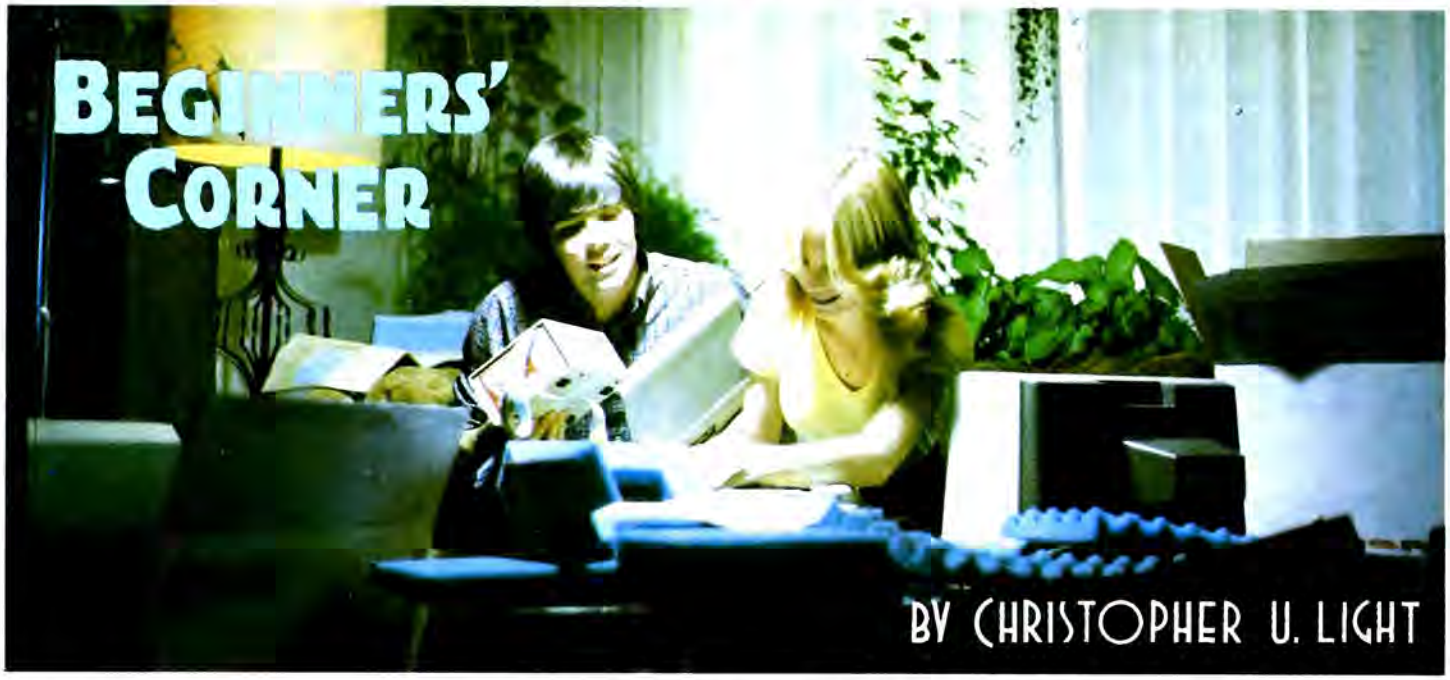
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*Featured front page Wall Street Journal — April 22, 1982.

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One of the enjoyable things about traveling is the opportunity it affords to browse in multifarious computer stores. Even if you live in a big city and have a large selection of Apple dealers, the grass always seems just a bit greener—especially if you're visiting places like California or Massachusetts that are centers of micro activity. If you find something that looks useful and the price isn't too high, you probably buy it; after all, you rationalize, the dealers back home might not have it.

That's not completely a rationalization. There's so much software available that no one dealer can carry it all. And some of the programs, such as the various *VisiCalc* peripherals, are of interest only to owners of other programs, so a dealer who doesn't stock the original won't stock the peripherals either. Then, too, some dealers tend to specialize in games or business applications or even in hardware to the exclusion of software. So it's a good idea to buy interesting programs to have on hand in case you run into a problem where you might need their help.

Flight of Fancy. Just imagine the goodies you might collect over two or three years as a traveling computer enthusiast. There's one from a Los Angeles computer store that lets you turn the command *save* into *init* so that anybody who tries to copy one of your programs with a *load* and *save* will zap the disk. There's an out-of-print personal finance package from Chicago that begins erasing disks only after you've entered eighteen months of transactions, including all your personal and business checks, credit cards, and department store charges. There's a musical pitch ear-training package, designed to run on an obscure synthesizer, found in a barrel in a Cincinnati computer store with a sign saying, "Only $7.50 each. Even if they won't run, you've got another disk."

Then there's the one designed to scroll listings slowly page by page, clearly designed for people who haven't heard of control-S. The fact that it was only $14.95 at a store on Convoy Street in San Diego makes it less annoying that it never leaves the shelf. From a computer store on Lexington Avenue in New York came a package that lets you draw a series of lines on the screen and then play these as sound pulses through the speaker to create sound effects. Surely, it'll come in handy someday.

In brief, in just one small part of your software library, you might find two graphics packages; three personal finance packages (one that erases disks); four regression programs (including one home made), two, three, or four programs that tell the starting address and length of binary files, and who knows how many phone number lists, none of which will sort the names alphabetically.

They're taking up space in the drawer, and they're tying up disks that you could use for other things, but you won't get rid of them. A good utility program is too valuable.

Back to Earth. Some of the more useful utility programs don't cost a thing—once you have your system—because they're included on your system master. By now you're familiar with *Copy* and *Copya*, right? The first is listed in the catalog as an Integer program, so it must be used for copying other Integer programs, while the second, which is in Applesoft, is for copying floating point files, correct? And, since an object file is another name for machine language file, the third copy program on the disk, *Copy.obj* (a binary file), must be for copying machine language programs, mustn't it?

Nope. Either of the first two programs will copy any file that is copiable by normal means, and the one written in the Basic language that your machine knows is the one you have to use. When you list one of these two, you realize that the third is the machine language program that does most of the actual copying and is called from the appropriate Basic program.

But, if you've spent some time trying to find the instructions that would tell you how to use these programs for copying individual binary files without specifying their starting address and length, you're not alone.

You've probably also run across *FID*. The instructions are in your *DOS Manual* and are quite clear. In addition to duplicating only those files you select by name (unlike *Copy* and *Copya*, which transfer the entire disk, bugs and all), *FID* makes it a tiny bit easier to lock, unlock, or delete files than does DOS by itself. Similarly, *Muffin* is well documented in the manual. This is the one that takes thirteen-sector 3.2 disks and upgrades them to sixteen-sector 3.3 disks. Not on the system master but available at your dealer if you ever need it (very unlikely) is *Niffum*, which downgrades files.

Dog Bites DOS. Unfortunately, not all the utility programs on your system master are mentioned in the *DOS Manual*. For example, if your dog's just chewed up the basics disk you use to boot those old thirteen-sector disks, you first kick the dog, second kick yourself for being too lazy to muffin them, and third insert your system master and type *brun Boot13* (note—no space between "Boot" and "13"). You can now boot 3.2 disks.

Suppose you're writing a program and discover that you need to put a twenty-line insert between lines 300 and 310. You could use a subroutine, but this is considered a very inelegant solution—almost a solecism—for a routine that's called only once per run. Instead, you remember that your system master has two programs entitled *Renumber* and *Renumber Instructions*. The first is very useful; the second is incomplete and

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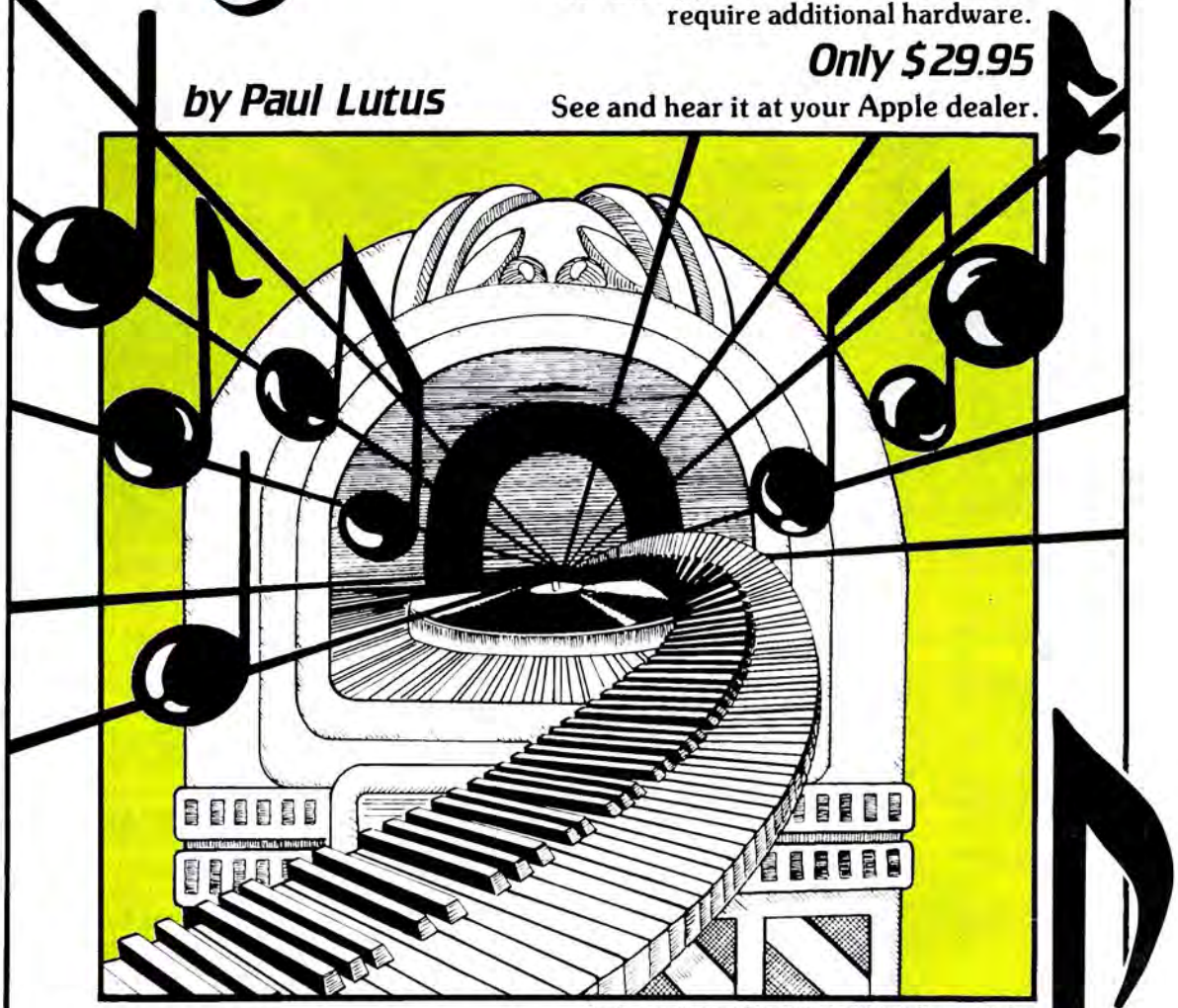
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confusing. The first allows you to renumber any or all lines in your Basic program and will automatically renumber in increments of five, ten, thirty-seven, or whatever you want.

Unfortunately, if you run the instructions you'll have to scroll through sixteen screen pages. If you print them, you'll have six 8½-inch by 11-inch pages with "Press space for more, esc to restart" messing up the printout three times on each page. When you look through them, you find that the program also contains supplementary programs to merge two Applesoft programs and to convert ROM and RAM Applesoft programs from one version to the other. It then has seven pages of error messages.

Nowhere do the instructions tell you in which order to load your program and the utility that renumbers it.

Better Yet. If all you want to do is renumber, forget the instructions and go through the following very brief tutorial. First type the program and save it on a disk.

```
3 HOME
19 PRINT "APPLES"
27 PRINT "AND"
32 PRINT "ORANGES"
39 PRINT "DRIVE"
1099 PRINT "ME"
55000 PRINT "BANANAS!"
```

Got it saved? Okay. Now insert your system master and type *run Renumber*. Ignore the summary instructions and hit return two or three times. You should see the usual blinking cursor. Now reinsert the disk you saved this little program on and load the program by name (what did you name it?). Type *&* (that's shift-6). Wait a second until the cursor returns. Type *list*. You should find the lines renumbered by tens beginning with 10. This is the default setting. If you want these line numbers, resave the program on a disk. Saving is not automatic with this utility.

Suppose you want to renumber only lines 32 through 1099. *Start* tells the program which old line you want to start with and *end* tells it which old line to end with. *First* tells it what the first new number is to be. *Inc* sets the increments between line numbers. To renumber lines 32 through 1099 by hundreds beginning with number 1000, type:

```
& FIRST 1000, START 32, END 1099, INC 100
```

These commands can be in any order and must be separated by commas. For any that you omit, default values take over; the default values start with your first program line, end with the last, and renumber by tens beginning with ten. If this is what you want, and you probably will until you get to the subroutines, just type the ampersand.

Switcheroonie. Also note that Basic sorts the new line numbers in the usual way, so that you can really garble a program if you goof and accidentally give some old high-numbered lines new numbers that are lower than some you didn't change. Suppose you intended to renumber a subroutine presently at 500 from 1000 and up by tens and planned to type *& Start 39, First 1000*. You get as far as & START 39 when the phone rings, and you hit return by mistake. Go ahead and do it. Can you imagine trying to straighten out a thousand-line program after something like that? So, save the original under its own name until you have checked the revised version.

The important thing to note, and this is something that the instructions omit, is that you must first run *Renumber* and then, after you hit return a couple of times, enter or load your program, which *Renumber* prompts by showing the usual blinking cursor. Then, when you type *&* and the optional parameters, whatever program you just loaded will be renumbered. If you load your program before *Renumber*, running the utility will wipe it out of memory. If you run your program after loading it, you'll wipe out *Renumber*. Remember, even though it appears that you've regained control after you've run *Renumber*, *Renumber* is running the whole time and your program, until saved, is really only input data; if you hit reset or use *maxfiles*, you'll destroy this program.

Dupes Your Digits. Two other useful utility programs on your system master are catalogued under the names *Make Text* and *Retrieve Text*. As you probably know by now, text files allow programs to control your machine using exactly the same commands you would use from the keyboard. If you want to call for the catalog in a Basic program, you can only do so in a roundabout way:

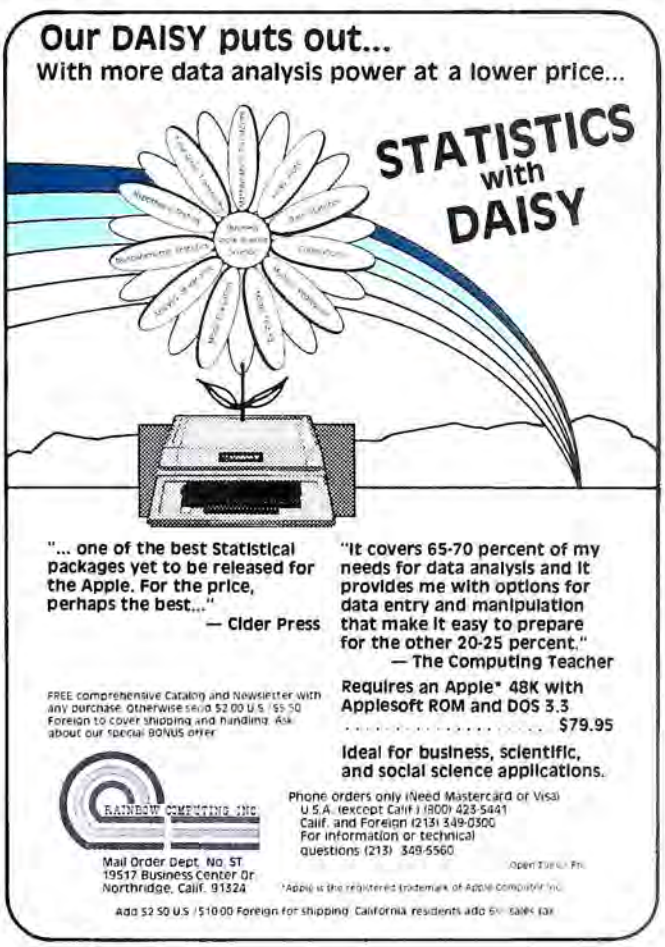
```
100 D$ = CHR$(4): PRINT D$; "CATALOG"
```

To call for it from a text file, you type simply *catalog* with no quotes or line number.

The drawback, however, is that text files must be created by Basic programs, which is a bit complicated because each program must first *open* the file, then *write* in it, and later *close* it. *Make Text* is a utility that does this automatically. To see how it works, insert your system master and load *Make Text*. Save it on a disk that's not write protected. Do the same with *Retrieve Text*. Then run *Make Text*. When asked for the first line, type *catalog*. That's all. If you put a line number at the beginning, it'll think you're writing a Basic program and later on will balk. Hit return twice, and the prompt will ask for a file name. Type *show.catalog*. The command to run a text file is *exec*. Type *exec show.catalog*, and you should see the catalog if the disk is still in your drive.

Retrieve Text is a utility program that allows you to see the contents of a text file. It's the equivalent of *list*, and its internal instructions are clear. Try it now with your text file named Show.Catalog.

Dust Collectors. The last utilities on your system master are *Chain*, which allows you to run a second Applesoft program without zeroing out the first one's variables, and *Master Create*, which is now obsolete. This one reorganizes the files on your disk so that, no matter what size machine they were saved from, they will load and run on any other size from 16K to 48K. Since the chances of running into a 16K machine that hasn't been upgraded are almost nil, you'll probably never use



it. If you need to, the instructions are in the manual, as are those for *Chain*.

Those are the utility programs that come with each system. Computer stores from Lexington Avenue to Convoy Street offer many more, some of which may prove useful to you. Here are just a few that may make your life a bit easier.

Xlister, on *Utility City* from Beagle Bros (4315 Sierra Vista, San Diego, CA 92103; 714-296-6400), lists an Applesoft program with each line as many columns long as your printer can print. It prints each statement on a separate line, indents those lines between each *for* and its *next*, and marks those on the same line following an *if-then*. Best of all, it lists hidden control characters. This one makes analyzing somebody else's programs almost a joy.

Zoom Graphics, from Phoenix Software (64 Lake Zurich Drive, Lake Zurich, IL 60047; 312-438-4850), allows you to take a picture from either hi-res screen, enlarge it to almost any size, rotate it ninety degrees if you want, change its vertical and horizontal proportions, and print it on a wide variety of printers; and *Graphtrix*, published by Data Transforms (616 Washington Street, Suite 106, Denver, CO; 303-832-1501), lets you mix hi-res graphics and text on the same printed page by converting text entered from the keyboard to hi-res characters identical with those of text mode.

Apple Writer, by Apple Computer (10260 Bandley Drive, Cupertino, CA 95014; 408-996-1010), is a good beginning text editor. It's old, and it won't do directly a lot of things other word processors will do, such as display lower case on the screen, underline, print superscripts and subscripts, and send control commands to the printer. But it has one overwhelming advantage if you're apt to use your word processor a lot: it's copiable. Although you may never have a problem getting a blown disk replaced, it's good to avoid the ten days or so you might be without your word processor if it did crash. A simple *Copya* backup takes care of this eventuality.

And if *Apple Writer* is the route you take, here's the service road to take with it. Brillig Systems (10270 Fern Pool Court, Burke, VA 22015; 703-323-1339) publishes a software peripheral called *Apple Writer Extended* that overcomes the underlying limitation of *Apple Writer* and provides some very useful file conversion programs. Among these, perhaps the handiest are those programs that convert Applesoft files, *Apple Writer* files, and text files to any one of the other types and at the same time change all upper-case letters to lower case or vice versa if desired. This allows you to write a demonstration program in Applesoft, run it and debug it, and then, without risking the introduction of new typing errors, convert it into the *Apple Writer* format to be included in a manuscript.

Innumerable other utilities exist to make using Apples easier, many specialized to particular interests. If you get into programming, you'll discover a score of utilities intended to smooth and speed the creation of new software.

Down the Garden Path. The best way to learn about the potential of your computer is to try to make it do something. We'll get a good start on this next month when we enter an Applesoft program that creates a special garden and, along the way, introduces a few commands and concepts not covered in the Applesoft tutorial.

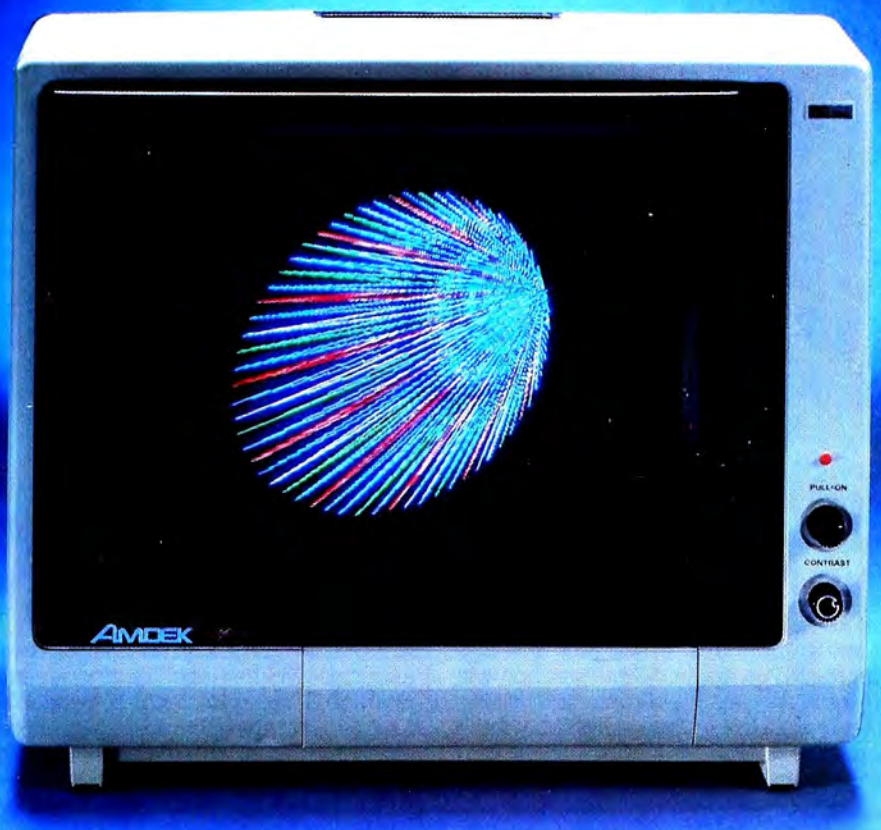
See you then. ■

Christopher U. Light has been a newspaper reporter, magazine editor, financial planning consultant, and professor of finance. He has written for Softside, The Journal of Political Economy, *and* National Geographic, *as well as appearing frequently in* Softalk.

Light's darker side revealed itself when he coauthored, with his son Chris, the diabolical Appletrivia contest for last March's Softalk.



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Word Processing: Lessons Loud and Clear

Avuncular Ed Scouten, an English teacher for nearly half a century, finds the story instructive: student and teacher are going over a paper on the eminently practical topic of dressing for the job interview. Both look down at the mistake-ridden composition. The student, seeing for the first time errors that escaped him time and again, says, "Wait, wait, wait, mistake."

This scene will reoccur time and again as the two plow, line by line, through the manuscript. And all the while the man in the checkered jacket will be wondering, "What is it that makes this student so sharp, so adept at finding mistakes that moments before, in the sign-language sanctuary of his dormitory, he couldn't have seen with the Mount Palomar telescope?"

Ed Scouten proffers a well-educated guess. His suddenly astute charge at the National Technical Institute for the Deaf at the Rochester Institute of Technology in Rochester, New York, has demonstrated once again that the hearing impaired are a curious mix of understanding and misunderstanding.

Quiet Mistakes. "They make errors that are typically deaf," says Scouten, a native of Omaha, Nebraska, who began his career counseling two deaf brothers at a Boy Scout camp during the Great Depression.

"They have been taught the use of the articles—*a, and*, and *the*—countless times," explains Scouten. "And they have been taught tense. But, actually, they have been overtaught. It's like hammering a nail. You get down to the surface and yet you keep on banging. And this overteaching irritates them. They hate English with a passion. English teachers are picky-picky. They're always finding fault, and the students come to expect red marks on their papers."

The foregoing state of affairs did not sit well with Scouten and fellow NTID educators Nancy Smith and Don Beil, who equate literacy (English and computer) with survival in the competitive eighties. So last year, with the blessings and assistance of the folks who produce the *Magic Window* word-processing program, they designed a course that would bring the two literacies together.

By the time hearing children are five years old, Scouten explains, they've learned all the syntax they'll need for everyday conversation. By contrast, a hearing-impaired child—particularly one who has been deaf since birth or since before the acquisition of speech—tends to render English in a fractured syntax devoid of the idioms of spoken English. A child who's never heard conversation will have problems developing the nominative "I." He's likely to talk "baby talk," as in "Charlie wants candy," or "Nice pretty she." And he will have trouble grasping what might seem the simplest parts of speech, the articles.

"Think of the multiplicity of exposures a hearing child has to *a, and,* and *the*," marvels Scouten. "The deaf child doesn't have them. They are abstractions. Show me an *a*. It's a number concept."

Without sound, the deaf must rely on visual or tactile communications. They write, finger-spell, or, more commonly, they sign, using American Sign Language, a language of more than one thousand ideographic symbols suggestive of Chinese characters. A child who learns one or more of these language skills early enough can communicate effectively—but signing is not standard English, Scouten emphasizes. "Theoretically, with signed English we give the complete syntax but, as a rule, in our rush, in the spirit of the thought, we leave out words," he says, finger-spelling as he speaks. "There," he says, making his point. "I said 'we' but I didn't sign it."

Top of Tiny Heap. It's estimated that less than one percent of the United States population can be categorized as deaf. The one thousand hearing-impaired students enrolled at NTID represent the cream of that minority. They've graduated from a four-year residential school for the deaf or a public high school that offers special programs for the hearing impaired. Yet, gifted as these students may be, they usually enter NTID reading at the sixth-grade to eighth-grade level.

As if this weren't enough, there are the mindsets of technically oriented students and teachers. Students choose NTID hoping to achieve vocational goals, and they prefer to concentrate on their majors. By the same token, their teachers have enough problems imparting technical concepts without worrying much about English.

"The technical faculty tends to use a limited vocabulary, and there are arguments to be made as to whether that's in students' best interests," observes Don Beil, an associate pro-



BY JONATHAN MILLER

fessor and member of the data processing department. "Yes, you are communicating, but you're not doing anything to enhance students' English skills."

Perhaps the trick to teaching English, then, lies in linking it to a technical major such as word processing. Motivation is the key; students could be shown that improved English skills enhance the marketability of their technical training.

"In the past," says program architect Beil, "an English teacher would make red marks on a paper and give it back to the student, who then discarded it. Word processing now allows an English teacher to make red marks and to require the student to make the changes on the computer. There's some motivation to get it right the first time."

Computing Bricks. Teaching the deaf is pretty much a matter of reducing the abstract to its concrete form, according to Scouten. A visually responsive word processor hooked to a large television monitor might be just the ticket for teaching English to a classful of deaf technical students. It might make the complex so simple that it could, as Scouten puts it, be "grasped with the eyeballs."

That, at any rate, was the original theory. But how to test it? There was no question who would teach it; Scouten was the logical candidate. There was no question who would take it—office career majors from Beil's data processing department. They were already being trained on a dedicated IBM word processor and needed exposure to word processing systems for microcomputers.

And, of course, there was no question about the make of the microcomputer. It'd be an Apple, a machine with which the students were already familiar. Rochester, home to Kodak and birthplace of Xerox, is, after all, part of Johnny Appleseed country. There are between thirty and forty Apples at NTID alone, not counting the twenty that faculty members have at home.

No, there was only one outstanding question for Beil and company: Which word processing program to use?

There's a wealth of word processing programs now available for the Apple. Capabilities vary, so do prices, but there are always unique aspects to each user's choice. In NTID's case, the major factors favoring *Magic Window* were its eighty-column capability and easy line-by-line editorial functions. The NTID staff looked at early versions of *Apple Writer* and *Word Handler*, but found these programs wanting; the former came only in forty-column, and the latter was hard to read without hi-res text enhancement.

"Visual display was a biggie," Nancy Smith explains. "Some of the other programs, like *Word Handler*, give you full display so you can see what the page looks like, but without high-resolution video display, you can't see it very well. And a lot of our students have some kind of visual handicap as well as hearing impairment." *Magic Window*'s answer to this need is its horizontal scrolling feature. By hitting a tab function key, the user can enjoy the benefits of large, forty-column type in an eighty-column format. If nothing else, adds Smith, that reduces eye strain and fatigue.

Soft Shoulders. Horizontal scrolling has a drawback, though: You can't see the full line or paragraph you're working on at any one time on the monitor. That's an inconvenience, Smith concedes, but it's one for which the other features easily compensate. "You get used to the tabs," she explains. "One jump and you're over to the end. You can scroll across the page and see exactly what the line will look like and exactly where things will end in the right-hand column."

Two other factors played a part in the selection of *Magic Window*. Smith and company were looking for a program that was easy for students with poor language skills to use, yet sufficiently different from the IBM system they were already trained on. *Magic Window*'s menu-driven package filled that bill, Smith says, because the options are limited, clear, and reasonable. The program's line-by-line editorial features also make "the cut and paste" of composing less onerous.

"You can go back and edit each line individually, and some systems don't give you that capability," she explains. "It's very easy to tell where you are and identify exactly where your cursor is and where the change is going to be made."

When it comes to choosing a word processing program, service is often as important as product. Beil says Artsci has been extremely supportive of NTID's project. Its staff made themselves available to answer questions and provided extra copies of the program at no extra cost; most important, they allowed NTID to tailor the documentation to their student's needs.

"Our students don't read very well, and you know what most user manuals are like," says Nancy Smith, launching into a general complaint. "There was nothing exceptionally bad about *Magic Window* documentation, but manuals are difficult for the average reader and more so for someone with language difficulties and without the background in technical terminology. I think that in the competitive software industry the companies that survive will be the ones who document their product well and make it easy for the user."

No Moving Lips. The Apple, its R2D2 beeps aside, speaks the language of the deaf, the moving cursor printing silently on the screen. The job world, even one dominated increasingly by computer technology, speaks volumes in sound. Lips move when people speak, but even a skilled lip-reader discerns only 60 percent of the spoken words. The remainder are elusive sounds like "ga" and "ng" that defy detection and make sentence reconstruction so much educated guesswork. "Sweeney and Sweetie are homophonous," Scouten points out. "They look alike on the lips."

Speech handicaps and the limitations of lip reading isolate the deaf worker. Scouten has witnessed the scene often—a hearing impaired employee working in a little cubicle in a big office and having no friends—excluded. "They don't have to do anything over because the barrier is already there."

Not surprisingly, the deaf often choose the easier path. They seek each other's company in larger cities and gravitate toward vocations strong on psychomotor skills that don't require extensive co-worker communication—printing, woodworking, and baking. But while the deaf can retire to their signing corner of the world, they cannot escape the rest. They are dependent to some degree, on the vast hearing majority.

"Perhaps we should have a weaning period away from our very comfortable, pleasant, ultramodern, deaf microcosm," says Scouten, reflecting on the question of signing at NTID. "It's a cozy place. In terms of the technical world, it's extremely real; in terms of the workaday world, it's unreal."

A short while later, Scouten picks up the idea during a reminiscence that includes an old Victor Borge routine on punctuation, replete with matching sound effects. "In the California School for the Deaf at one time, the manual (finger-spelling) teachers would use period, comma, exclamation point"—Scouten utters the appropriate squiggly, squishy sounds as his hand flashes hand punctuation signs—"but that's all gone by the boards now. Nobody does that anymore. That's too much trouble. Today we lay back and sign. It's fun to sign, I love to sign. It doesn't tax the brain. I can split infinitives, have dangling doodads, and just rattle on, and whether I'm grammatical or not makes no difference."

Blessed for Success. But by Scouten's and Bell's lights, the ability to communicate precisely will matter in the technical world that's dawning. The race will go to those literate in computers and English. But how do you prepare the hearing impaired for their entry into the cruel, hard world, a world in which they're already underemployed? "You set your course up as a business, like a game," Scouten says. "I'm to be a hearing boss, a person who has invested a lot of money in Apple computers, and we have exactly ten weeks in which to get this company operating. I, as a hearing boss, am not interested in sign language. I don't care beans about the deaf, I'm not interested in anything but one thing, making lots of money."

In one sense, this make-believe world bears an ironic resemblance to the real thing—all of the fifteen office-practice majors enrolled in the course are women. A curious footnote, Smith notes, in light of NTID's predominantly male student body and the greater incidence of congenital deafness among males (the ratio is 3 to 1). "Sex stereotyping of jobs happens in the deaf as well as the hearing world," Smith says. "It's just an extension of who's the typist, who's the secretary. Well, you've automated the office and guess who's in it?"

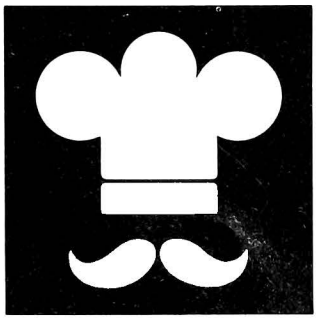
In Scouten's classroom, who's in it is our teacher-tycoon and his merry band of business majors. Because this is a simulated hearing environment, communication is strictly by lip reading, reading, finger-spelling and, where possible, by speech. Signing is nix. If a student doesn't understand something, Scouten and the student will tough it out in speech; failing that—it was necessary only once during the past quarter—they'll resort to signing. "The deaf read lips more extensively than the average person realizes, and they can talk—from very intelligibly to poorly. But one can acquire an ear even for poor speech."

On class days, a student volunteer heads for an Apple keyboard, either typing an instructional passage chosen by Scouten or trotting out one of her own. The latter invariably produces the greater merriment, as students, eyes glued to the large, centrally located monitor, spot those telltale syntax and grammar errors, like, "Me it killed," or, "It killed me," for the correct, "It's killing me." The short compositions written by the students on topics like appropriate office behavior and job skill requirements may seem elementary, Smith says, but they aren't to the deaf. "These thoughts have to be reiterated with students. Language deprivation makes it really important that all those social graces everyone takes for granted come through loud and clear."

Now See This. Abstractions pose a major obstacle. Consider the relatively simple concepts of short-run and long-run for a money-making enterprise such as Scouten's theoretical company. To get these ideas across, Scouten usually uses "chalk talk." He'll draw a short line on a blackboard with dollar signs going out to represent plant and equipment investments. Then he'll show the class a long line with dollar signs—profit—coming in.

"The fun aspect is when a thread of understanding comes through," he explains. "It's quite different from a graduate

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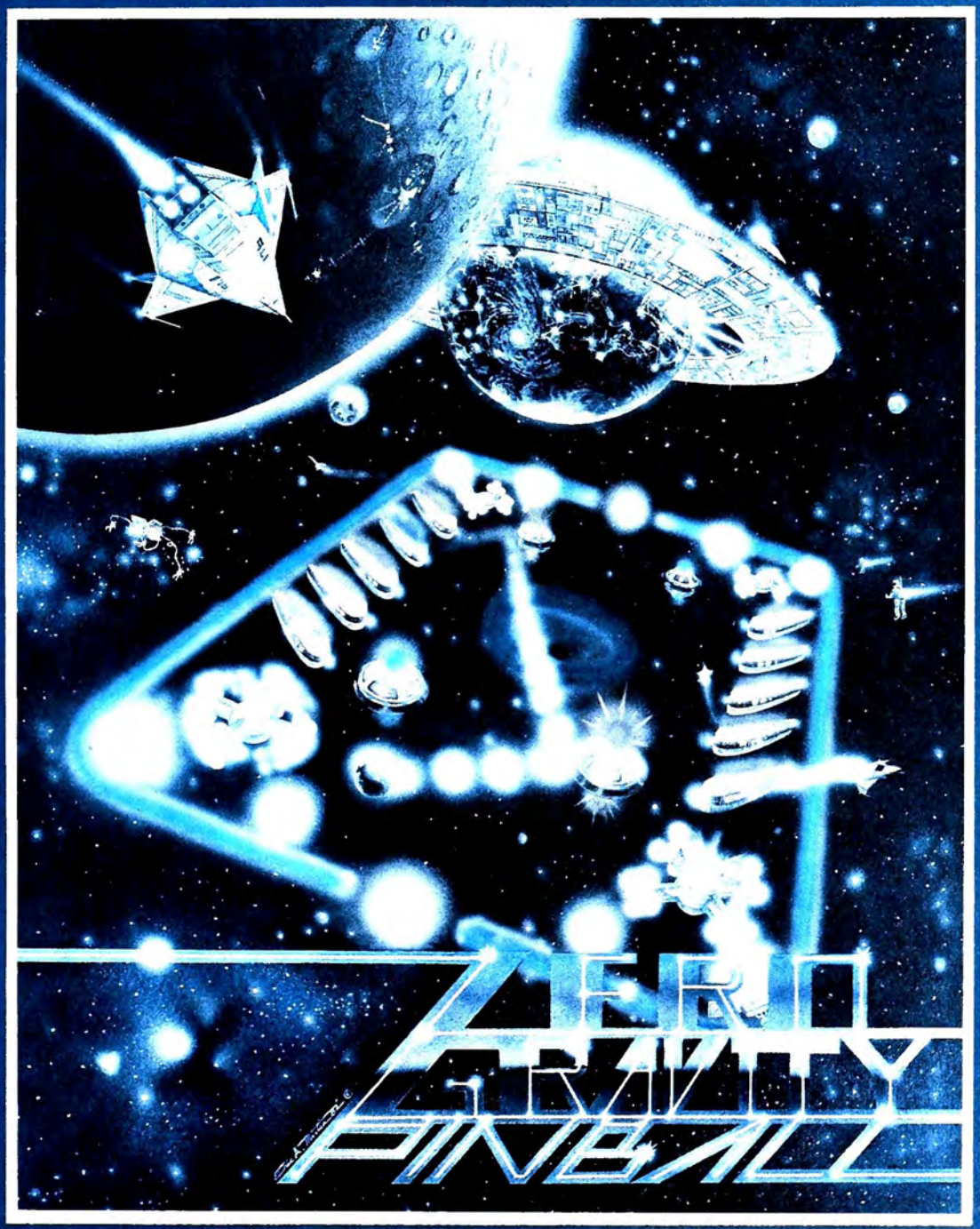
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program where one introduces a theory, teaches the history of the theory, the philosophy of the theory, and various interpretations of the theory. You start off with the abstract and get more so. In educating the deaf, it's just the opposite. You have an abstraction and you bring it down closer to earth."

There's a tendency to think of the hearing impaired as stone deaf. "We treat them all as though they couldn't say boo," Scouten complains. To set the record straight: Very few NTID students are without any residual hearing; hearing impairment varies widely, and so does command of speech. Most deaf students use hearing aids, to hear conversation better, to hear life-saving alarms, and to monitor their own speech.

No, there's nothing homogenous about the deaf. The same, it might be added, can be said about helping them. Two major trends dominate current professional thinking on the subject, according to Scouten. On the one hand are those who prefer to regard the deaf like an ethnic minority, linked actually or potentially by signing. On the other is "mainstreaming," the deaf world's moral equivalent of busing. "The idea here is to take deaf children out of special schools and put them into special classes in public high schools and integrate them, if possible, with hearing children," Scouten says.

Reality Strikes Again. Scouten is philosophically predisposed to this approach, but he readily concedes that there's a hitch: local school districts must be willing to provide support services for the deaf student, ranging from note takers to tutors. That's a dim prospect in these less-than-balmy times, particularly for an educational approach that is playing to mixed reviews.

Smith reports that a number of Rochester-area students who tried mainstreaming are now back in the local school for the deaf because of inadequate funding and inadequate student preparation. "They go out and try it and find that it doesn't work too well, and they come back and have to start over."

Not that there haven't been successes, she adds. The empirical evidence is inconclusive. "Some of our best students have been mainstreamed, but you can't say mainstreaming made them that way. I think the deaf definitely need training in socializing and incorporating with the hearing world, but I don't think mainstreaming is inherently helpful. On some kids, it's an added strain."

As a federally funded institution, NTID steers a politically neutral course through these philosophical waters. It harbors oralists like Scouten, who favor voice communication and lip reading; it entertains total communicators who advocate the simultaneous use of American Sign Language with voice and lip reading; and it shelters devotees of signing only. "Ed feels strongly about oral supplemented with manual," Smith observes diplomatically. "You'll find people here whose feelings are equally strong about simultaneous communication and signing. NTID accepts a range of students with a wide spectrum of backgrounds in communication skills. Some are purely oral and do not sign; others are pure signing. We have a range of people on the faculty and among the students, and I think that's positive."

One Man, One Rote. Avuncular Ed Scouten, teacher of the deaf, listens politely to the official line but he knows what he knows. Eclecticism in instruction is not his way of teaching. "If we conducted a business in this manner, it would go to the wall," he says.

Smith smiles. So does Beil. They know when Scouten is on the stump, and they can already hear the conclusion coming 'round the bend. "In order to teach English, everybody has to contribute, not just English teachers. All the technical people, the staff—everybody is violating every rule in the book. Why, no wonder we can't teach them. It's impossible."

That bit of hyperbole hardly seems to square with nearly a half century of teaching the deaf, but it suggests a feistiness reminiscent of his students.

Says Scouten, "It's hard for me to do as I'm told." ◨

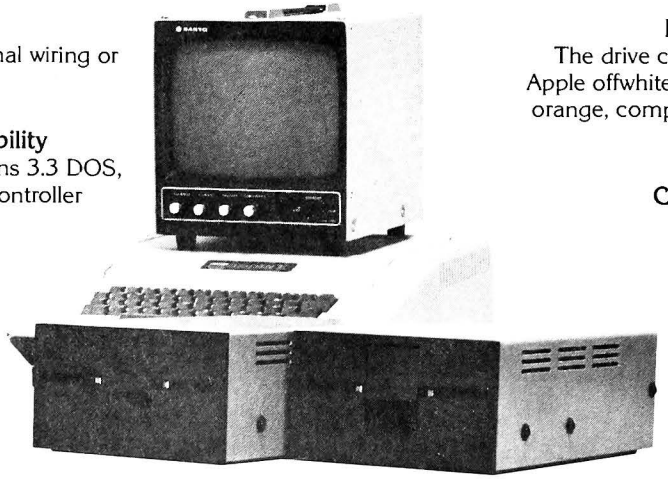
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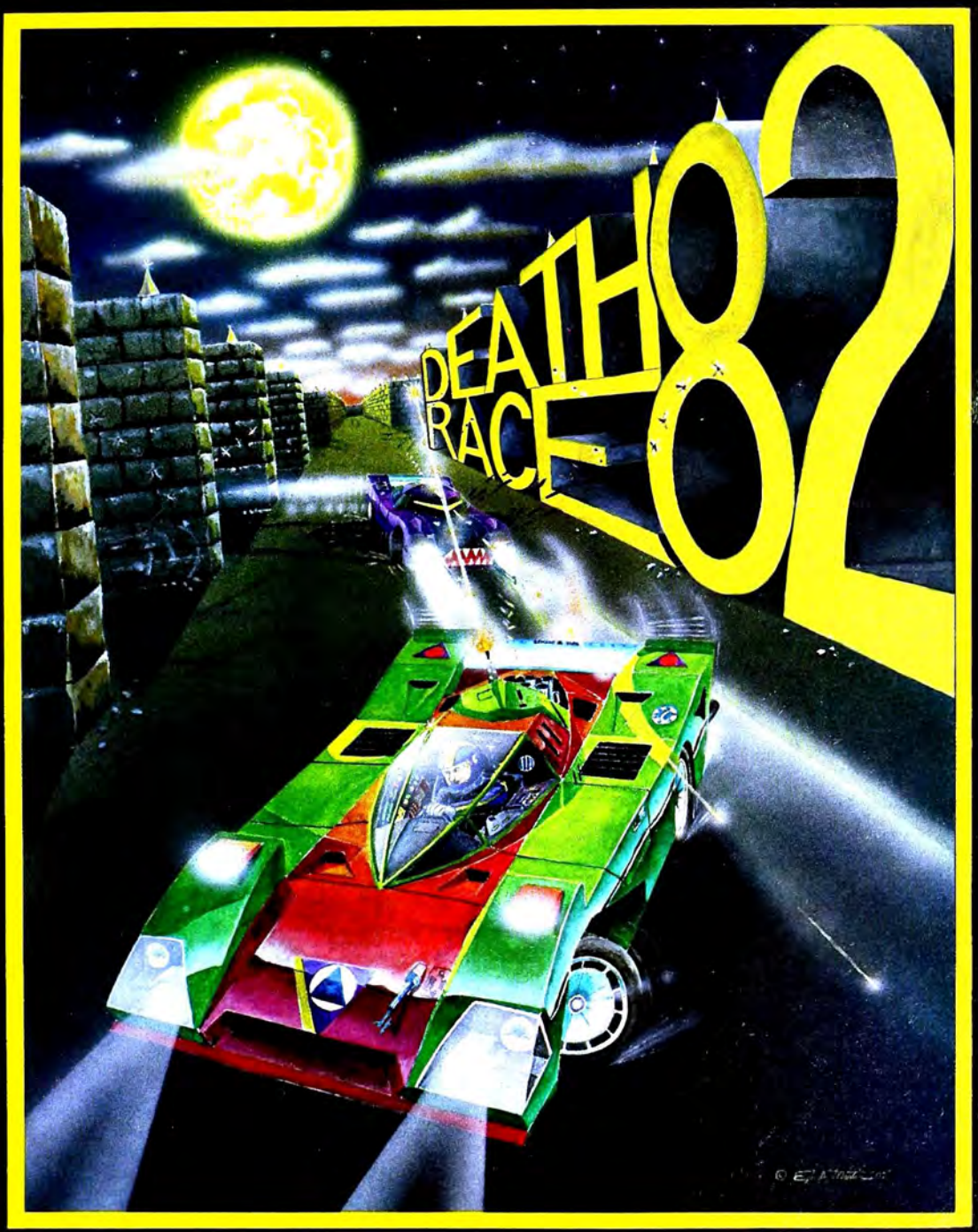
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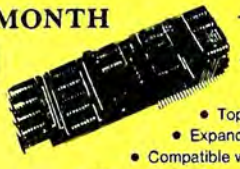
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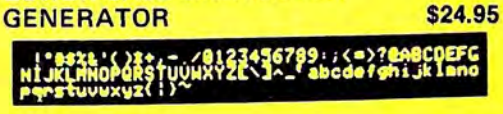
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Exec Sirius

from page 38

Bradley. "If you do an extra good job, you get a bonus. The incentive for playing the game is a big score."

In an adventure game the incentive is to solve the puzzle and complete the game successfully. Bradley is a big fan of adventure games, which may explain why Sirius has recently entered the genre with *Kabul Spy*.

At the End of a Long Day, It's Apple Time. Sirius added a nice touch to the marketing of Mark Turmell's *Beer Run* by using the Olympia beer logo in the packaging and in the game itself. They tried the same thing with *Fly Wars*, trying to get the cooperation of a household pesticide company, but there were no takers.

Bradley wears many hats at different times, figuratively speaking. Sitting at a table discussing contracts, for example, Bradley puts himself in the place of the person he is talking to. "Keeping things in a reasonable context, everybody has to win when striking up deals like this.

"It all depends on the manufacturer's cooperation. The Olympia deal was mostly done on the phone and with a letter of understanding. It was done neatly and has been beneficial for both parties."

Sirius has no intentions at present to go into areas like education and business. The reasons are obvious to Bradley and Jewell.

"In education there is a good demand but no sales." Bradley says. "Schools want software but don't want to pay for it. They want to buy one copy and make five hundred of their own. Where's the payback to the manufacturer?"

In business, the nature of the products is a major reason why Sirius is not interested. "The amount of support needed for *VisiCalc* must be frightening," says Jewell. Sirius has enough trouble keeping up with callers trying to find their way through *Kabul Spy*.

Bradley believes that the personal computer in the home is a family affair and that games should appeal to everyone. He abhors sex-oriented advertising, which usually offers more than the product delivers.

"Sex has no place in this industry. Who needs it? The artwork for *Minotaur* with the female figure is about as much sex as you'll ever find in a Sirius product."

It's Bradley's conviction that most of society has morals, but that software buyers should still be careful. Parents have to screen television movies, and the same is true of software programs. Bradley admits to being picky sometimes, but he feels strongly about producing a family product.

Where Fun in the Fourth Dimension Is the Secret Weapon. Sirius has gone through some changes in its two years, but they still deliver winners.

At Applefest in Boston, Sirius had an impressive five-foot-tall video screen hooked up to an arcade machine showing *Bandits*. There was always a line of kids waiting to play the game. Out there on the floor, larger than life, *Bandits* stood up to the test. Another potential barn burner is Larry Miller's latest tour de force, *Minotaur*.

"There's not a product that we've released that I'm ashamed of. I don't lose a wink of sleep on that account," boasts Bradley. "If a product is obviously not right, Jerry and I say, 'Let's fix it or forget it.' "

Two years is nothing in the life of a star, but things move faster in the world of software publishing. Sirius is keeping pace and growing at a healthy rate.

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THE THIRD BASIC



by Taylor Pohlman

Exploring Business Basic, Part 10

First things first. I must offer an apology for being absent from these pages last month. Here's hoping that this month's material will keep you busy enough to make up for the gap in our cycle of exploration.

On the subject of exploration, congratulations are due to John Jeppson for his excellent articles on Basic and the Apple III. The article in the April issue which covered a character set editor was a fine one. If you haven't seen it, try to get a copy; it was really that excellent.

On With It. This month's article could be entitled "Down and Dirty in the SOS Mines," or perhaps more accurately, "The Console Driver Is Your Friend." Last time, as you will perhaps recall, we looked at techniques that substituted a little thinking (about how to access records by key values) for the brute force method (having the computer scan hundreds of records looking for the one we wanted). The result was a method that was both fast and flexible. In general, there's no substitute for taking a little time to think about the best way to implement a program before beginning to write it.

Along with attempting to choose the best method to implement a particular task, a good programmer always looks at the tools at hand. Since every computer and every implementation of Basic is different, it pays to check out the computer on which the program will run and see what features and capabilities it can lend to the task. Sure, some folks will insist that it is most important to write programs that run on as many computers as possible, but the truth is that some modification is always required, so why not make the best of the environment you have (especially if that environment can save you some work)?

Basic with Hot SOS. The inspiration for this month's article came from a friend who complained how hard it is to write in assembly language on the Apple III and then use that code in a Basic program. After letting him know about the technical note on writing invokable modules, the question of what he wanted to do arose. As expected, he wanted to do special handling of input for some menu screens. He also wanted to handle the listing to the screen of records longer than eighty columns, and was perplexed as to how to do this without having to rewrite the screen each time. After seeing how well *VisiCalc* did its vertical and horizontal scrolling, he was even more convinced that assembly language was the only way to go.

Before this article is concluded, we'll see how to do these things and more using Basic and the power of SOS. In a previous column, we did some work with the Basic invokable module, Request.Inv, found on the Business Basic product disk. We covered the functions *filread* and *filwrite*, which correspond to the SOS *f_read* and *f_write* calls. This month we'll concentrate on the *control* and *status* functions of the request.inv module, which correspond to the SOS *d_control* and *d_status* calls. Remember that SOS views files as one of two fundamental types, *character* and *block*. The control and status functions we'll use this time are generally applicable to character files, and are documented in the respective manuals for the devices.

Since it's already been announced that this month's column will deal with the console driver (that wonderful driver you communicate with via keyboard and screen), your next logical step is to get out your *Standard Device Drivers Manual* and prepare to follow along with the fascinating discussions that lie ahead. The discussion of the console driver starts on page 27 of the manual, and our first task is to become familiar with the capabilities of the console driver.

Some Further Consolation. The console on the Apple III really consists of two devices: the keyboard (normally a read-only device) and the screen (normally a write-only device). To communicate with these devices, and especially to change their operating characteristics, SOS allows you to give and receive information from the *driver*, a software routine that is responsible for managing the physical screen and keyboard hardware. Information about the driver is obtained by using the status commands, and changes are made through the control commands. Let's start with status.

The following program uses the Request.Inv invokable module to allow calls to determine the status of the console:

```
10 DIM statuslen(18)
15 DATA 8,41,2,1,1,1,6,-1,5,-1,1,1,1,1,1,1,
   2,1,-1
20 INVOKE"/basic/request.inv"
25 FOR i=0 TO 18:READ statuslen(i):NEXT
30 device$=".console"
```

These first lines do some initialization. Since the status call will always return the buffer string fully padded to 255 characters in length, the *statuslen* array is set to the number of valid bytes returned by each different call. Note that some calls, indicated by a −1 in the data list, are reserved and therefore invalid. Those of you who are comparing the data statement with the descriptions of the status calls in the *Device Drivers Manual* will notice some anomalies in the list but, have faith, all will be explained later. Note too that the *invoke* statement needs to be changed to refer to the proper pathname for Request.Inv on your system. Meanwhile, on with the code:

```
35 INPUT"Status code: ";stat$
36 IF stat$="" THEN 100
37 stat=CONV(stat$)
38 If stat<0 OR stat>18 THEN PRINT"Status
   code out of range, try again":GOTO 35
39 IF statuslen(stat)<0 THEN PRINT"Invalid
   status code, try again":GOTO 35
40 buffer$=""
42 PERFORM status(%stat,@ buffer$)device$
```

Lines 35 through 42 first check the status request for validity, and then use the *perform* statement to make the SOS call. Remember, that status returns its result in the string variable *buffer$* and the @ symbol instructs Basic to pass the address (location) of the buffer$ variable, so that status can return the requested information in the string. Now that *buffer$*

```
28 00 01 0B 67 F3 01 01 0E 67 F3 03 00 80 0D 00 80 80 80 80 80 82 0D 00 17 00
(              g  s              g  s
4F 00 17 0F 00 82 0D 00 17 00 4F 00 17 0F 00
0                             0
```

Figure 1.

contains the mystery information, we can print it out in meaningful form with the following:

```
45 endlist=statuslen(stat)
47 line$=""
50 FOR i=1 TO endlist
55   hexvalue$=HEX$(ASC(MID$(buffer$,
     i,1)))
57   char=TEN(hexvalue$):IF char<32
     THEN char=char+128
58   char$=CHR$(char)
59   line$=char$+"  "
60   PRINT USING"2a,x";MID$(hex
     value$,3,2);
65   IF i/26=INT(i/26) THEN PRINT:
     PRINT line$:line$=""
70 NEXT i
72 PRINT:PRINT line$:PRINT
```

Note that *endlist* is the number of valid bytes of status information, so the routine from line 50 to 70 scans *buffer$* and prints out the hex value of each character. The *line$* string accumulates the ASCII character values (after changing real control characters to printable control characters in line 57) so they can be printed out below the hex values. Line 65 handles the case where more characters need to be printed than can fit on a single line and line 72 cleans up after the last line of hex values is printed.

All that remains is to return to request the next status code, and to provide a place to go to terminate the program.

```
80 GOTO 35
100 INVOKE
110 END
```

Let's look at some sample output for a few typical status calls.

First, something simple. According to the manual, status 0 should do nothing. The request module does a little better than that, returning the name of the device being accessed; to wit:

```
2E 63 6F 6E 73 6F 6C 65
```

More interesting and twice as mysterious is status 1, which returns the total state of the console driver. For reasons of compatibility with printers, only the printable ASCII characters are listed below. All others can be deduced by their hex equivalents above. As you fool around with other status calls, the order in which these status indications fall will become apparent. In the meantime, figure 1 shows you everything you wanted to know about the console and then some! Note that the special character symbols will actually print out on your screen.

Now for something simpler and more useful. Status code 2 is advertised as indicating the status of the *line termination character*. Of course, you know the line termination character as the return key, or perhaps you have noticed that return and control-M are the same character. Notice the two bytes returned from a status 2 call:

```
80 0D
```

The first byte indicates (as described in the *Device Drivers Manual*) that a specific line termination character is enabled. The second byte (0D) is hex notation for decimal 13, or the control-M (return) character. Later on we'll see that this can be changed to any other character for fun and profit.

Now come two calls that are interesting but fraught with danger if you fool with them. Specifically they are status 6 and 8, the *attention* and *any key* events. Events can be set in SOS that trigger interrupts to an interpreter (like Basic) to inform it that some specific action is required or requested. Again, as described in the drivers manual, status 6 gives the priority and event ID of the attention event, along with the address of the event handler that services the event, and the character code that triggers the event. The return from status 6 should look something like this:

```
01 01 0E 67 F3 03
         g  s
```

Again, only the printable ASCII characters are listed. The rest of the characters will show up on your screen when you run the program. Notice that the first two bytes are the priority and the event ID and that the next three bytes compose the address of the event handler for this event.

For those of you who wonder how Apple III addresses all that memory, part of the answer is here. Three-byte addresses are used throughout most of the system code to allow addressing up to a theoretical limit of 512K bytes. The important thing to remember is that you should not change the event handler addresses, since that's an easy way to cause the system to leap off into space, never to return. The real key value in this call is the last byte, the attention character itself. As you can see, it is hex 03, which is also ASCII character 3, usually known as control-C. Yes, all those times you pressed control-C to stop a program or break a listing, you were setting an *event* within the console driver, which flagged SOS to call Basic's event handler to shut down the current activity.

Later on we'll discuss how to change the attention character to something besides control-C; it's guaranteed to baffle your friends. For now, consider the *any key* event, number 8 on your hit parade:

```
00 01 0B 67 F3
         g  s
```

Same format, except with a different priority and different event handler address. In addition, there is no event character, since this event is set by pressing any key. As you might expect, this is the mechanism Basic uses to implement the *on KBD* statement.

Other status calls of interest include the ones for *cancel status* (yes, Virginia, you can avoid control-X printing the backslash character and skipping to the next line) and *backspace status*, which determines if the back arrow is destructive (erases the character backed over) or nondestructive (allows you to use the forward arrow copy feature). All this and more is yours to investigate with the status call.

Still Curious? You now have a program that will do all the status calls listed in the *Standard Device Drivers Manual*. Ah, yes, you say: "What about status call 18, *preserve viewport*?" Truth is, there's a little problem with the way this invokable is written. Status call 18 (for those who are not following along in the manual) saves the entire contents of the viewport into the buffer. Unfortunately, individual Basic strings are limited to 255 characters, and any attempt to use a string array in this invokable will illicit a polite error message. Worse yet, an attempt to save a viewport of more than 255 characters using the status call will lock up Basic as the invokable module happily writes data into the middle of Basic itself. For that reason, the *statuslen* array doesn't allow the use of that call. Those of

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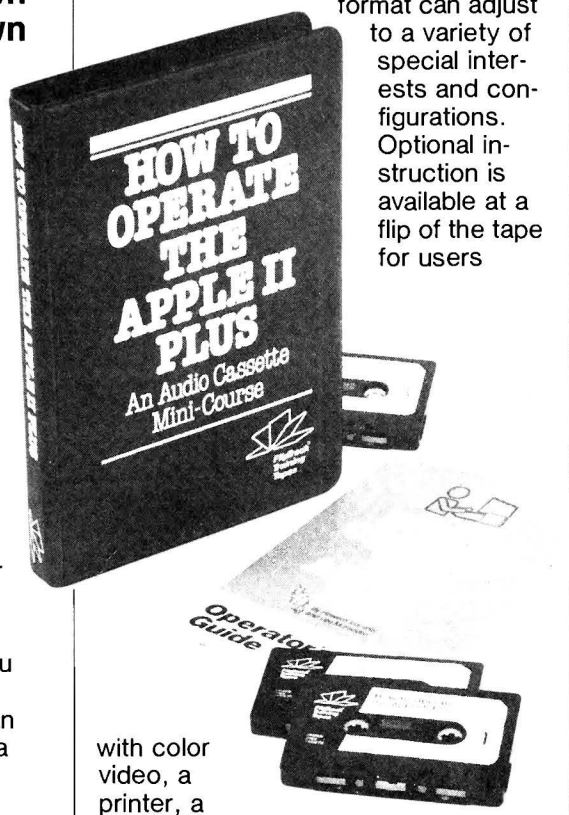
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you who are more adventurous, or who use viewports of less than 256 characters, should consider the following:

```
41 IF stat=18 THEN GOSUB 125
43 IF stat=18 THEN GOSUB 140
125 vtemp= VPOS:htemp= HPOS
130 PRINT CHR$(26);CHR$(0);CHR$(0);
    CHR$(2);CHR$(26);CHR$(9);CHR$(24);
    CHR$(3);CHR$(12);
135 RETURN
140 TEXT:VPOS=vtemp:HPOS=htemp
145 RETURN
200 DATA 8,41,2,1,1,1,6,-1,5,-1,1,1,1,
    1,1,1,2,1,243
```

These changes to the program will make a special case of the *save viewport* call. Basically it works like this: Line 125 saves the current cursor position, and line 130 sets up a window consisting of the first three lines of the screen. Similar action could be taken using the Basic *window* command, but it doesn't hurt to see how console commands are used to accomplish the same purpose. In any case, setting up the window (which contains 240 characters) gives the status function something to read within the 255 character limit of the *buffer$* variable. Line 140 restores the cursor to its original position, and since we changed line 200 to indicate 243 characters expected (240 + 3 bytes of coded information), the program will list out the screen data just as it does the other types of status data.

To give you an idea of how this works, imagine that the three lines in figure 2 are at the top of the display when you run the program with status function 18. The resultant listing of the buffer (made by lines 50 through 72) will look something like figure 3. Just a bunch of gibberish, right? Unfortunately, computers are eminently logical, and our favorite, the Apple III, is no exception. Because of the way the video is organized for accesses over its internal sixteen-bit bus (which also provides transparent access to extended address bytes), the characters are mapped in an alternating pattern, with visually adjacent bytes split by a distance on half the viewport window.

```
TYPE  BLKS   NAME         MODIFIED  TIME   CREATED   TIME   EOF
TEXT  00003  STATUS.LIST  05/23/82  19:31  05/23/82  19:31  933
TEXT  00004  TRY.LIST     05/23/82  20:16  05/23/82  20:16  1189
```

Figure 2.

```
B2 4F 02 A0 D4 D0 A0 A0 CC D3 A0 C1 C5 A0 A0 A0 A0 A0 A0 CF C9 C9 C4 D4 CD A0
   O     A  P        L  S     A  E                       O  I  I  D  T  M
C3 C5 D4 C4 A0 C9 C5 A0 C5 C6 A0 A0 A0 A0 A0 A0 A0 A0 D9 C5 A0 C2 CB A0 CE CD
C  E  T  D     I  E     E  F                          Y  E     B  K     N  M
A0 A0 A0 A0 A0 A0 CD C4 C6 C5 A0 C9 C5 A0 D2 C1 C5 A0 D4 CD A0 A0 CF A0 A0 A0
               M  D  F  E     I  E     R  A  E     T  M        O
A0 A0 A0 A0 A0 A0 D4 DB A0 A0 B0 B0 A0 D4 D4 D3 CC D3 A0 A0 A0 B5 B2 AF B2 B1
               T  X        0  0     T  T  S  L  S              5  2  /  2  1
BA B1 B0 AF B3 BB A0 B9 B3 A0 B9 B3 A0 A0 A0 A0 A0 A0 A0 A0 C5 D4 A0 B0 B0 B3
   1  0  /  3  B     9  3     9  3                          E  T     0  0  3
D3 C1 D5 AE C9 D4 A0 A0 B0 AF B3 B8 A0 B9 B3 A0 B5 B2 AF B2 B1 BA B1 A0 B3 A0
S  A  U     I  T        0  /  3  B     9  3     5  2  /  2  1  :  1     3
A0 A0 A0 A0 A0 A0 A0 A0 D4 D8 A0 A0 B0 B0 A0 D2 AE C9 D4 A0 A0 A0 A0 B5 B2 AF
                        T  X           0  0     R     I  T                 5  2  /
B2 B2 BA B6 B0 AF B3 BB A0 B0 B1 A0 B1 BB A0 A0 A0 A0 A0 A0 A0 A0 C5 D4 A0 B0
2  2  :  6  0  /  3  B     0  1     1  B                          E  T     0
B0 B4 D4 D9 CC D3 A0 A0 A0 A0 B0 AF B3 BB A0 B0 B1 A0 B5 B2 AF B2 B2 BA B6 A0
0  4  T  Y  L  S                 0  /  3  B     0  1     5  2  /  2  2  :  6
B1 B9 A0 A0 A0 A0 A0 A0 A0
1  9
```

Figure 3.

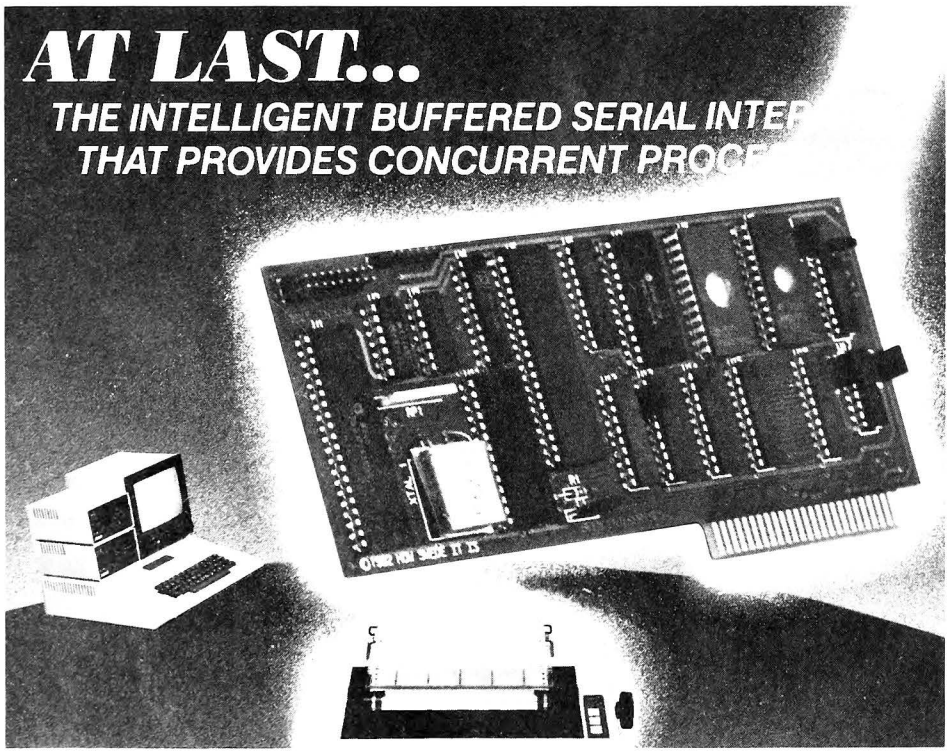
All that leads to the following adjustment of our program, to reconstruct the image from the scramble in the buffer:

```
75 IF stat=18 THEN GOSUB 160:GOSUB 140

160 INPUT"Press RETURN to reconstruct the
    captured display: ";a$
165 buf1$=MID$(buffer$,4,240)
170 HOME:PRINT CHR$(21);"5";
172 FOR j=1 TO 3:VPOS=j:HPOS=1:FOR i=1 TO
    40:PRINT MID$(buf1$,80*(j-1)+i,1);
    MID$(buf1$,80*(j-1)+i+40,1);:NEXT
    i:NEXT j
175 TEXT:RETURN
```

You can adjust the constants in line 72 to accommodate other viewport sizes. Note also that in line 170 the statement *print CHR$(21);"5";* is used to turn off several console options (like scrolling and new line) to ensure that the data is written back correctly. The *text* statement in line 175 sets everything back to normal.

Getting Control. Now that you have all this information, the immediate reaction is "how do I change things?" The following is a sample program that allows the use of the control call to modify the state of the console driver to your wishes. Remember, modifying certain things (like event handler addresses) can cause the system to crash, so try to keep it simple. With that warning, here's the magic incantation:



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```
10 DIM contrallen(18)
15 DATA -1,40,2,1,1,0,6,-1,5,-1,1,1,1,
   1,1,1,-1,73,-1
20 INVOKE"/basic/request.inv"
25 FOR i=0 TO 18:READ cantrollen(i):
   NEXT
30 device$=".console"
35 INPUT"Control code: ";ctrl$
55 errorcade=0
60 IF ctrl$="" THEN 145
65 ctrl=CONV(ctrl$)
70 IF ctrl<0 OR ctrl>18 THEN PRINT"Contral code
   aut af ronge, try ogoin":GOTO 35
75 IF cantrollen(ctrl)<0 THEN PRINT"Involid
   cantral cade, try ogoin":GOTO 35
80 ON ctrl+1 GOSUB 1000,1100,1200,
   1300,1400,1500,1600,1700,1800,
   1900,2000,2100,2200,2300,2400,
   2500,2600,2700,2800
85 IF errarcode THEN PRINT"Contral functian nat
   performed.":GOTO 35
90 PERFORM cantrol (%ctrl,@buffer$)
   device$
95 endlist=controllen(ctrl)
97 line$=""
100 FOR i=1 TO endlist
105 hexvolue$=HEX$(ASC(MID$
   (buffer$,i,1)))
110 char=TEN(hexvolue$):IF chor<32
   THEN chor=chor+128
115 chor$=CHR$(char)
117 line$=chor$+"  "
120 PRINT USING"2o,x";MID$(hexvolue$,
   3,2);
125 IF i/26=INT(i/26) THEN PRINT:
   PRINT line$:line$=""
130 NEXT i
135 PRINT:PRINT line$:PRINT
140 GOTO 35
145 INVOKE
150 END
```

As you can see, the main part of the program is somewhat similar to our status example. The big exception is the *on gosub* statement in line 80, which allows for each control request to be handled separately.

Following are the routines and commentary.

```
1000 buffer$=CHR$(0)
1010 RETURN
```

This is just the *reset console* function, which has no formal parameters.

```
1100 REM set sub$(buffer$,1,1) equol to $28 and
     set the rest af
1110 REM the buffer to stotus toble volues
1120 PRINT:PRINT"Not implemented"
1125 errarcode=1
1130 RETURN
```

Normally, this would be the *restore console status* function. Because it is both dangerous and undocumented, it is "left to the reader as an exercise." In general, you should only restore with a buffer loaded during a previous *preserve console status* call (status code 1).

```
1200 PRINT:INPUT"Da yau want ta terminate input
     with a specific chorocter? "
     ;o$
1210 GOSUB 5000
1215 IF NOT yes THEN 1250
1220 INPUT"ASCII volue af terminotian chorocter:
     ";o$
1225 chor=0:chor=CONV(o$)
1230 IF chor<1 OR chor>255 THEN 1200
1235 buffer$=CHR$(128)+CHR$(chor)
1240 RETURN
1250 buffer$=CHR$(0)+CHR$(0)
1255 RETURN
```

By contrast, control 2 is nice and safe and also serves to introduce the input test routine at line 5000, as follows:

```
5000 yes=1
5010 ons$=MID$(o$,1,1):IF ons$<>"Y" AND
     ons$<>"y" THEN yes=0
5020 RETURN
```

One of the things you might enjoy doing with the termination character routine involves remembering that the open apple key adds 128 to the value of a given key value. Therefore, to change the function of the return key to require *open apple* (return) is simply a matter of setting the termination character to ASCII 141 (128+13). Amaze your friends! Note too that Basic does not reset these values until you reboot, so if you set the value to something you can't type (or happen to forget), you're out of luck!

```
1300 INPUT"Do yau want to do two byte reods
     fram the keyboord? ";o$
1305 GOSUB 5000
1310 IF yes THEN buffer$=CHR$(128):
     RETURN
1320 buffer$=CHR$(0):RETURN
```

Two-byte reads are a whole world by themselves. This is the way to set up your application to use the numeric keypad for special functions, to read the state of the Apple keys, and so on. More information is in the *Device Drivers Manual.* (If interest in these techniques is sufficient, maybe it would make a good subject for a future column.)

```
1400 INPUT"Size of the type-oheod buffer: ";o$
1405 IF o$="" THEN errarcade=1:RETURN
1410 size=CONV(o$)
1415 IF size<0 OR size>128 THEN PRINT"Invalid
     input, try ogoin":GOTO 1400
1420 buffer$=CHR$(size)
1425 RETURN
```

Type-ahead buffer size is interesting only in the ability to set it to zero (no type-ahead).

```
1500 buffer$=CHR$(0)
1510 RETURN
```

This just flushes the type-ahead buffer (like control-6, which is handy if you want to guarantee a certain input state or timing.

```
1600 PRINT"Worning, Dan't make a mistakel"
1605 INPUT"Attention event priarity: ";a$
1610 IF o$="" THEN errorcode=1:RETURN
1615 pri=CONV(o$):IF pri<0 OR pri>255 THEN
     1605
1620 buffer$=CHR$(pri)
1625 INPUT"Attention Event ID: ";o$
1630 IF o$="" THEN 1605
1635 event=CONV(o$):IF event<0 OR event>255
     THEN 1625
```


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```
1640 buffer$=buffer$+CHR$(event)
1645 INPUT"Attentian event handler address (three
     bytes): ";a$
1650 IF LEN(o$)<>3 THEN 1645
1655 buffer$=buffer$+a$
1660 INPUT"ASCII cade af Attentian chorocter:
     ";a$
1665 cade=CONV(a$):IF cade<1 OR cade>255
     THEN 1660
1670 buffer$=buffer$+CHR$(o$)
1675 PRINT"Buffer is: ";
1680 FOR i=1 TO 6:PRINT USING"2o,x";
     MID$(HEX$(ASC(MID$(buffer$,i,
     1))),3,2);: NEXT
1685 INPUT" Ok? ";a$:GOSUB 5000
1690 IF yes THEN RETURN:ELSE:GOTO 1605
```

Here's where life gets dangerous. If you use this routine, you must first call attention status to get the priority and event ID and address, and reenter that information exactly. Only then can you feel free to change the attention character.

```
1700 errorcode=1:RETURN
```

Control call number 7 is reserved.

```
1800 PRINT"Worning, Dan't make o mistokel"
1805 INPUT"Any-key event priority: ";o$
1810 IF a$=" " THEN errorcode=1:RETURN
1815 pri=CONV(o$):IF pri<0 OR pri>255 THEN
     1805
1820 buffer$=CHR$(pri)
1825 INPUT"Any-key Event ID: ";o$
1830 IF a$=" " THEN 1805
1835 event=CONV(o$):IF event<0 OR event>255
     THEN 1825
1840 buffer$=buffer$+CHR$(event)
1845 INPUT"Any-key event handler address (three
     bytes): ";a$
1850 IF LEN(a$)<>3 THEN 1845
1855 buffer$=buffer$+a$
1860 PRINT"Buffer is: ";
1865 FOR i=1 TO 5:PRINT USING"2o,x";
     MID$(HEX$(ASC(MID$(buffer$,i,
     1))),3,2);: NEXT
1870 INPUT" Ok? ";o$:GOSUB 5000
1875 IF yes THEN RETURN:ELSE:GOTO 1805
```

What applied to the attention event earlier goes double for the routine above.

```
1900 errarcade=1:RETURN
```

Control call number 9 is reserved.

```
2000 INPUT"Do you want Na-Woit input? ";o$
2005 IF o$=" " THEN errorcode=1:RETURN
2010 GOSUB 5000
2015 IF yes THEN buffer$=CHR$(128):RETURN
2020 buffer$=CHR$(0):RETURN
```

No-wait input is fun to play with because it bypasses buffering and waiting for return, and gives the inputting program whatever has accumulated since the last input request. The program is responsible for making sense of the entered characters. This might come in handy in conjunction with the console-synchronizing function (chr$(22)) to wait a certain time and see what had been typed in that period.

```
2100 INPUT"Da you wont any echoing of
     chorocters to the screen? ";a$
2105 IF a$=" " THEN errorcode=1:RETURN
2110 GOSUB 5000
2115 IF yes THEN 2130
2120 buffer$=CHR$(0)
2125 RETURN
2130 INPUT"Do yau also wont cantral chorocters
     ta be echoed? ";o$
2135 IF a$=" " THEN 2100
2140 GOSUB 5000
2145 IF yes THEN buffer$=CHR$(192):RETURN
2150 buffer$=CHR$(128)
2155 RETURN
```

This is a handy function for typing in passwords and other characters where selective display is desired. In addition, it allows programmatic setting of the control-8 (display control characters) keyboard function.

```
2200 INPUT"Da you want the Retype function
     enabled? ";a$
2205 IF a$=" " THEN errorcode=1:RETURN
2210 GOSUB 5000
2215 IF yes THEN buffer$=CHR$(128):
     RETURN
2220 buffer$=CHR$(0)
2225 RETURN
```

Retype allows the forward-arrow key to copy characters into the buffer. This is the normal mode for Basic, but can be disallowed to provide pure cursor movement.

```
2300 INPUT"Do you wont the Bockspoce function
     ta be enabled? ";o$
2305 IF a$=" " THEN errorcade=1:RETURN
2310 GOSUB 5000
2315 IF yes THEN 2330
2320 buffer$=CHR$(0)
2325 RETURN
2330 INPUT"Da you olso wont bockspoce to be
     destructive? ";a$
2335 IF o$=" " THEN 2300
2340 GOSUB 5000
2345 IF yes THEN buffer$=CHR$(192):
     RETURN
2350 buffer$=CHR$(128)
2355 RETURN
```

This is really handy for applications programs taking input from the keyboard using standard input statements. It, in connection with disabling the *retype* function, allows the naive user to be sure that what shows up on the screen is what is actually going to be input when return is pressed.

```
2400 INPUT"Do yau wont the Concel functian ta be
     enobled? ";a$
2405 IF a$=" " THEN errarcode=1:RETURN
2410 GOSUB 5000
2415 IF yes THEN 2430
2420 buffer$=CHR$(0)
2425 RETURN
2430 INPUT"Do yau also want Concel to be
     destructive? ";a$
2435 IF a$=" " THEN 2400
2440 GOSUB 5000
2445 IF yes THEN buffer$=CHR$(192):
     RETURN
2450 buffer$=CHR$(128)
2455 RETURN
```

Turning on *destructive cancel* is the most powerful feature of this routine. By now you have probably become accustomed to getting a backslash and then a carriage return and line feed when you press control-X. When destructive cancel is turned on, the console driver instead issues a destructive (erasing) backspace for every character in the input buffer. The net effect of this is that the cursor snaps back to the exact place it was when you began to type that line, erasing everything as it goes. This is not particularly handy when you are writing programs if you want to cancel a line and then use the forward arrow to correct the mistake. However, it makes lots of sense in an application where you might be confused by the backslash and the cursor sitting on the line below, expectantly waiting for who knows what.

```
2500 INPUT"Da you wont Escape Made enobled?
     ";o$
2505 IF a$=" " THEN errorcode=1:RETURN
2510 GOSUB 5000
2515 IF yes THEN buffer$=CHR$(128):
     RETURN
2520 buffer$=CHR$(0):RETURN
```

Escape mode is another handy thing when you are developing programs, but you might want to turn it off during an application program, especially if you want to restrict the input to just the prompted locations. If you use destructive backspace and destructive cancel, it makes sense to disable escape mode also.

```
2600 errarcade=1:RETURN
```

Downloading an entire character set cannot be implemented with this invokable because of the 255-character limit on the buffer. Don't despair, however, since there is the great *download.inv* to take care of the problem. See your friendly *download.doc* file on the Basic product disk for more details.

```
2700 PRINT"Nat currently implemented"
2705 REM sub$(buffer$,1,1) contoins the chorocter
     count
2710 REM the rest is individuol chorocter definitians
     (mox 8)
2715 errorcode=1:RETURN
```

Even though it is not possible to download an entire character set using this invokable, control request 17 does provide a mechanism for downloading eight characters at a time. Although the process for developing the character definitions is beyond the scope of this article, there is enough information in the *Device Drivers Manual* to get you started.

```
2800 errarcode=1:RETURN
```

The process of restoring a viewport is also left to the reader. Because of the 255-character buffer limit, it is not possible to restore a whole viewport. Further, the initial three-byte code at the front of the buffer is undocumented, which makes it a little tough to create your own viewport definitions. Don't be discouraged, though. There's lots to do that can make your application development smoother and more friendly (and lots of time re-

quired to test everything out).

Homework! This has been quite a treatise on the use of the Apple III console. There are lots of other useful options in the console driver that we'll cover next time; meanwhile, here's a present, a homework assignment that should give you some chuckles while proving that there is very little you can't do with SOS and Basic. Without further ado, try the following:

```
5 INPUT"File to fill with ossorted trosh: ";file$
10 IF file$="" THEN 230
15 OPEN#1,file$
20 INPUT"How mony lines of this trosh do you wont
   to creote: ";line$
25 line=0:line=CONV(line$)
30 IF line<1 THEN GOTO 5
45 DATA "duke","prince","frog",
   "sonitation engineer","dowoger duchess"
50 DATA "coptivated","impressed",
   "repulsed","bored","completely
   overwhelmed"
55 DATA "hondsome","pothetic","eoger",
   "reluctont","willing"
60 DATA "wholesome","reserved","wild",
   "enthusiostic","shy"
65 DATA "king","queen","todpole",
   "flogpole climber","lody morine"
70 DATA "mother","fother",
   "grondporents","onolyst","best
   friends"
80 FOR i=1 TO 5:READ o$(i):NEXT
90 FOR i=1 TO 5:READ b$(i):NEXT
100 FOR i=1 TO 5:READ c$(i):NEXT
110 FOR i=1 TO 5:READ d$(i):NEXT
120 FOR i=1 TO 5:READ e$(i):NEXT
130 FOR i=1 TO 5:READ f$(i):NEXT
140 FOR i=1 TO line
145 PRINT#1; USING"3#,x";i;
150 PRINT#1;"Once o ";o$(INT(RND(1)*5+1));
160 PRINT#1;" wos ";b$(INT(RND(1)*5+1));
170 PRINT#1;" by o ";c$(INT(RND(1)*5+1));
180 PRINT#1;" but ";d$(INT(RND(1)*5+1));
190 PRINT#1;" young ";e$(INT(RND(1)*5+1));
200 PRINT#1;" thot neither of them tolked to their
   ";f$(INT(RND(1)*5+1)); " obout."
210 NEXT i
220 CLOSE
230 END
```

Running this little jewel should create the following kind of file (be sure to run at least fifty lines):

1 Once a dowager duchess was impressed by a reluctant but enthusiastic young flagpole climber that neither of them talked to their mother about.

2 Once a duke was completely overwhelmed by a pathetic but wholesome young tadpole that neither of them talked to their analyst about.

3 Once a duke was bored by a willing but wild young queen that neither of them talked to their grandparents about.

4 Once a prince was repulsed by a pathetic but shy young tadpole that neither of them talked to their analyst about.

Unfortunately, if you print this file out on the screen (by replying *.console* to the file name prompt, for example), you get the sentences wrapped around because the lines are more than eighty characters long. How nice it would be if you could see them printed out and scroll horizontally to read them, just as the console already scrolls down to allow more information to be printed. Next month we'll explore the following program in detail, and other programming tricks with the console, but for now, type and enjoy:

```
1 DIM o$(500)
5 INPUT"File nome to scroll through: ";o$
10 IF o$="" THEN 200
15 OPEN#1,o$
20 moxlength=0
25 ON EOF#1 GOTO 35
30 FOR i=0 TO 500:INPUT#1;o$(i):IF LEN
   (o$(i))>moxlength THEN moxlength=LEN
   (o$(i)):NEXT:ELSE:NEXT
35 lostrecord=i
40 leftscroll$=CHR$(23)+CHR$(255)+CHR$
   (26)+CHR$(79)+CHR$(0)+CHR$(2)+CHR$
   (26)+CHR$(0)+CHR$(24)+CHR$(3)+CHR$
   (21)+"5"+CHR$(12)+CHR$(22)
45 rightscroll$=CHR$(23)+CHR$(1)+CHR$
   (26)+CHR$(0)+CHR$(0)+CHR$(2)+CHR$
   (26)+CHR$(0)+CHR$(24)+CHR$(3)+CHR$
   (21)+"5"+CHR$(12)+CHR$(22)
50 scrollup$=CHR$(16)+CHR$(3)+CHR$
   (26)+CHR$(0)+CHR$(23)+CHR$(10)
   +CHR$(21)+"5"+CHR$(22)
55 scrolldown$=CHR$(16)+CHR$(3)+CHR$
   (12)+CHR$(11)+CHR$(22)
60 HOME:PRINT CHR$(21);"5";
65 FOR i=0 TO 23:IF LEN(o$(i))>80 THEN
   PRINT MID$(o$(i),1,80);:NEXT:ELSE
   PRINT o$(i):NEXT
70 hi=1:vi=24:TEXT
75 bnk$="                        ":b$=bnk$:c$=bnk$
80 GET o$:cursor=ASC(o$)
85 move=(cursor=8)+2*(cursor=21)+3*
   (cursor=10)+4*(cursor=11)
90 ON move+1 GOSUB 130,100,105,110,120
95 GOTO 80
100 IF hi>1 THEN index=vi-25:hiindex=hi
   -1:FOR j=1 TO 24:SUB$(c$,j,1)=MID$
   (o$(index+j),hiindex,1):NEXT:PRINT
   rightscroll$;c$;:hi=hi-1:c$=bnk$:TEXT
102 RETURN
105 IF hi+80<=moxlength THEN index=vi
   -25:hiindex=80+hi:FOR j=1 TO 24:
   SUB$(b$,j,1)=MID$(o$(index+j),hiindex,
   1):NEXT:PRINT leftscroll$;b$;:hi=hi
   +1:b$=bnk$:TEXT
107 RETURN
110 IF vi<lostrecord THEN PRINT scrollup$;
   MID$(o$(vi),hi,80);:vi=vi+1;TEXT
115 RETURN
120 IF vi>24 THEN PRINT scrolldown$;
   MID$(o$(vi-25),hi,80);:vi=vi-1:TEXT
125 RETURN
130 IF cursor=27 THEN POP:GOTO 200:
   ELSE:RETURN
200 TEXT:PRINT CHR$(26);CHR$(0);
   CHR$(23);
210 CLOSE
220 END
```

Be sure you type it in exactly as written, and be sure that *bnk$* in line 75 contains exactly twenty-four spaces between the quotation marks. Then use the first program to create a file of junky messages. If you want, you can change the data statements to make up your own messages. Then use that same file name for the second program and use the arrow keys to scroll up, down, left, and right through the file. If you have trouble, just wait until next month when some of the murky water will clear.

Until then, there doesn't seem to be anything else that can console you, so have fun with your Apple III!

What would you give to have your Apple II able to configure to any peripheral?



SOFTECH MICROSYSTEMS

THE PASCAL PATH

By Jim Merritt

Tools Of The Craft, Part 13

An Exercise Completed: CopyText. As a faithful follower of the Path, you should have had no trouble completing last month's exercise. You were asked to create a program, *CopyText*, which copies all the text from the file of your choice into a file called CLONE.TEXT. As you read these words, you are probably flush with triumph at having disposed of the exercise so handily, and are waiting to compare your solution to mine. Who am I to disappoint you? Compare away!

```
PROGRAM
  CopyText;
(* Copy the text in physicol file COPYTEXT.TEXT
   to physicol file CLONE.TEXT*)
  CONST
    SourceNome= 'COPYTEXT.TEXT';
    DestNome=   'CLONE.TEXT';
  VAR
    Source,
    Destinotion
      :Text (* some os FILE OF Chor *);
    Ch
      :Chor;
BEGIN (* CopyText *)
  Reset(Source, SourceNome);
  ReWrite(Destinotion, DestNome);
  WHILE (NOT EOF(Source)) DO
    BEGIN (* Get ond copy next line *)
      WHILE (NOT EOLn(Source)) DO
        BEGIN (* Get ond copy next chor *)
          Reod(Source, Ch);
          Write(Destinotion, Ch);
        END (* WHILE NOT EOLN *);
      (* Finish reoding current line *)
        ReodLn(Source);
      (* Reflect end of line in Destinotion *)
        WriteLn(Destinotion);
    END (* WHILE NOT EOF *);
  (* The following Close is not reolly necessory, since
     we were only reoding from Source. It's good
     proctice to do it, though. *)
    Close(Source);
  (* The following Close is ABSOLUTELY NECESSARY,
     if we expect to hove the physicol destinotion file
     oround for exominotion, ofter progrom execution
     finishes. *)
    Close(Destinotion, LOCK);
END (* CopyText *).
```


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Perhaps you had a sense of deja vu on reading this version of *CopyText*. If so, that's not surprising. This program is only slightly different from last month's *Lister1*. All we did was change the commentary a bit, change the names of the physical files on which the program operated, and introduce a new text file, Destination, as the place where the listing display is sent (instead of the standard output).

Old programs never die, they're simply reincarnated as new programs and routines whenever needed. So it was with *Lister1*; so it will be with *CopyText*. A program that always copies the text of the same specific file into another may strike you as being of limited utility. However, a generalized *routine* that copies the contents of *any* text file into *any other* text file will prove handy, indeed. In a future installment, we'll resurrect *CopyText* as just such a routine, so hang onto it.

Input and Output with Non-Text Files. In previous discussions, we learned that Read, ReadLn, Write, and WriteLn will work only for a FILE OF Char; this being true, you must use some other means of accessing files of other types. The file variable has been described as a "window" into the physical file. At any instant, your program can "look through" the window at exactly one item in the file

(or at a meaningless garbage value which lies immediately after the last valid datum in the sequence). The file variable assumes the value of the current datum. You can refer to this value in a Pascal program by appending the caret (^) to the file variable identifier.

Some terminals display a caret, others an "up-arrow" for this character code. Don't confuse it with the up-arrow cursor-movement key found on many video terminal keyboards. If a keyboard contains only an up-arrow key, that key will probably generate a caret. If both the caret symbol and the up-arrow are found on different keys of the same keyboard, however, you'll want to press the caret key, not the up-arrow key, when referring to file variables in your Pascal programs.

To illustrate the use of the caret with file variable identifiers, if IFile has been declared as a FILE OF Integer, then IFile^ is an Integer variable that contains the value of the datum that is currently in IFile's window.

How To Get It. In general, when any file is opened with Reset in a Pascal program, the file window is automatically positioned over the first item in the file. If we assume that the physical file INTEGERS.DATA contains the three values, 1, 2, and 3, in that order, then IFile ^ = 1 *immediately after* the execution of Reset(IFile, 'INTEGERS.DATA'). To advance through the data, your program must issue successive calls to the built-in procedure Get.

As shown in figure 1, Get accepts exactly one argument, an identifier that corresponds to a file variable. If the file window is not already looking past the end of file, Get advances the window by one datum position, and loads the file variable with the value that is stored in the new position. As mentioned earlier, upon opening INTEGERS.DATA as IFile, the initial value of IFile^ is 1. If Get(IFile) is executed, then the window advances by one position, and IFile^ assumes the value of 2. Another Get(IFile) call advances the window yet again, resulting in an IFile^ value of 3. One more Get would advance the window past the last datum in the file, causing EOF(IFile) to become True, and the value IFile^ to become undefined garbage. In general, your programs should never try to Get more data from a file F once EOF(F) is True.

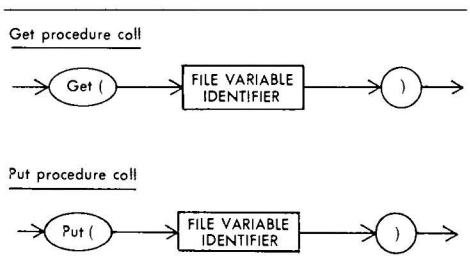
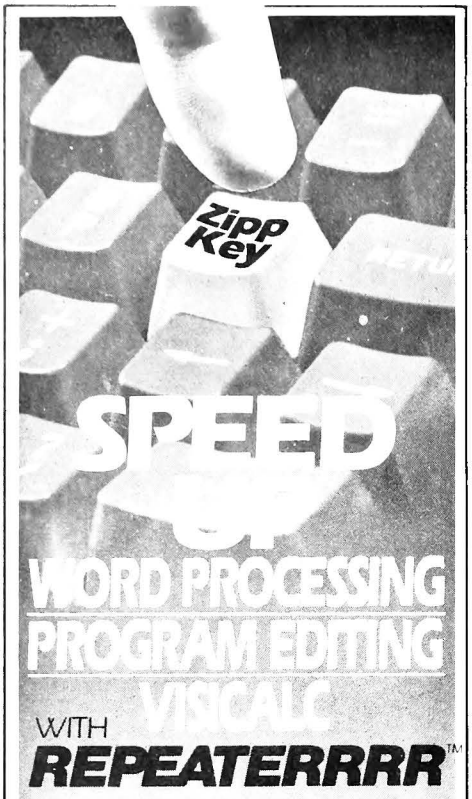


Figure 1.

What would you give to have TURTLEGRAPHICS, with automatic scaling, and four graphic modes, including HIRES and LORES, on your Apple II?

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For any physical data file (except an Interactive one), Pascal keeps track of the location of the last datum that was written into it. When, during Reading or Getting, the file window is advanced beyond this last datum, Pascal returns an EOF value of True for that file. (Note that the method used to determine EOF for Text or Interactive files is rather complicated, owing to a complicated internal structure that the Pascal system imposes upon them. The inner secrets of Text and Interactive files will be revealed further down the Path.)

You must have been disappointed to learn that Read won't work with file types other than Text and Interactive. However, we can compensate for this loss by using Get in conjunction with an appropriate file variable to simulate a Read for any particular file type. To be specific, if FileVar is a FILE OF DataType, and Datum is a variable of DataType, then the following compound statement behaves exactly as we would expect Read(FileVar, Datum) to behave:

```
BEGIN Datum := FileVar^; Get(FileVar) END
```

At first glance, you may wonder why the assignment to Datum comes first, and the Get second. It's natural to think that the Get should come first. After all, you have to "get" something before you can do anything with it, right? Of course! But don't forget the invisible, "initial Get" that occurs when FileVar is opened. After a call to Reset, FileVar^ contains the value of the first datum in the physical file. No Get is necessary to acquire this value; more precisely, Pascal has already performed the first Get for you, as part of Reset. In order to keep the file's first value around, your program must assign it to another variable, such as Datum, before issuing any more Gets. This is why the assignment comes first in our Read simulation; to guarantee that the first value in the file will not be skipped. The subsequent Get advances the window to the next value in the physical file. This value will wait patiently in the window until the Read simulation is executed again.

You, Too, Can Put Out. Putting data through the window and into the file is the inverse of getting data from it. Opening a file with ReWrite moves the window over the first datum *position* in the file. Of course, Pascal assumes that position to be empty. The only way your program can fill the hole with some datum is to use the built-in procedure Put. Like Get, Put requires a file variable identifier as an argument.

For a file variable F, Put(F) takes the value that is currently in the window F^ and writes it into the physical file that has been associated with F. Then, automatically, the file window advances by one position. Notice that the window during writing behaves much like the cursor on your video screen; it always sits at the point where the next item will be written. Thus, it is always looking into "virgin" territory, and never onto an actual datum. Just as we simulated Read for an arbitrary file, using Get, we can use Put to simulate Write. The compound statement

```
BEGIN FileVar^ := Datum; Put(FileVar) END
```

is equivalent to Write(FileVar, Datum), where FileVar is a FILE OF DataType, and Datum is a variable of DataType.

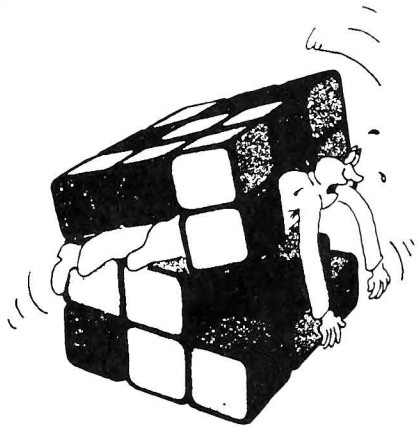
Putting It Together. Here are two programs—the first creates a FILE OF Integer, while the second displays its contents.

```
PROGRAM
  MakeInt;
(* Construct an external file, INTFILE.DATA, that
   contains N Integer values, in order of descending
   numeric value. *)
  CONST
    N=          100;
    DestName=  'INTFILE.DATA';
  VAR
    DestFile
      :FILE OF Integer;

    I
      :Integer;
BEGIN (* MakeInt *)
  ReWrite(DestFile, DestName);
  FOR I := N DOWNTO 1 DO
    BEGIN (* Equivalent to Write(DestFile, I) *)
      DestFile^ := I; (* Place I in the window *)
      Put(DestFile); (* Put window value in DestFile *)
    END (* FOR I *);
  Close(DestFile, LOCK);
END (* MakeInt *).

PROGRAM
  DumpInt;
(* Display the contents of the external FILE OF Integer,
   INTFILE.DATA, in the order of storage. *)

  CONST
    SrcName=    'INTFILE.DATA';
    NumAcross=  5;
    FieldWidth= 8;
VAR
    SrcFile
      :FILE OF Integer;
    I,
    Count
```



Liebermon, Suddeutsche Zeitung/Munich
Reprinted from World Press Review/March 1982

```
        :Integer;
BEGIN (* DumpInt *)
  Reset(SrcFile, SrcNome);
  Count := 0;
  WHILE (NOT EOF(SrcFile)) DO
    BEGIN
      (* Equivolent to Reod(SrcFile, I) *)
        (* Copy window contents into I *)
      I := SrcFile^ ;
        (* Move the window down one item *)
      Get(SrcFile);

      Write(I:FieldWidth); (* To CONSOLE: *)
      Count := Count + 1;
      IF (Count MOD NumAcross = 0)
        THEN
          WriteLn;
    END (* WHILE NOT EOF *);
    IF (Count MOD NumAcross <> 0)
      THEN
        WriteLn;
    WriteLn('NUMBER OF ITEMS READ: ', Count:1);
  (* No close necessory for reoding *)
END (* DumpInt *).
```

Interactive Files. The console device represents two sequences of characters, one incoming (from the keyboard) and one outgoing (to the video screen). This seems to agree with our definition of a Text file and, of course, we already know that Pascal treats the console as a file—actually, your Pascal program sees the console as two separate files.

Given all this, you may be tempted to think that the console corresponds to two Text files. It does, in many Pascal systems. Unfortunately, there is a conflict between Pascal's notion of a file and the realities of interactive input. Stated simply, it's not always convenient to do the "initial Get" when opening a file that has been associated with an interactive device. With the console keyboard, for example, the file variable cannot be loaded until someone presses a key! The Reset operation cannot conclude, and so program execution must remain suspended, until the user presses the first key. Here's a small program that illustrates the problem:

```
PROGRAM
  TextKbd;
(* Demonstrotes the "hong-up" thot occurs when
  Reset—ond "initiol Get"—is opplied to interoctive
  input device. *)
  VAR
    InFile
      :Text;
    Ch
      :Chor;
BEGIN (* TextKbd *)
  Reset(InFile, 'CONSOLE:');
  Write('Press o key: ');
  (* Simulote Reod(Ch)—I could hove used Reod here,
    since Infile is of type Text, but this is just to show
    thot Get works for oll files. *)
    Ch := InFile^;
    Get(InFile);
  WriteLn('You typed ', Ch);
END (* TextKbd *).
```

When you run this program, notice that the prompt to press a key cannot be displayed on the screen *until* a key is pressed! Let's walk through *TextKbd*, so

What would you give to develop programs for the IBM PC, TRS 80 Model II, T.I. 99/4 Home Computer, and Xerox 820 on your Apple II?



SOFTECH MICROSYSTEMS

we can understand clearly the exact sequence of events that occurs when the program is executed. The first statement in the program is Reset(InFile, 'CONSOLE:'). Two consequences follow from the call to Reset. Because 'CONSOLE:' is the system's physical file name for the console device, InFile is linked with the keyboard. (If the file variable had been opened with ReWrite, but had still been associated with 'CONSOLE:', it would have been linked to the video screen instead.)

Next, the system tries to get InFile's first character. This sets off a chain of procedure calls internal to the operating system and P-machine simulator, culminating in a call to the "keyboard driver" (discussed during our May 1982 stroll down the Path). The driver procedure must wait for the user to press a key before it can send a character back up through the chain of procedures to the *TextKbd* program. Program execution is thus suspended until the user presses a key.

When a key finally is pressed, the driver sends the corresponding character back to *TextKbd*, where it is loaded into InFile^. Then, and only then, can execution continue to the next statement, which, ironically, issues a prompt that instructs the user to press a key! Next, the value in the file window, InFile^, is assigned to the variable Ch. Another call to Get is made, which means that the program must wait for the user to strike another key. Finally, the value of Ch is displayed on the screen. Notice that this value is that of the first character typed by the user, not the second.

Although InFile is a Text file, we're not using Read(InFile, Ch) here, but rather the compound statement simulation of that call (its "Get expansion"). This shows more clearly why *TextKbd* displays not the value that was typed in the midst of simulated Read, but rather the one that was typed in order to satisfy the "initial Get." If you want to prove that the simulated Read performs like the real thing, just substitute an actual call to Read at the indicated point, then recompile and execute.

Reset performs an "initial Get" because the designer of Pascal, Niklaus Wirth, did not take interactive input into account when specifying Reset's behavior. Instead, Reset and Read are designed to access files that are stored on such media as floppy and hard disks, magnetic tapes, punched cards, and punched paper tapes. When adapting Pascal to microcomputers, the designers of the Apple Pascal system provided for interactive communication between human being and computer and neatly sidestepped the "initial Get" problem by defining the Interactive file type. An Interactive file is identical to a Text file in the sense that both represent sequences of Char values. When an Interactive file is Reset, however, no automatic "initial Get" occurs. Also, the sequence of operations in Read is reversed for Interactive files: the Get occurs first, followed by the assignment of the file window value to a variable:

```
BEGIN (*Interactive Read(F, Ch) *)
Get(F); Ch :=F ^
END;
```

Note that the differences between Text and Interactive files apply to input only; output to either type works correctly for both disk files and interactive output devices.

Because Reset and Read give special treatment to Interactive files, a program or procedure that processes interactive input differs significantly in structure from one that acquires input from regular data files or Text files. To see the differences clearly, consider the following version of *CopyText*, which has been rewritten to accept its input interactively from the console keyboard. Compare it with the earlier Text file version.

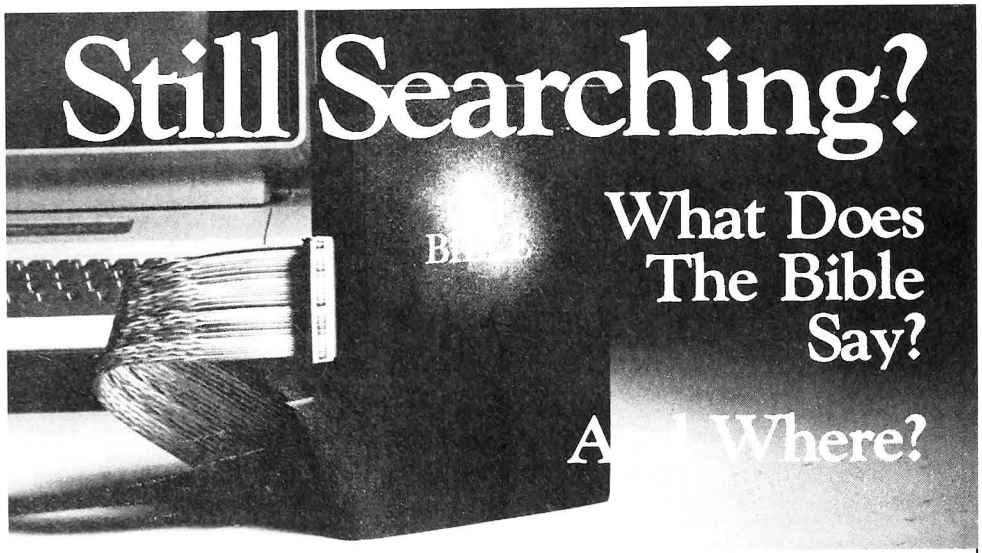
```
PROGRAM
  CapyText2;
(* Copy the text in physical file CONSOLE: ta physical
   file CLONE.TEXT. Input file is assumed ta be
   Interactive, nat Text *)

  CONST
    SaurceName='CONSOLE:';
    DestName=   'CLONE.TEXT';

  VAR
    Saurce
      :Interactive;
    Destinatian
      :Text (* cauld alsa be Interactive *);
    Ch
      :Char;
BEGIN (* CapyText2 *)
  Reset(Saurce, SaurceName);
  ReWrite(Destinatian, DestName);
  REPEAT (* Get and capy next line *)
    REPEAT (* Get and capy next char *)
      Read(Saurce, Ch);
      IF (NOT EOLn(Saurce))
        THEN
          Write(Destinatian, Ch);
    UNTIL EOLn(Saurce);
    (* Turn aff EOLn *)
      ReadLn(Saurce);
    (* Reflect end af line in Destinatian *)
      WriteLn(Destinatian);
  UNTIL EOF(Saurce);

  Clase(Saurce);
  Clase(Destinatian, LOCK); (* Keep it araund *)
END (* CapyText2 *).
```

As you can see, the two programs differ primarily in the type of loops each uses to copy one file to another. *CopyText* employs two WHILE-DO loops, one nested within another, while *CopyText2* uses nested REPEAT-UNTIL loops. The purpose of either set of loops is to detect EOLn and EOF in an accurate, timely fashion, in order to permit the program to recognize and deal with line bounda-



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Upgrade to the UCSD p-System Version IV from SofTech Microsystems. It's got all the features of Apple Pascal, and then some. For instance, Apple Pascal's UNITS must be linked in at each compilation, the p-System's do not. And instead of being limited to 32 UNITS, like Apple Pascal, the p-System allows a virtually unlimited number.

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ries in the Source, and to prevent it from trying to acquire more data than the Source file contains.

The WHILE-DO loops in the first program are appropriate because, in the case of regular files, Pascal is always looking ahead to the datum that lies just beyond the one currently in use, and thus "knows" about such conditions as end of file and end of line well before the program uses EOF or EOLn to check them. Therefore, it is not only proper, but *necessary* for a program that works with regular files to check for EOF and EOLn *before* trying to do anything with the file window (such as assign its value to a variable).

With Interactive files, Pascal can't determine whether or not EOF or EOLn is true until your program explicitly Gets or Reads a character. This is why the REPEAT-UNTIL loop is appropriate: it's designed to handle those situations where the program can only decide whether to quit looping *after* it performs some definite action (such as Getting or Reading a character, for instance). Of course, not all of the REPEAT-UNTIL loop body should be executed for all input characters. For example, the character obtained by a Get or Read will be blank if it corresponds to EOF or EOLn, and should not itself be copied to the destination. Thus, there must be a guard within the REPEAT-UNTIL loop body which splits it into two or more conceptual pieces. In *CopyText2*, the "IF (NOT EOLn(Source))" statement within the inner REPEAT-UNTIL loop takes care of this situation. It divides the loop into two parts: one to be executed for all characters (the Read), and the other to be executed only for "regular" characters (the Write). It handles both EOF and EOLn situations, even though only EOLn is tested, because, in Pascal, EOF implies EOLn (as proven by our experiments with the *EchoASCII* program a few months ago).

In general, then, you'll find it most convenient to use the "WHILE-DO" type of program structure when accessing regular files (including all non-text data files), and the "REPEAT-UNTIL" structure (with internal guards) when treating files interactively. Note that no rule requires you to associate a text file on disk with a file variable of type Text. In fact, you can link a disk file to an Interactive file variable, if you wish, and access it using "REPEAT-UNTIL" methods just as if it were an interactive I/O device. In other words, you never really have to use Text variables at all in Apple Pascal. Interactive variables will serve to access all textual material, whether it comes from disks or other I/O devices. This fact allows us to write general routines and programs that can switch back and forth from disk to console input at a moment's notice; the very same code will apply in both situations. Be warned, however, that programs which use Interactive file variables do not conform to "standard Pascal," which does not include the Interactive file type.

Predeclared Interactive Files. Apple Pascal predeclares three Interactive files: Input, Output, and Keyboard. For every program it processes, the Pascal compiler "inserts" the following declarations in the main (global) declaration area:

```
VAR
  Input,
  Keyboord,
  Output
    :Interoctive;
```

It also injects the following "invisible" procedure calls at the beginning of every main program block (but *not* at the beginning of a procedure or function):

```
Reset(Input, 'CONSOLE:');
Reset(Keyboord, 'SYSTERM:');
ReWrite(Output, 'CONSOLE:');
```

The difference between the files Input and Keyboard is a subtle but important one. Whether your program accepts data from either Input or Keyboard, the data comes from the same source: the console keyboard. If acquired through Input (which is associated with the physical file/device 'CONSOLE:'), the data is also echoed to the screen automatically by the operating system as we discussed in the May 1982 Pascal Path. However, if your program acquires its data through Keyboard (which is associated with the file/device 'SYSTERM:'), the user's keystrokes are *not* echoed to the screen; if any echoing occurs, it must be instigated by the program. To demonstrate, here's a short program that echoes any capital letters just as they are, but echoes a blank for all other characters:

```
PROGRAM
  Blonker;
(*  Accept nonechoing input from keyboord; echo oll
    upper-cose letters, but echo blonk for oll other
    chorocters. Terminote when ot-sign key is pressed. *)

  CONST
    Blank=      ' ';
    AtSign=     '@';

  VAR
    Ch
      :Chor;
BEGIN (* Blonker *)
  REPEAT
    Reod(Keyboord, Ch);
    IF ((Ch >= 'A') AND (Ch <= 'Z'))
      THEN
        Write(Ch)
      ELSE
        IF EOLn(Keyboard)
          THEN
            WriteLn (* Just to keep things pretty *)
          ELSE
            Write(Blonk);
  UNTIL (Ch = AtSign);
END (* Blonker *).
```




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Be sure when using the Keyboard file to use the proper form of EOF and EOLn in checking for end of file and end of line. Even though Input and Keyboard are both tied to the console keyboard, EOF—that is, EOF(Input)—is not the same as EOF(Keyboard), nor is EOLn the same as EOLn(Keyboard). Specifically, if your program is accepting input from the Keyboard, EOF and EOLn will never be True, but, depending on the characters that the user types, EOF(Keyboard) and EOLn(Keyboard) will. As a matter of style (and self-defense!), you should almost never use the EOF or EOLn functions without naming a file variable as a parameter. If a program gets its input from the Input file, it should always check EOF(Input) and EOLn(Input). If it uses the Keyboard file, then it should check EOF(Keyboard) and EOLn(Keyboard). Following this practice will help you avoid confusion and will eliminate one possible reason for program misbehavior.

Output to the Printer. There is nothing sacred about the physical files 'CONSOLE:' and 'SYSTERM:', just because they are normally linked to the predeclared files Input, Output, and Keyboard. You are free to link them to your own file variables if you want to (even as they are simultaneously linked to the predeclared Interactive files), and we will have occasion to do so more than once as we travel down the Pascal Path. Another such physical file is 'PRINTER:', which corresponds to the output device (if any) that is hooked into slot 1 of your Apple's expansion backplane. To send output data to that device, simply use ReWrite to link a Text or Interactive file variable to the physical file 'PRINTER:', as in the short demonstration program below:

```
PROGRAM
  PrnOut;
  CONST
    Message= 'On the screen, and printer, too!';

  VAR
    PrnDevice
      :Interactive; (* Text is alsa OK *)
(* *** WARNING *** DON'T TRY THIS PROGRAM,
   UNLESS YOU HAVE A PRINTER HOOKED INTO
   SLOT 1 OF YOUR APPLE. THE PRINTER SHOULD BE
   TURNED ON, AND READY TO ACCEPT DATA FROM
   THE COMPUTER BEFORE YOU EXECUTE THIS
   PROGRAM. *)
BEGIN (* PrnOut *)
  ReWrite(PrnDevice, 'PRINTER:');
  WriteLn(Message); (* Ta screen *)
  WriteLn(PrnDevice, Message);
  Clase(PrnDevice); (* Not really necessary, but good
  form *)
END (* PrnOut *).
```

Before executing *PrnOut*, take care that your system actually has a printer hooked into slot 1, and that the printer is ready to accept data. If there is no card in slot 1, Pascal will complain of I/O error #9 ('No device') when you try to execute *PrnOut*. Also, the Pascal system may "freeze" in trying to send data to a printer that is either turned off or is "off-line." (Many printers have a switch that, when pressed, causes them to ignore data from the computer—this is known as the "off-line" switch.)

Note that you may reassociate the standard files Input, Output, or Keyboard to interactive devices (but *not* to text files on disk, unless you want the system to overload and reboot), by using Reset or ReWrite, whichever is appropriate. Of course, you can't reopen any of these files until you Close them first. Remember that Pascal opens these special files for you, automatically, at the start of every program, and you can't Reset or ReWrite a file that is already open. Reassigning the predeclared Interactive files is a risky business, though, because they were never designed for that. It's preferable, instead to declare separate and distinct file variables, then link these new variables to the physical devices or files of your choice, as we did in *PrnOut*.

Something to Keep You Busy. By accepting user input through the Keyboard file, your programs are free to echo *any* appropriate data to the screen, not just the exact characters that are typed. Write a program that responds to the following single-character commands by echoing not the "command character" but the complete command name:

CHAR	ECHO
A ar a	Add
S or s	Subtroct
M ar m	Multiply
D ar d	Divide
Q ar q	Quit
<blank>	<blonk>
<ather letters>	ILLEGAL COMMAND
<all athers>	<no echa>

For example, this is what you might see on the screen after pressing the D key:

```
Commond: Divide
Command: <program is prampting for onother
command>
```

Encapsulate, within a function named NewCommand, the part of the program that prompts for, accepts, and responds to a command. NewCommand should return a result of the enumerated type ComType:

```
CamType= (Add, Subtract, Multiply, Divide, Quit)
```

Program execution should terminate only after the user issues the **Q** (*quit*) command.

In completing this assignment, you'll be turning the A, S, M, D, and Q keys into "special function keys" for a calculator program that we will begin to develop and refine, soon. Good luck! Meet you back here in thirty days, and we'll compare notes. ◨



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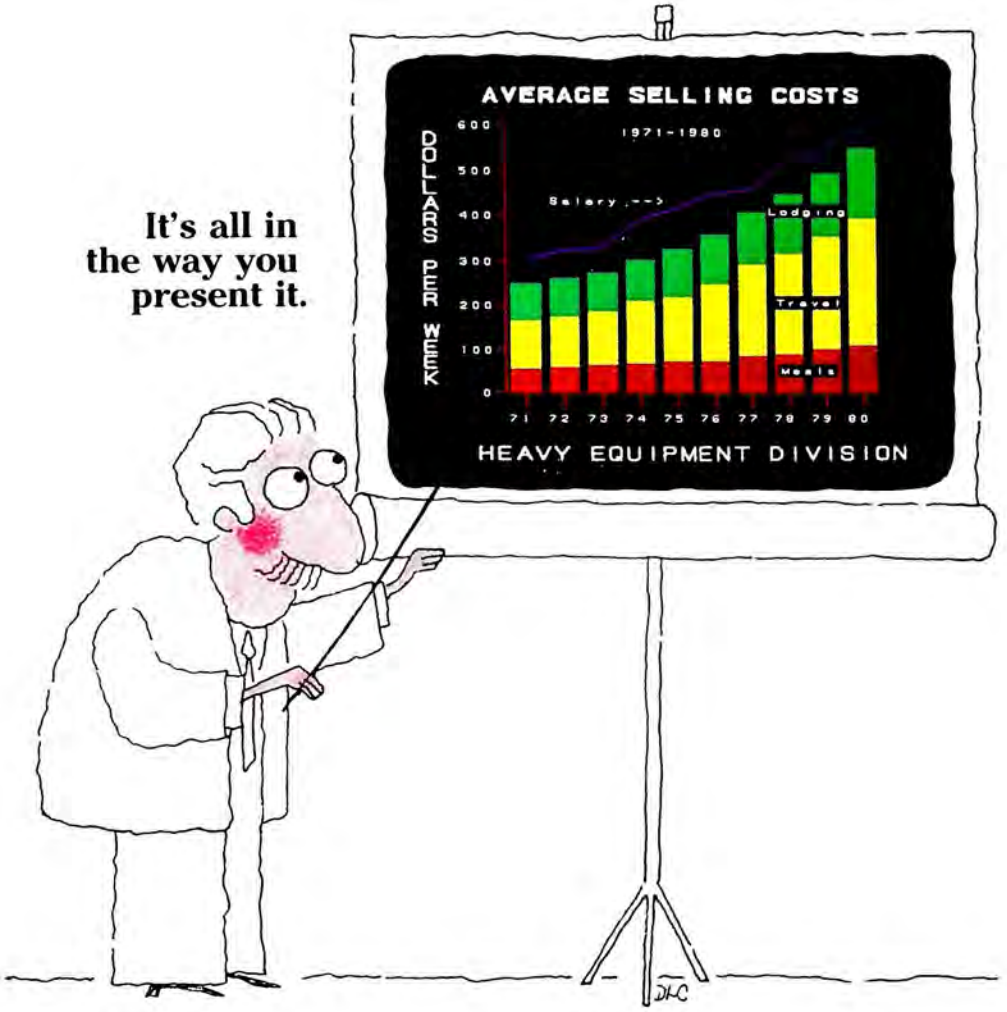
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Mind Your Business

BY PETER OLIVIERI



Happy July! Welcome back once again and thank you for your cards and letters. They are very helpful in focusing the column on topics that are of interest to you.

Stop, Look, and Listen. Many of you have been reading along for several months now. In fact, at least based on my mail, many of you have been quite successful in integrating the Apple into your business. It's a good idea from time to time to stop for a moment and make sure that all is going well. Here's a brief self-evaluation to apply to your existing system.

1. What is your policy concerning backup?

Do you make backup copies of your important data files? Do you make them frequently enough? Do you have backup versions of your main processing programs? Do you have two copies of each of your backup disks (one for on-site and one for off-site)? Is the "off-site" backup copy actually kept off-site? Have you made arrangements with someone—perhaps a dealer or business acquaintance—for operating your system on their equipment in the event of a real problem?

2. How secure is your system?

Is the equipment secure from theft? Are the programs secure from tampering by employees? Are program checks built in to detect unreasonableness?

3. Is the system controlled well?

Does anyone do a periodic audit of the system? Do the controls that were built in at the start really work? Have they been verified?

One of the strengths of microcomputers is also one of their drawbacks. That is, they are easy to use. A disgruntled employee or one with bad luck at the track may have the capability of "solving the problem" by creating one for you! It is essential that you not get complacent with your fantastic microcomputer system.

4. Is the equipment being cared for?

Do you have dust covers for your hardware when it is not in use? (Dust is the real enemy of microcomputers.) Do you regularly clean the heads of your disk drives? Do you keep track of roughly how many hours of use your disks are getting? (Remember, they only last for about forty hours.)

Have you taken precautions against the hazards of static electricity around your computer? Have you considered the dangers of a surge of power from your electrical outlet into your machine? Have you planned for a power interruption during processing? (Even a momentary one can cause significant problems for you.) Is your machine heating up considerably due to the addition of a lot of peripheral equipment but no fan? Do you keep a log of all hardware problems (date, cause, service performed, and so on)? Is the computer area kept clean? Are disks lying all about or are they carefully cared for and stored?

5. Is the software being maintained?

Do you keep in contact with vendors and get the latest revisions, improvements, or enhancements to the software packages you own? Have you written to or talked with the vendor about any special problems you might have had with the system?

6. Are the people being cared for?

Have they been properly trained? Should they be trained on any new features of the system? Do they get appropriate praise for their important role in the organization?

7. Do you regularly consider the future needs of your system?

Have you tracked your computer needs over the next year? The next five years? Will you eventually need a hard disk? Will the software you own right now be compatible with your future needs? Will you need a better or faster printer? Are there other software applications packages you should be considering?

You get the idea. Once a computer system is installed and working, your job is not over. Any computer system must be managed. It's easy to get comfortable with a system and assume that it will manage well by itself. All too often, we only realize the importance of each of these considerations after it is "too late." Read them again. If you see some places where you are a bit lax, now's the time to remedy the situation.

Charting a Course. If you are an avid sailor or powerboat owner, you know that the most important item on your boat is not an Apple but a cruising chart. A *Chart Kit* is produced by the Better Boating Association (Box 407, Needham, MA 02191) containing all the appropriate charts for a particular region in an easy-to-handle spiral bound chart book. These charts are widely acclaimed as being extremely clear and accurate.

One of the most important items at BBA (besides charts) is an Apple. BBA president Jim Owen has Apples at work and at home. (The at-home Apple is used as a backup for the one in the office as well as for work Owen brings home.) The system that is used in the office includes an Apple II Plus with 48K, a Sanyo monitor, two floppy disk drives, and an IDS printer. Since Owen got started with his Apple some two-and-a-half years ago, he can certainly be counted as one with a good deal of experience.

One of the major advantages Owen sees to using a microcomputer in the office is the fact that it allows him to be on top of the business. Since he does all of the major work on the machine (except for some data entry) himself, he is quite knowledgeable about what is taking place from day to day. He likes the Apple in particular because it is user friendly, convenient (you can run it when you want it), and easy to learn to use. He is self-taught and has designed all of his management reports himself.

Owen's favorite software packages will come as no surprise to you. He thinks *VisiCalc* is terrific and that *DB Master* is just perfect for his database needs. *Apple Writer* is sufficient to handle the office word processing tasks and *BPI* accommodates those accounting jobs that are necessary for BBA. In addition, Owen uses *Trend Spotter, Appleplot,* and *VisiSchedule.*

One impressive aspect of Owen's use of the Apple is his design and development of management reports. In addition to using the standard reports furnished by the software packages, Owen has designed a cash-flow report that has helped him cut costs significantly over the last few years. He used *VisiCalc* as the basis for making these cash flow and profit projections. He also used *VisiCalc* to massage some data produced by the BPI package in developing yearly summary reports to be given to stockholders. The shareholders get to see monthly differences (actual numerical and percent differences) for a variety of income and expense categories.

The shareholder's report itself is done using *Apple Writer.* Owen always incorporates a lot of visual detail into his reports and has several bar charts for the shareholders to look at. These include yearly sales data, net sales, quarterly profits, regional sales, and so forth (all produced by his graphics pack-

ages). Needless to say, the shareholders are impressed.

Owen is now focusing on using the Apple for modeling various aspects of the business. He wants to be able to pose more "what if" type questions about when customers are likely to replace their charts as well as to perform a variety of other market analyses.

In some organizations, the computer sits somewhere on a desk in a corner, or the user doesn't use the machine to its full potential within the setting. This is certainly not the case at the Better Boating Association. The Apple is an important management tool that provides valuable planning and operational information to the organization's president. Jim Owen, a successful and competent manager, has found his Apple to be a very valuable resource.

A Reintroduction. Apple Computer is surely committed to the successful reintroduction of the Apple III. Not only did Steve Jobs and Steve Wozniak state this explicitly at the Applefest computer show in Boston, but Apple Computer has recently introduced an information newsletter for Apple III owners and users. The newsletter is called *Dimensions* and can be obtained by writing to: Apple III Newsletter, 10260 Bandley Drive, Mail Stop 3-E, Cupertino, CA 95014. It is mailed regularly (and free of charge) to all Apple III owners. Just send your name, address, and Apple III serial number to the address just mentioned (not to *Softalk*) and you'll be placed on the mailing list.

The newsletter's intent is to provide Apple III users with a vehicle for exchanging experiences, to highlight software designed specifically for the III, and to answer questions from various readers about their particular system. The first issue contains a brief listing of some of the software packages available for the III, instructions on upgrading your Apple to 256K, data about recent Apple III software revisions, technical notes, and a calendar of coming events. It is a good beginning.

As an indication of the commitment of Apple Computer to this machine as the ideal small business system, the newsletter mentions that the reintroduction of the Apple III was the number one project for the entire company in 1982. Enough said!

AppleCalc? Be on the lookout for a new software package from Apple, *Senior Analyst.* It's a *VisiCalc*-like product that can be used by the financial manager, or the sales manager. It is a very powerful generic financial tool. A particular user may need *Senior Analyst, VisiCalc*, or both! *Senior Analyst* works best when some or all of the following conditions exist:

1. The same model will be used many times.
2. Formatted reports are often required.
3. Data from different models must be consolidated and shared.
4. Assumptions in the development of the model need to be shown.

Be on the lookout for the *Senior Analyst* and consider it as an addition to (or alternative to) your "modeling" library.

Time Out! If you are at all like most of us, you are extraordinarily busy. You probably write notes to yourself quite frequently. We all have our own to-do lists. Some of us actually have lists that refer us to other lists. Well, a product is available to Apple owners that can help you to organize your lists (and consequently, your time). It is called *Time Manager* and is distributed by Image Computer Products.

Time Manager gives your Apple the power to help you organize and plan your activities while at the same time maintaining accurate and complete records for your future reference. To use this program, you will need an Apple II or Apple II Plus with 48K of memory, a disk drive, and a monitor. Additional peripheral equipment certainly enhances the overall usefulness of the package but is not necessary. Some of the additional pieces that would help are a printer, a compatible clock card, a lower case adapter, and a second disk drive.

The package comes with a readable user guide that explains all of the features of the software. When you first start *Time Manager,* you are asked a few questions about the current date and data file you are using and then presented with a calendar of the current month. It is clearly displayed in typical format on your screen. A set of arrows points to "today," and any day that has some memos stored is shown on the screen in inverse. By pressing the arrow keys, you can move to a display of the next month or the previous month. You can, of course, pass through several years of calendars in this fashion.

Let's say that you are looking at the month of July on your screen. The arrows (actually the > and < symbols) point at July 12. If you press the return key, the display shows all of the memos you entered for July 12. Now, if you press the arrow keys, the display will move you through the days of the month (either forward or backward) and even into other months. Rather nice!

Back to our example. Let's say that you're looking at the display for July 12. You have the option of making an entry onto this day's calendar. An entry always consists of four parts: a priority, a permanence, a category, and some text. The parts must be typed in that order. The priorities you can use are *, 1, 2, 3, and *note* in order of decreasing importance. Entries are always displayed in priority order. This helps you organize your time better. The star (*) priority has a special characteristic in that star entries always appear on today's date. That is, if you haven't done them, they automatically get moved to the current day. This is a good way in which to set up your to-do lists. The "permanence entry" is used to indicate that a particular entry is to stay there from year to year (for example, a note about a birthday or wedding anniversary).

An entry's category is simply a letter from A to Z. *Time Manager* allows you to define (and store) a list of what each category letter stands for. You can then search for items in a specific category. The final entry is the text entry. This is the memo, note, or schedule item you wished to record in the first place.

In addition, you can issue a command that calls to the display a series of notepads (up to twelve of them) where you can place entries that are not really tied to a particular day. For example, you may create a notepad listing purchases you want to make over the next few weeks. Another notepad might contain a list of repairs that are needed around your home or office. You can name the notepads and edit them quite easily. And, as with any screen in *Time Manager,* you can print a copy of your notepad.

Time Manager even incorporates some totaling and accounting features as part of its package. It can provide some accounting and totals for categories such as income received, hours worked, and expenses. As many as nine separate accounts can be maintained. Totals for each account can be obtained for a day, a month, or any specified time period within the current year. Totals can also be obtained for the entire year.

This is but the beginning of the *Time Manager*'s usefulness. On any screen, you can press the slash, / (much the way you can in *VisiCalc*), and have a list of command codes displayed. Brief descriptions of some of these commands should give you a good indication of the power of this package.

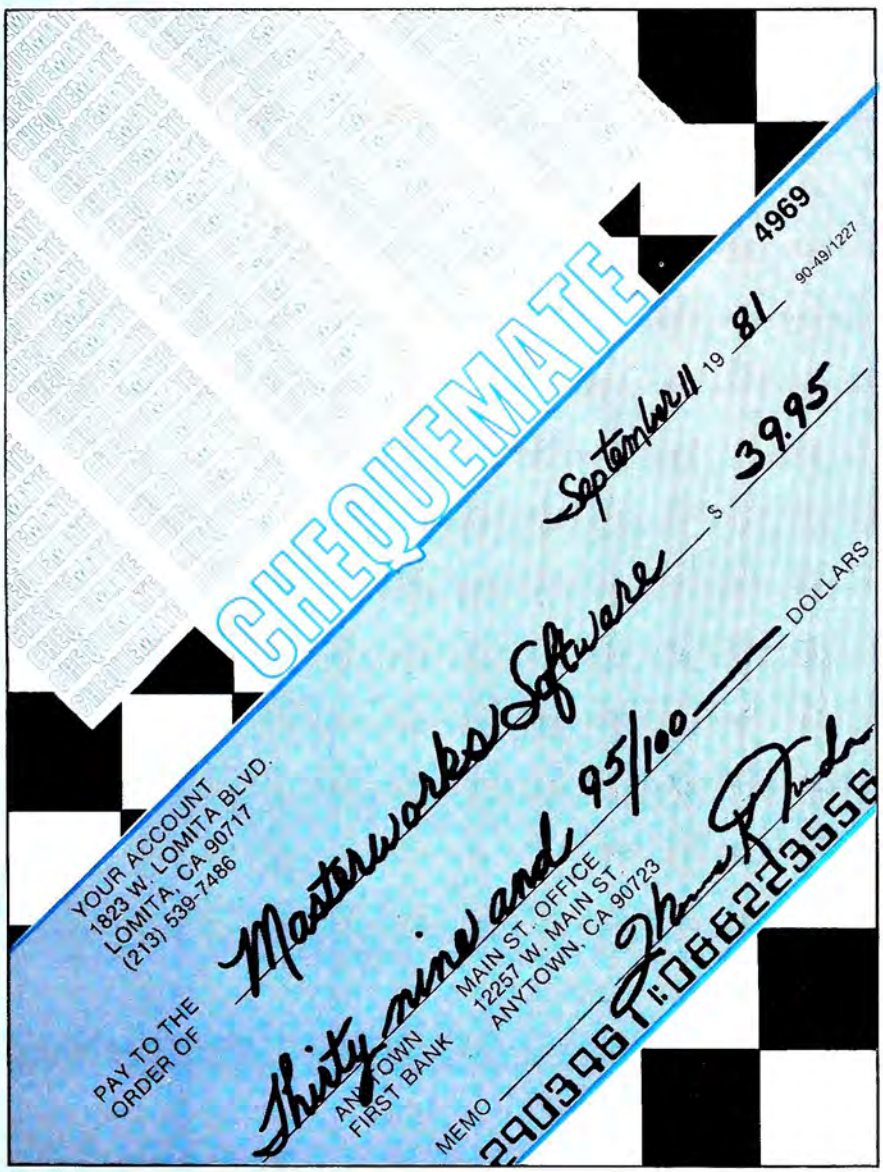
/A	Allows you to alter such things as dates, category names, disk titles.
/D	Deletes an entry.
/L	Selects priorities for display
/M	Moves an entry from one date to another
/N	Retrieves the notepad directory
/P	Prints entries
/X	Copies data to a new disk
/T	Displays commands for working with accounts

The commands listed are but a few of the commands available. *Time Manager* also offers a line editor, a notepad editor, commands for dealing with upper and lower case, and much more. One of the nicest aspects of the package is the ability to print out a copy of what is on the screen. For example, each Sunday evening you could print out a copy of this month's calendar, a two-week schedule, and all your notepads. Then during the week you could cross items off your printed lists and add any new ones that occur to you. On the following Sunday, after a few minutes of entering your new

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CHEQUEMATE is **the** complete home financial package for the Apple. All aspects of home money management are addressed including checks, charge cards, cash control, automated teller transactions, "checkless" bill paying, and budgeting. You can even split checks into two categories (i.e. to keep track of interest and principal separately for house payments). A complete set of reports allows you to make hard copy printouts or review them on the screen. In addition the contents of the screen can be printed at any time. Standard abbreviations may be defined so recurring entries can be generated with minimal keystrokes.



FEATURES

- Budgeting with actuals
- Charge cards and accounts
- Multiple categories per check
- Automatic teller transactions
- Standard entries by abbreviation
- Multiple checking accounts
- Video display printed at any time with CTRL-Y
- Comprehensive documentation
- Graphic budget analysis
- Unpaid bills display in check entry
- No monthly or annual cutoffs necessary
- All data accessable for change

REPORTS

- Check list
- Standard entry list
- Budget list
- Budget comparisons
- Charge list
- Graph budget/actual

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data, you can generate your next appointment book.

The hardest part of using this package has very little to do with the package itself. In order to make effective use of *Time Manager*, you have to use it. You have to manage your time well enough that you can regularly use the package and all its features. Once you see its advantages for yourself, it's quite likely you'll make a point of building a few minutes into your schedule each week for using *Time Manager*.

PFS Users. If you use *PFS* (the *Personal Filing System* database), make sure you contact Software Publishing Corporation and find out how you can get the latest update. It has some very nice features. Also, the *PFS* series now has a graphics package available. It is called *PFS: Graph* and displays *PFS* data as bar charts, pie charts, line graphs, and much more. We'll be reviewing this new release in a future column.

The Readers Speak. "Can you give me suggestions for looking at business software before I buy it? I really don't care to purchase something that I eventually will not use or is not appropriate for me. I have not been able to find a dealer that is either willing to spend time with me on software or who has enough of the packages that I am interested in. I am sure others must have this same problem. Any guidance you can give me would be greatly appreciated," B.D., Long Beach, California.

You are quite right, B.D. It's a very difficult problem. It's difficult for many reasons. First, there is an awful lot of business software out there. For example, there are well over fifteen different word processing packages and close to twenty database management systems (and this includes only the major ones). It's very difficult for dealers to stock all of these different packages and almost impossible for them to become skilled at using all of them. They do not have the money, the time, or the resources. Second, many dealers are more interested in selling machines than in selling individual software packages.

You have several alternatives. (1) Find a dealer in your area and see how much help that dealer can provide to you in your evaluation and selection of different software packages. (2) If you need to visit with more than one dealer, then, by all means, do just that. (3) Call the vendors of the software packages you're considering and ask them if they will provide you with the names of some satisfied users in your area that you can call or visit. (4) Look for a local Apple User Group that meets regularly and can provide you with the experiences of other users. (5) Look for a computer user group in your area. Many of these groups have "hands on" rooms that allow members to experiment with both hardware and software. (6) Read publications that review business software (*Softalk*, *InfoWorld*, and others). (7) There are now seminars being set up that teach how to use various software packages. Examples include "Introduction to VisiCalc" and "Choosing a Word Processing Program." You might look for similar programs and seminars being held in your area.

Your letter suggests an idea. Someone could establish a successful business by setting up a shop that allowed prospective software buyers to experiment with the various packages. The packages would not necessarily be for sale on the premises. Rather, a very large selection would be available, along with several Apples, so that people could experiment with packages before purchasing them. Personnel would be advisors/consultants to those availing themselves of the store's services. Of course, there would be an hourly charge associated with using the facility but it's highly likely that software buyers would be willing to pay a nominal amount for this "one-stop shopping" and advice. It has some interesting possibilities.

As you can see, there isn't a simple solution to your dilemma. I hope that some of these ideas will help. If you get stuck, write me. I'll try to respond as soon as possible. ■

Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA 95014; (408) 996-1010. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043; (415) 962-8910. Image Computer Products, 615 Academy Drive, Northbrook, IL 60062; (312) 564-5060.

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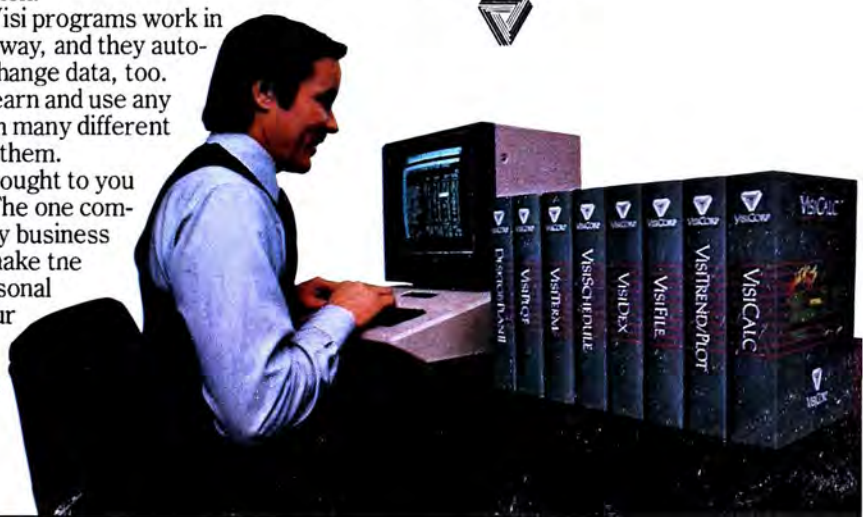
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Softalk Presents The Bestsellers

The software publishing business is getting more like the music business all the time. Publisher A will announce that he's shipped x copies of *Melon Picker*. Publisher B will then proclaim that he shipped 2x copies of *Plumber's Helper*. Finally, Publisher C tops them all with the claim that he shipped x∧2 copies of *Dish Washer*.

None seems to be aware that shipping copies to stores is not quite the same process as getting end users to take the cuddly floppies home with them, even though it's that end user's dollar that validates the publishers' efforts. That makes the present circumstances of the Sir-tech clan most noteworthy.

The gentlemen of Sir-tech, from Father Sirotek to Robert Woodhead, are clean shaven. But if they were of the hairy persuasion, they'd definitely be chuckling in their beards these days because they not only shipped x∧3, nearly all those packages found a home. They're now riding the crest of the hottest software wave to come along since Ken and Roberta Williams introduced hi-res adventures almost two years ago.

May saw the introduction of the second *Wizardry* scenario, *Knight of Diamonds*; and it literally took the Apple market by storm. Some stores had as many as fifty customers the first day for the program as it jumped to second place on the Top Thirty. First-month sales on *Knight of Diamonds* rival those of *Apple Galaxian* when it first hit the Apple market.

That's all the more remarkable when you consider that *Apple Galaxian* hit at Christmastime instead of during the traditionally slow spring season and that *Galaxian* hit during relatively prosperous times while *Knight of Diamonds* was introduced in the midst of the slowest software market in the last eighteen months. Likewise, it's unheard of for programs other than arcade games to break that rapidly.

Apple III

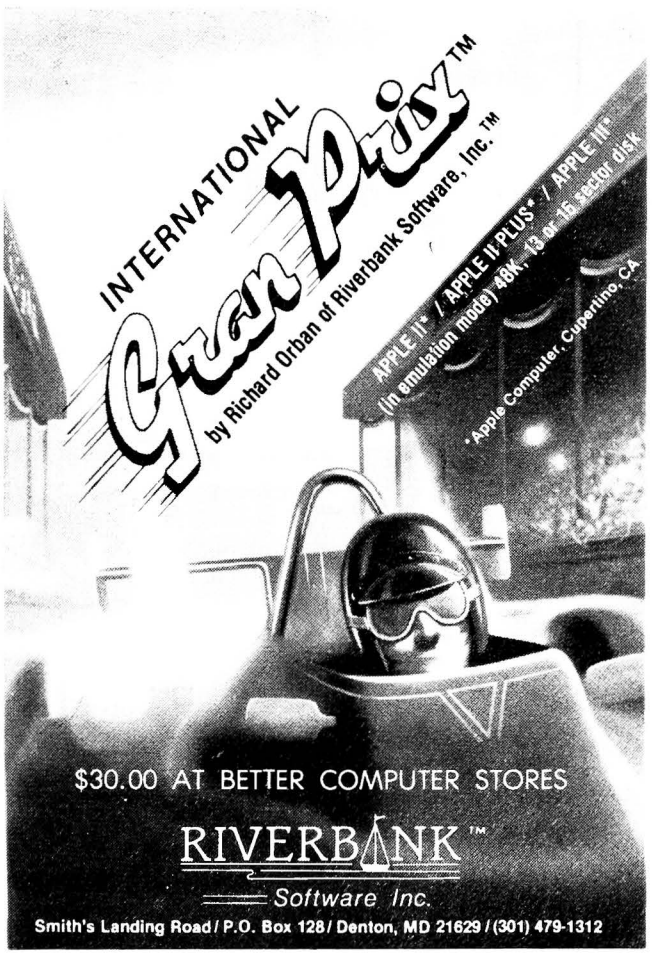
This Month	Last Month	
1.	1.	**VisiCalc,** Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
2.	2.	**Apple Writer III,** Paul Lutus, Apple Computer
3.	3.	**Personal Filing System,** John Page, Software Publishing Corporation
4.	5.	**Apple III Business Graphics,** Apple Computer
5.	7.	**Access III,** Apple Computer
6.	4.	**PFS: Report,** John Page, Software Publishing Corporation
7.	6.	**Word Juggler,** Tim Gill, Quark Engineering
8.	10.	**Great Plains Hardisk Accounting Series,** Great Plains Software
9.	8.	**Mail List Manager,** Apple Computer
10.	8.	**Apple Business Basic,** Apple Computer

Business 10

This Month	Last Month	
1.	1.	**VisiCalc,** Software Arts/Dan Brieklin and Robert Frankston, VisiCorp
2.	2.	**Personal Filing System,** John Page, Software Publishing Corporation
3.	3.	**DB Master,** Alpine Software/Stanley Crane and Jerry Maeon; and Barney Stone, Stoneware
4.	5.	**PFS: Report,** John Page, Software Publishing Corporation
5.	6.	**VisiTrend/VisiPlot,** Micro Finance Systems/Mitch Kapor, VisiCorp
6.	7.	**BPI General Ledger,** John Moss and Ken Debower, Apple Computer
7.	4.	**VisiFile,** Creative Computer Applications/Colin Jameson and Ben Herman, VisiCorp
8.	8.	**Accounting Plus II,** Software Dimensions, Systems Plus
9.	—	**General Manager,** Brillig Systems/Paul Malachowski and Kevin Cooper, On-Line Systems
10.	—	**VersaForm,** Joseph Landau, Applied Software Technology

Word Processors 10

This Month	Last Month	
1.	1.	**Apple Writer II,** Paul Lutus, Apple Computer
2.	4.	**Magic Window,** Gary Shannon and Bill Depew, Artsci
3.	2.	**WordStar,** MieroPro
4.	3.	**SuperText II,** Ed Zaron, Muse
5.	—	**Apple Speller,** Sensible Software
6.	—	**Executive Secretary,** John Risken, Sof/Sys
7.	—	**EasyWriter,** John Draper, Information Unlimited Software
8.	—	**Letter Perfect,** LJK Enterprises
9.	5.	**Word Handler,** Elekman, Silicon Valley Systems
10.	—	**Goodspell,** Henry G. Brown, Special Delivery Software, Apple Computer



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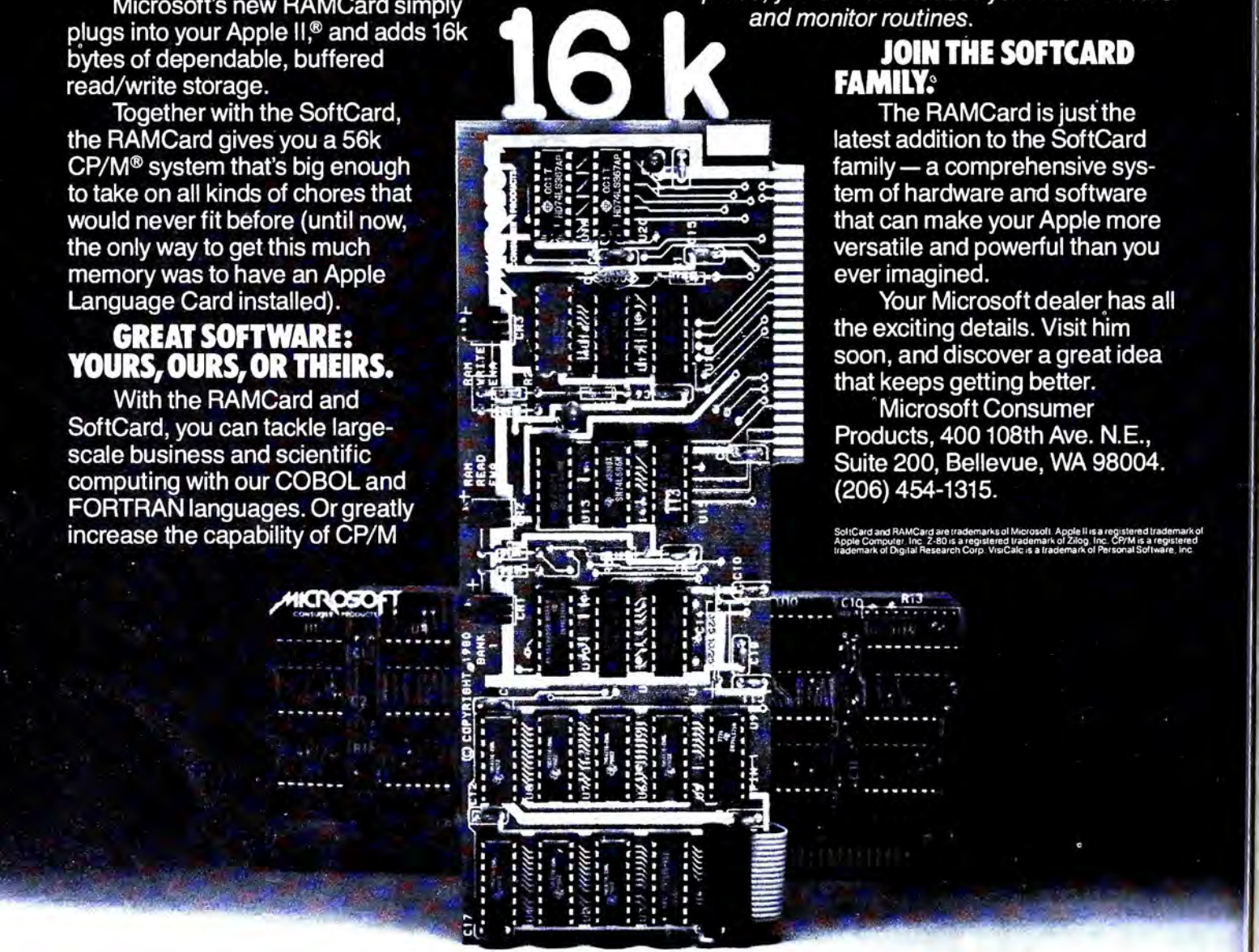
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MICROSOFT

Softalk Presents The Bestsellers

The month of May was absolutely abominable for software sales. The kindest word said by any dealer was, "We had several good months in a row, so I guess we shouldn't complain." A combination of factors led to poor software showing. Good spring weather in wintry climes had people outdoors rather than at their computers. The difficult economic climate was also a major contributor.

All program genres suffered. Business system sales slowed, resulting in reduced sales of business software. Software to aid home programmers dropped completely out of sight. Users picked and chose among entertainment software with some definite trends indicating conservatism in their choices.

First, Infocom's series of text adventures held their own. Apparently fueled by interest in *Deadline* and the increased exposure to the *Zork* series created by their introduction on the IBM Personal Computer, Infocom's product line suffered the least from the downturn. Likewise, adventure fans were willing to shell out the $100 necessary for *Time Zone,* on the theory that the value received made the program a bargain.

Second, arcade buyers went for the tried and true—meaning eat-'em-up games. *Snack Attack* retained third position in the Top Thirty, *Taxman* rose to sixteenth, and *Jawbreaker,* thought out of contention, resurfaced in a tie for twenty-sixth.

Third, entertainment software with tinges of artistic merit held up better. In this category were Bruce Artwick's *Night Mission* pinball game, Tony Suzuki's *Star Blazer,* and Paul Stephenson's *Swashbuckler.* Also falling here is *Choplifter,* the stunning programming breakthrough by Dan Gorlin that entered the lists at number eleven although some of the nation didn't receive it in May and much of the rest only got a limited supply.

There were only position changes in the Apple III software list. The most noteworthy trend was the rise of Great Plains from tenth to eighth. Their hard-disk based accounting system is now being praised as one of the relatively few programs that sell systems. This is no trivial compliment when one considers that the system has to include a hard disk.

Of course, *VisiCalc III* led sales of Apple III software, with *Apple Writer III* and *PFS* in second and third positions, respectively.

The Business Ten list got a slightly new look with *General Manager* from On-Line Systems and *VersaForm* from Applied Software Technology edging onto the bottom rungs. There were only minor position changes among the top eight programs.

The Word Processing Five got doubled to reflect both the increased number of competitive word processors in the market and the proofreading programs that are beginning to make sales inroads. *Apple Writer II* continues to impress end users, but the market is relatively quiet while awaiting the delivery of *ScreenWriter II* from On-Line Systems.

Strategy 5

This Month	Last Month	
1.	1.	**Castle Wolfenstein,** Silas Warner, Muse
2.	2.	**Flight Simulator,** Bruce Artwick, SubLogic
3.	3.	**Sargon II,** Dan and Kathe Spracklen, Hayden
4.	—	**AirSim-1,** Mind Systems
5.	—	**Southern Command,** Roger Keating, Strategic Simulations

Adventure 5

This Month	Last Month	
1.	2.	**Deadline,** Infocom
2.	3.	**Time Zone,** Ken and Roberta Williams, On-Line Systems
3.	1.	**Kabul Spy,** Tim Wilson, Sirius Software
4.	—	**Zork II,** Infocom
5.	—	**Zork I,** Infocom

Fantasy 5

This Month	Last Month	
1.	—	**Knight of Diamonds,** Andrew Greenberg and Robert Woodhead, Sir-tech
2.	1.	**Wizardry,** Andrew Greenberg and Robert Woodhead, Sir-tech
3.	3.	**Apventure to Atlantis,** Bob Clardy, Synergistic Software
4.	2.	**Ultima,** Lord British, California Pacific
5.	—	**Crush, Crumble and Chomp,** Automated Simulations

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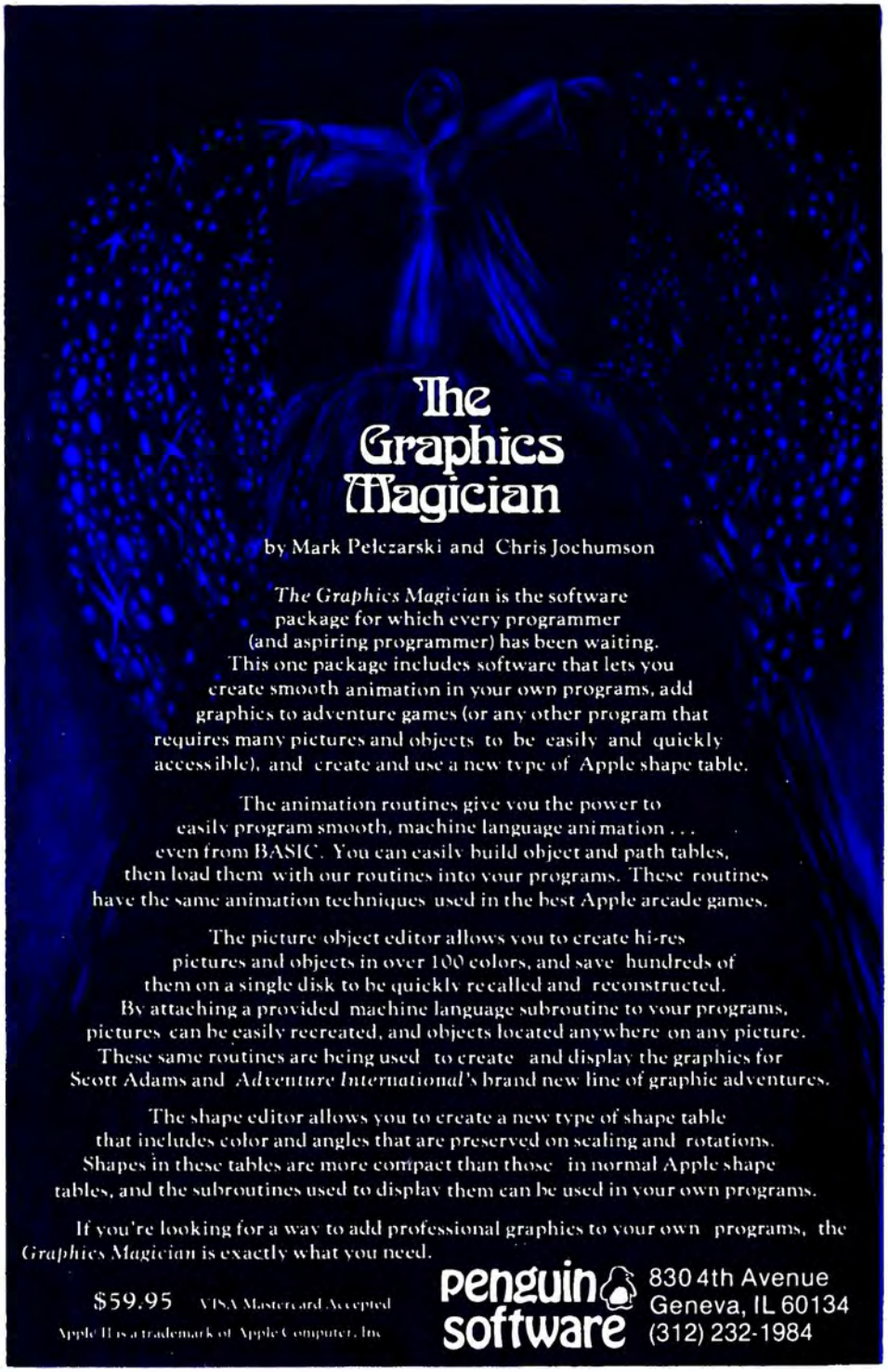
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The Graphics Magician

by Mark Pelczarski and Chris Jochumson

The Graphics Magician is the software package for which every programmer (and aspiring programmer) has been waiting. This one package includes software that lets you create smooth animation in your own programs, add graphics to adventure games (or any other program that requires many pictures and objects to be easily and quickly accessible), and create and use a new type of Apple shape table.

The animation routines give you the power to easily program smooth, machine language animation . . . even from BASIC. You can easily build object and path tables, then load them with our routines into your programs. These routines have the same animation techniques used in the best Apple arcade games.

The picture object editor allows you to create hi-res pictures and objects in over 100 colors, and save hundreds of them on a single disk to be quickly recalled and reconstructed. By attaching a provided machine language subroutine to your programs, pictures can be easily recreated, and objects located anywhere on any picture. These same routines are being used to create and display the graphics for Scott Adams and *Adventure International*'s brand new line of graphic adventures.

The shape editor allows you to create a new type of shape table that includes color and angles that are preserved on scaling and rotations. Shapes in these tables are more compact than those in normal Apple shape tables, and the subroutines used to display them can be used in your own programs.

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Softline Magazine

See *The Graphics Magician* at work in Sentient Software's new arcade games, *Gold Rush* and *Cango*, and in the *Scott Adams Graphic Adventures* from Adventure International, or ask your dealer for a demonstration.

There appear to be as many as five thousand back orders for *ScreenWriter II*, which in other days was known as *SuperScript* and then *SuperScribe*. If On-Line can get those orders filled during the latter part of June, they'll not only bring traffic and prosperity back to the retailer, they'll be giving *VisiCalc* a real run for its money.

It should be noted during the introduction of proofreading programs to the word processing list that, in the past, *GoodSpell, Magic Words, The Dictionary,* and *Apple Speller* all would have made the list at various times. *Apple Speller* from Sensible Software is currently capturing more than 50 percent of the total market for proofreading programs and appears to have a solid grip on the market.

One other item of note about the word processor market was the reappearance of *PIE*. Last year, *Apple PIE* dominated southern California word processing and was making inroads across the nation when the closure of Programma and the decision to upgrade the product caused it to be yanked from the market. The revised product, brought out by Hayden under the name *PIE Writer*, is just coming into general distribution and is already making its mark.

The Hobby Ten market was truly a depressed area during May. *Bag of Tricks* from Quality wrested the lead from Phoenix's *Zoom Grafix*. Apple owners again showed a definite preference in product in this area during tight-money times. Utilities from Beagle Bros and graphics packages from Penguin

Home 10

This Month	Last Month	
1.	1.	**Home Accountant,** Bob Schoenburg, Larry Grodin, and Steve Pollack, Continental Software
2.	2.	**MasterType,** Bruce Zweig, Lightning Software
3.	5.	**Data Capture 4.0,** David Hughes and George McClelland, Southeastern Software
4.	3.	**Personal Finance Manager,** Jeffrey Gold, Special Delivery Software, Apple Computer
5.	9.	**VisiTerm,** Tom Keith, VisiCorp
6.	10.	**ASCII Express,** Bill Blue, Southwestern Data Systems
7.	4.	**Typing Tutor,** Image Producers, Microsoft
8.	—	**Financial Management System II,** D. R. Jarvis, Computerized Management Systems
9.	—	**Crossword Magic,** Steve and Larry Sherman, L&S Computerware
10.	—	**Real Estate Analyzer,** James Howard, Howard Software

Hobby 10

This Month	Last Month	
1.	2.	**Bag of Tricks,** Don Worth and Pieter Leehner, Quality Software
2.	1.	**Zoom Grafix,** Dav Holle, Phoenix Software
3.	—	**The Complete Graphics System,** Mark Pelezarski, Penguin Software
4.	4.	**Utility City,** Bert Kersey, Beagle Bros
5.	6.	**DOS Boss,** Bert Kersey and Jaek Cassidy, Beagle Bros
6.	—	**The Graphics Magician,** Chris Joehumson, David Lubar, and Mark Pelezarski, Penguin Software
7.	—	**Super Disk Copy III,** Chuck Hartley, Sensible Software
8.	—	**Special Effects,** Mark Pelezarksi, Penguin Software
9.	8.	**DOS 3.3,** Apple Computer
10.	—	**Locksmith 4.0,** Omega Microware
	—	**Alpha Plot,** Bert Kersey and Jaek Cassidy, Beagle Bros



Softalk Presents The Bestsellers

practically own this segment of the market.

Home Accountant continued as the unchallenged leader of the Home Ten list, although its sales tailed off considerably from the previous month, when it had risen to second on the Top Thirty. Nevertheless, it has a comfortable lead over its competition in the home finance field.

MasterType continues to widen its lead over *Typing Tutor*, and *Data Capture 4.0* continues well in front of the other communications packages. A total newcomer to the Home Ten list was *Crossword Magic*, from L&S Computerware, another product that seemed to hold up better in the depressed market.

All the specialty entertainment lists saw some shake-up. Of course, *Knight of Diamonds* went to the head of the Fantasy Five class with *Wizardry* dropping to second. *Apventure to Atlantis* held on to third with *Ultima* tailing off to fourth. *Crush, Crumble and Chomp* from Automated Simulations was fifth.

Among adventure games, *Deadline* accomplished what most observers believed was the impossible: A text adventure outsold the leading graphics adventure. *Kabul Spy*, last month's leader, dropped to third; *Time Zone* rose to second.

Castle Wolfenstein continues to dominate the Strategy Five listing with *Flight Simulator* second and *Sargon II* third. *Flight Simulator*, for the first time, appears to have a challenger. *Air-Sim-1*, another piloting simulation, made fourth. *Rendezvous*, a space simulation from EduWare, is also making a concerted run in the marketplace.

But right now the market belongs to Sir-tech; they're selling what they're shipping and that's an example a lot of other publishers would love to follow. ■

Apple-franchised retail stores representing approximately 6.8 percent of all sales of Apples and Apple-related products volunteered to participate in the poll.

Respondents were contacted early in June to ascertain their sales leaders for the month of May.

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 June 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.

Probability of statistical error is plus-or-minus 4.1 percent, which translates roughly into the theoretical possibility of a change of 3.17 points, plus or minus, in any index number.



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The Top Thirty

This Month	Last Month	Index	
1.	1.	133.32	**VisiCalc,** Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
2.	—	99.70	**Knight of Diamonds,** Andrew Greenberg and Robert Woodhead, Sir-tech
3.	3.	62.50	**Snack Attack,** Dan Illowsky, DataMost
4.	4.	60.71	**Wizardry,** Andrew Greenberg and Robert Woodhead, Sir-tech
5.	9.	58.63	**A2-PB1 Pinball: Night Mission,** Bruce Artwick, SubLogic
6.	8.	55.06	**Star Blazer,** Tony Suzuki, Broderbund Software
7.	5.	52.68	**Personal Filing System,** John Page, Software Publishing Corporation
8.	7.	51.19	**DB Master,** Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
9.	6.	48.81	**Apple Writer II,** Paul Lutus, Apple Computer
10.	2.	45.24	**Home Accountant,** Bob Schoenburg, Larry Grodin, and Steve Pollack, Continental Software
11.	—	40.18	**Choplifter,** Dan Gorlin, Broderbund Software
12.	19.	30.65	**Swashbuckler,** Paul Stephenson, DataMost
13.	—	26.78	**Cannonball Blitz,** Olaf Lubeck, On-Line Systems
	12.	26.78	**PFS: Report,** John Page, Software Publishing Corporation
15.	11.	26.49	**Castle Wolfenstein,** Silas Warner, Muse
16.	20.	25.30	**Taxman,** Brian Fitzgerald, H.A.L. Labs
17.	—	23.21	**Deadline,** Infocom
18.	17.	22.02	**Bag of Tricks,** Don Worth and Pieter Lechner, Quality Software
19.	13.	19.94	**VisiTrend/VisiPlot,** Micro Finance Systems/Mitch Kapor, VisiCorp
20.	24.	19.64	**David's Midnight Magic,** David Snider, Broderbund Software
21.	17.	19.34	**MasterType,** Bruce Zweig, Lightning Software
22.	15.	18.15	**Apple Panic,** Ben Serki, Broderbund Software
23.	—	17.86	**Time Zone,** Roberta and Ken Williams, On-Line Systems
24.	25.	17.26	**BPI General Ledger,** John Moss and Ken Debower, Apple Computer
25.	25.	16.96	**Kabul Spy,** Tim Wilson, Sirius Software
26.	—	16.39	**Zork II,** Infocom
	—	16.39	**Jawbreaker,** Olaf Lubeck, On-Line Systems
28.	13.	15.77	**Zoom Grafix,** Dav Holle, Phoenix Software
29.	—	15.48	**Magic Window,** Gary Shannon and Bill Depew, Artsci
30.	—	14.58	**Data Capture 4.0,** David Hughes and George McClelland, Southeastern Software

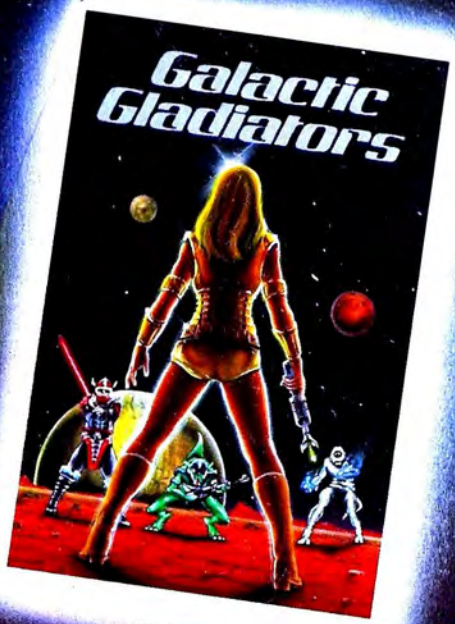


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