SOFTALK

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Robots!



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Computers at Folsom

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SOFTALK

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September Song. . . . Business, business, business. . . . Exec Hayes Microcomputing: . . . Premiering a tutorial with a difference: Business Basic for the Apple III. . . . Introduction to Stock Market Programs. . . . The Applesoft Compilers: after a long wait, a plethora . . . and more . . .

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SUBSCRIPTIONS: Complimentary to all owners of Apple computers in the USA. If you own an Apple but you're not receiving *Softalk*, send your name, address, and Apple serial number with a request for subscription to Softalk Circulation, 11021 Magnolia Boulevard, North Hollywood, CA 91601. *Softalk* is totally independent of Apple Computer Inc.; sending your Apple warranty card to Apple Computer will not inform *Softalk* of your existence. Non-Apple-owner subscriptions for one year: $12. For the convenience of businesses and schools in which several staff members share an Apple and would like individual copies of *Softalk*, multiple subscriptions to the same address are available at lower rates: two through five, $9 each; more than five, $7 each.

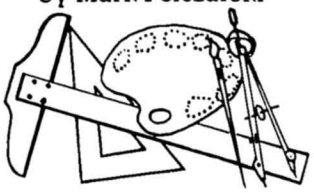
BACK ISSUES: $2 through February 1981; $2.50 thereafter. November and December 1980 issues are sold out. January and March 1981 issues are in short supply. *Softalk* will send you a back issue of your choice free (available issues only) for the name, address, and serial number of each Apple owner you can find who isn't already receiving *Softalk*.

PROBLEMS? If you haven't received your *Softalk* by the 10th of the month or if you have other problems with your subscription, Ron Rennells or Kimberly Curling can help out. Call (213) 980-5099.

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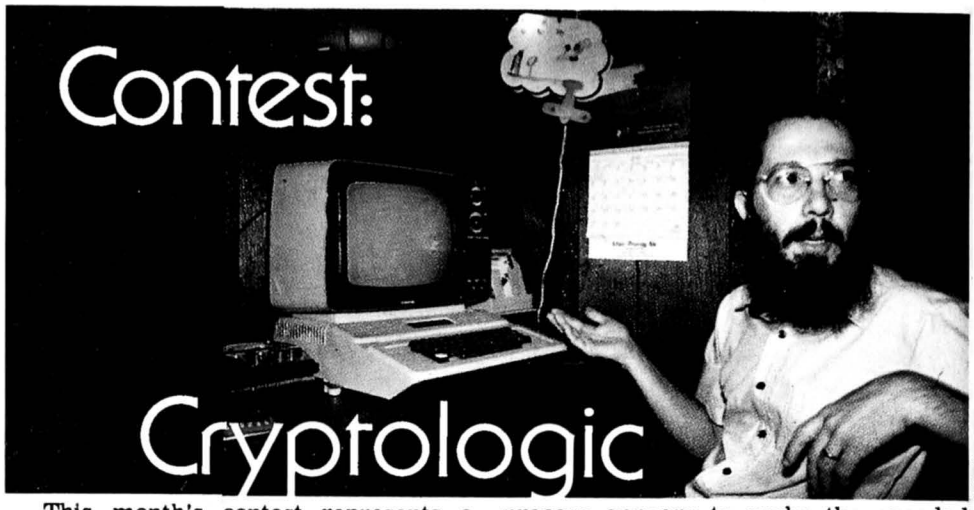
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Softalk photo

This month's contest represents a challenge by software developer Dann McCreary to the entire Apple community. McCreary has offered his 48K Apple and his disk drive with controller card to anyone who can decipher the encoded SuperCrypt message.

The message was encoded using McCreary's newly developed *Absolute Security* system, an encoding process that he avers is unbreakable.

Should McCreary prove correct, his program has interesting implications for industry and for the Apple market. As the requirement for transmission of data over public utility communications networks increases, so does the demand that the information be at least reasonably secure from unauthorized persons.

McCreary's system presumably provided total security. Using it, theoretically it would be possible to transmit the most sensitive conceivable industrial and financial data without fear. Companies could transmit data between far-flung divisions, auditors could share information gleaned at various locations, lawyers could plan legal strategy for important cases.

Having an intelligent terminal such as the Apple makes it all possible.

Softalk cannot be encouraging about your chances of winning McCreary's Apple. We have taken possession of the decoded message to ensure fairness in judging, but the nature of the encoding process appears to make the encoded message itself foolproof. For that reason, there's a second contest, LittleCrypt, right after this one, that's definitely solvable.

SuperCrypt. If you can decode the following message, you win McCreary's Apple and disk drive:

```
YS(7^!="^LYF5N%I?1ITX8)Y!*IHT%9:;))8CE
[BI3E[3_64\S$_9^!+W_!]+(@E&.'FX>I&5203
2M34N?2J724+GYNO> N?2SO<9I-??)>4[^'IFA
X9I_69CD-UF5F5[W@[Y^@Z#GP9X/'XO\ !(#91
,'.]/Z3X@M6"94S 2V+7NSEIR?7\XGS&PBX;FF
!;+Z3&>6%RZT9"O(>;4?!3X2J.8JI"6LZ*:93E
%FL:MW@GO"^!UZU*)?"/N;<=G_:@L3.@/J-&E1
H-7Y^JZKV6_<GRAG4:=C^BIPO?RO#,'%<)I40
CXVM/=M?B)RD\HOXJ_O_:,##"RC+0;!I22[,A3
/T&_UX1;"/W6S.\NFMSTI-#2<XZX#_(*+C6A
WL?_SJJEF+T<-O.A*J"[D>MAA&\&^9M7JV2010
&'1R@@JSO8RK.SS8;J8(@?+L,RK_ZJB)>@T+F7
+Y!RCWIYB%R/8.I$0HO,_-ET/;4J:)G'I#+E7C
JOJ!\=5X_BG$O!\R9TD3\Y_+XT&EMW@<;L.?B0
?99PAO'="2UO^Z3Z/'-6;N++PO!*M=$2+^5J75
'R,_A)"4&&GN\02M7N2NO$B+S_/3:'MUYX_#E5
ELGOFN_+'S.3GI?ZHF,FZEO D8084H.H%BRA5F
",L:FS'%*>K-S_,3>F_?=1TDO>J+4MR>X-BE
SK!HH:._3R62+9T7DWDAV4_>=#2IY- FHXK$9C
/R1'UC*.9P(>RGH#77!';@B5*2*FE#C'LW350D
D'*#G0(F@.(XHH#JDI1M16C"ZKXDAX#%(PKEC1
5_#ZXMMZW&7@.U<N&CC>ZYO_5@/""I)<-.XC43
+W>OYT<N&Y.1NT:%*:RE+HIIOP-6Y7FX2B#"FD
_+D1VU_PE""M!JR>+L8;J*X(A4L3WJT"K^:8C3
[B!;7A>2U1*G:0+J"!K(9Z/M"9GWZ%GF_DUXO5
8F*7S7*6S_^CEO:ZT*TWD>UG#P^#\ZIFI"$9F
M8=_8C.PF=KE8BA2:K#W1X&H%3?\*BJ<&OO)C3
E1DI"LV)2*D:IAVM3DKWD*!G^JY9Y%:A1MH&31
:OE=TM:V$2+U%KXZUJ1N^!BINURLC[OK5V?+C7
C_7L-6WCMKO?.\O>P'00%@$8MV74X&J%?9:ZF6
$_?7_@R'+<AY/9)W!N/&LHPY-0=3_2!FY3Z!8O
I$'_IT2WGOZ^L1[<HG)OB#TO^<D=@[Y6^Z9A1
^1.<)DV.EEW[:5A'5&4FL-FAD#_U)3DP:_K?C2
2ZPH9(JO"NF9USC^M5W14\@)PK7%A)BSH"6223
(0_\5D))X:4D$!Z>X9J<M+#@A%\F=R"G(1L'BB
H3Z^W87N_\J/CRRJM7-D*PBJVNA-^L*E96L=98
FOV")IX&33?[TUUFF5PIEPONS<YMTB=W1U4MEF
DM/H4.G^5OAE95R^TC1ZIG1#9/FZ-S=52LCJ67
M_\_-5*-1D$GUO3C9#[\ED<L&EAE/_TW/ZC1
'3Z&"A6%=[RTZLN7^7JLVCH_"Y3P<JI_MF.&55
FODE3@17010U=6P210TO<5FIN'>O'R*1+6S26
!3IZ55L@.J=/"9M(\'_!?66=6%V.8UVMN8X$AA
##.6V67IML?P)8W0&L=)RG^WL+T<HB50"1G%06
?2_J7*U0;G-NO.+47=!<OK<WX64>&N*<X?[FEB
0@#.W%D'TA#-##NGKU_?"F_TUC#E(4.>J\6/BD
.4_XV/AL5;!D9RVY1+"F=.,"C/O*:(F'V_W\P9D
=+^K*$4@='CIN)'&*MDC@WM26_0D_#2RF9_F7A
?*IZ@UZZ4H.1?L3TQV1H^^G;CRJE]CJ'?7V0C9
```

On the Cover: *Contemplating a Byte,* an airbrush painting by Robert Anthony Zraick.

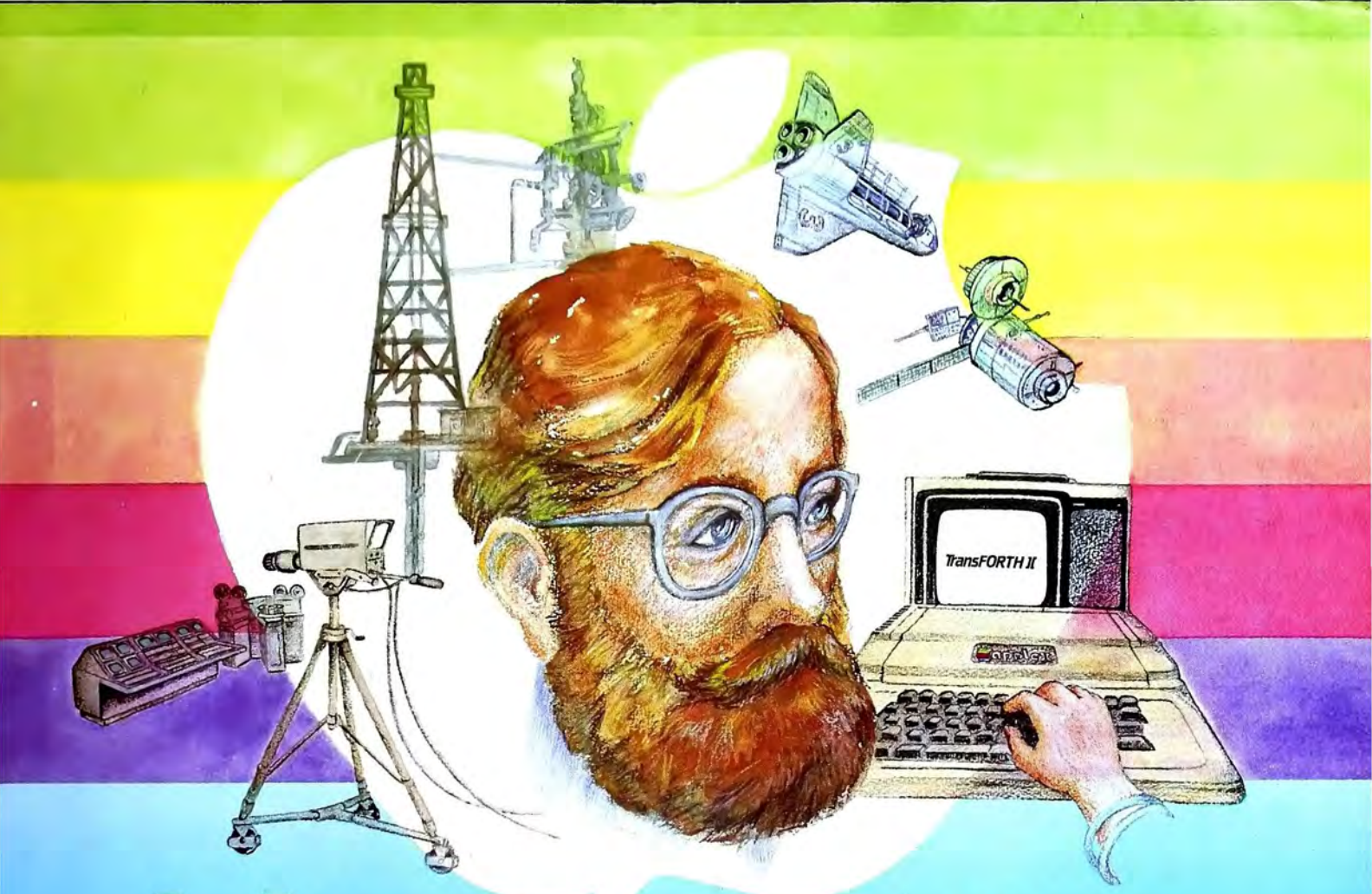
About the Artist: Robert Zraick is a freelance designer and creative consultant in southern California. Known for the whimsical quality in his art, he has done creative work for McDonald's, for motion pictures, and for live shows and special effects projects. Whimsy is a special quality in Zraick, who once spent two years as a clown with Ringling Brothers Circus.

Softalk's first nonphotographic cover was a labor of love for Zraick, who became an Apple computer owner after writing, producing, and directing a computer controlled attraction for the Universal Studios Tour in Los Angeles.

The show, called "The Battle of Galactica" (based on the Universal production of almost the same name), makes use of robots, lasers, explosions, and other special effects choreographed by Zraick into a live sci-fi experience for tour visitors. At the heart of the system was an Apple. Zraick got his first hands-on experience while creating the firmware for the show and has been hooked ever since.

"I'm particularly interested in the application of computer technology to the creation of art and entertainment," says Zraick. "So many of my interests—robots, Apples, sci-fi, art, entertainment—all seem to focus in this one work of art."

Softalk is releasing Zraick's cover painting in poster form. Zraick personally oversaw the printing to ensure the highest quality reproductions. Information about ordering the poster appears on page 89.



In Language Lies The Future.

Paul Lutus creates language. Language for the future.

From him we have Apple Writer, Apple World and MusiComp. His software was used by the Viking Mars Lander team and other advanced space programs.

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- Cursor based screen editor
- Upper and lower case text entry
- Nested macro instructions
- Local, global and universal labels
- Comprehensive error trapping

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Important: The last two characters of each line are a checksum, not part of the message.

McCreary is so confident of the unbreakability of his encryption that he has provided the plain text version of the third line of the coded message. That he dares to do this should be a clue that there's more here than a simple substitution code. The plain text third line is:

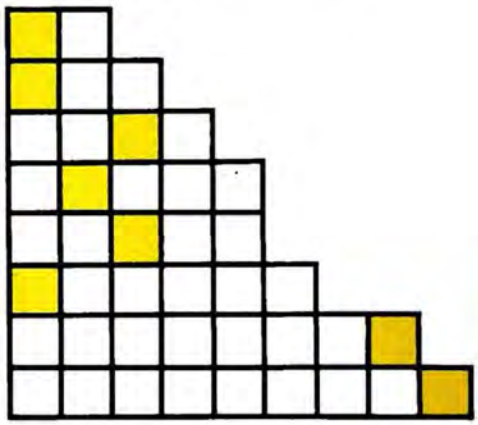
WORDS-AND OBSCURE SAYINGS
RUN THROUG

Rules:

1. By whatever means make sense to you, attempt to decode the above message. Deadline for entries is September 15, 1981.
2. The plain text version is known only to Dann McCreary, although *Softalk* has possession of a sealed pouch with the answer enclosed. The plain text is comprehensible and recognizable English. If your decryption fits that description, mail it to Softalk Apple, 11021 Magnolia Boulevard, North Hollywood, CA 91601.
3. If your answer matches exactly that contained in *Softalk*'s pouch, you'll win McCreary's Apple. If your efforts show that you had a reasonable start, you'll earn a copy of *Absolute Security.*

LittleCrypt. Because SuperCrypt is theoretically impossible, here's a more normal *Softalk* contest. To keep the flavor, it's a cryptogram. Hopefully, you'll have to work at it, but this one's definitely solvable.

8RUQK 3WG9J EKQ5Q YQ48Q
JEJQ0 9Z39J W9Z9Y QE7W3
EQ00Z 3D9K0 7534W 5Y362
97ZED 345Q8 JZ6YQ F3G33
JDQZZ 3EJ94 5Y34J W083W



Rules:

1. The message is in a substitution cipher. Each alphabet letter has been replaced consistently with a different character. Word spaces have been ignored and the characters have been regrouped into blocks of five characters. Determine which letter was used as a substitute in each instance and decode the sentence.
2. Some of the words in the decoded sentence fit into the word blocks below the message. Where more than one word from the sentence would fit in a word block, work back and forth to figure out which one is right.
3. One box in each word block is shaded. Unscramble the letters you've inserted in the shaded boxes to arrive at a one-word solution to the puzzle.
4. Deadline is September 15, 1981. Mail to Softalk Code, 11021 Magnolia Boulevard, North Hollywood, CA 91601.
5. Winner will receive $100 worth of products sold by advertisers in this issue. In case of a tie, winner will be determined by Apple's random number generator.

☐ Check here if you're entering Supercrypt, and attach your answer.

LittleCrypt Code: _____
Decoded sentence: _____
_____
Final word: _____
Name: _____
Address: _____
City: _____
State: _____ Zip: _____
Telephone: _____
My local retailer is: _____
My autograph: _____



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GORGON is here...

THE EARTH HAS ENTERED A TIME WARP . . . AND THE BATTLE HAS JUST BEGUN

Sirius Software, Inc. 2011 Arden Way, #225A, Sacramento, CA (916) 920-1939

OPEN DISCUSSION

There, But for the Grace . . .

The June issue just arrived, and while reading it, I came across Paul Wilson's letter. To an Apple owner it made enjoyable reading, although if it were to be read by owners of other brands of computers it would probably not. And I'm sure that in that case there would be rebuttals aplenty, some making valid points and stressing the positive aspects of whatever machine the letter writers possessed.

While reading this letter—so like many I've read in various publications—I couldn't help wondering what makes Apple owners such rabid fans. Of course one explanation is the undeniable excellence of design and implementation that the Apple enjoys.

But another possible reason occurred to me. Despite the comparatively small price required of one who wishes to own a computer in the eighties, it is still a major investment. Particularly so if the computer is bought to indulge an interest or further a hobby. And back issues of such magazines as *Byte* graphically describe the thicket of machines through which the prospective buyer has (or had) to forge in order to find the Apple.

I think that among Apple owners there exists the same sort of psychology as can be found among survivors of a shipwreck. The enormous relief at having made the right choice (when so many others have not) cannot help but produce the sort of partisan feeling that Mr. Wilson's letter shows.

Yes, TRSers and PETters, you've got some wonderful machines, but, God am I glad I bought an Apple!

Bob Crafts, Edgartown, MA

After Softalk's Own Heart

By the way, though for some dumb reason I seem to be in the minority (at least it looks that way from reading Open Discussion), I'm quite pleased with the tone and content of your reviews. I agree with you that there seems to be an excess of negativism floating around. I think that your reviewers do an excellent job of pointing out both strengths and weaknesses of the various products.

H. Arden Tohill, Jr., Bloomington, IL

Thanks!

Interface Unnecessary

To Annette Herron, Troy, New York: In last month's issue of *Softalk*, you asked for information on how to use the Apple to process data from Sweda cash registers. My advice is to forget the Swedas and use your Apple as the cash register. We at Rainbow Computing have been using the Apple in our retail store for three years as a cash register with a program we sell called *Cashmaster*. It works. Call me—I'll tell you more.

Vivian Richman, Rainbow Computing, Northridge, CA

In Search of Simple Software

The talk among the people who do know seems to point to simpler programming for the pure user as the key.

Most people who want the pleasure and profit of a computer are still out yonder, afraid of Pascal, Basic, Applesoft, etc.

The microcomputer is in the Model-T era of its potential, we users still must get out and crank the darn thing.

To a good programmer it may look easy, a task that any twelve-year-old should be able to do. Henry Ford had the smarts in building his auto, for everything was made for mass usage and intelligence.

Small businesses cannot hire a full-time computer expert nor can a household user.

I've had my Apple in use over one year now doing primarily an inventory control of over six thousand items. I have one person without any computer skill

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FOR ANY APPLE II* WITH 48K AND DISK

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(702) 647-2673
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EPOCH

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SNEAKERS

Get ready for unending variety and fun as you stomp the Sneakers, Saucers, Fangs, H-Wings, Meteors, Scrambles, and Scrubs. Sneakers offers five levels of difficulty and awards bonus points to perfect players. Written by Mark Turmell. Requires an Apple II or II+ with 48K and one disk drive. Suggested retail is $29.95.

THE PASCAL GRAPHICS EDITOR

A complete editing package for creating fonts, pictures, and partial images within the Apple Pascal environment. Includes powerful utilities for use in your own programs for drawing ellipses, triangles, parallelograms, moving or saving blocks, and loading of pictures to disk or to an array. This package is for the professional who needs advanced editing of graphics and the ability to define character sets of various styles and sizes. PGE will be available August, 1981 from your local computer dealer. Suggested retail is $114.95.

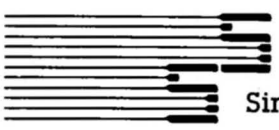
GAMMA GOBLINS

A "bloody" good game for the true-blue game freak. A real heart stopper! Your mission is an exploratory operation, code name BLUE. Your purpose is to deliver whole blood to Hemophilia, a city in the sky, and return to Anemia base. This beautifully designed arcade game has unusual depth as swarms of Gamma Goblins attack, wave after wave. Written by Tony and Benny Ngo. Requires an Apple II or II+ computer with 48K and one disk drive. Suggested retail is $29.95.

ORBITRON

You are in the center of an orbiting space station protected by a revolving force shield. You must fight off enemy forces which attempt to place killer satellites in orbit around your station. Orbitron has seven levels of play and many chances to score bonus points. Requires an Apple II or II+ with 48K and one disk drive. Suggested retail is $29.95.

Contact your local computer dealer for more information. Dealer inquiries invited (916) 920-1939



Sirius Software, Inc. 2011 Arden Way, #225A, Sacramento, CA 95825

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running it. I also purchased a payroll program that still refuses to cooperate totally. This made me very careful in buying other programs.

I finally did buy *PFS*, made by Software Publishing. I struck gold with this program. This type of program is like the electric starter to me. It makes life and computer operation easy. The manual talks to me in plain language as does the program itself. I can create, using minimum knowledge. This one program could and should sell any real estate office an Apple computer. I immediately ordered the second part to *PFS, PFS: Report.*

So maybe the answer to mass appeal and usage is not easier program language but rather easier usage by those who prefer to be pure users. This would mean simpler language yet more complex programs to allow the user to do what *PFS* allows.

I don't attempt to repair my own car and I don't really care how it works, just so long as it does work. Can't the computer be treated the same way?
Lee Bandle, Palm Desert, CA

In Support of Apple Inc.
It is not too often that a reader comes to the defense of a corporation, but I feel I must comment on some of the remarks made by Mr. J. Rothenberg in the Open Discussion section of *Softalk*, June 1981.

Mr. Rothenberg, along with others, implies that the Apple factory is unresponsive to the needs of their customers. Now that Apple has gone Wall Street, has lavish advertisements in national magazines, and sends out catalogs extolling Apple T-shirts, drinking glasses, and puzzles, many feel it is the rich kid on the block, who has forgotten his humble origins.

My experience with the Apple corporation does not support this. I have corresponded with their people in the executive suite, engineering, and the parts department, and they have been responsive and helpful in an efficient, timely manner. Where problems did exist, a solution or rational, reasonable explanation was offered. When, for example, I wrote describing the frustrations encountered in attempting to get parts and chips from the local dealers, prompt assistance was offered.

The rapid growth of the company may have caused problems for both the organization and its customers. However, the people I have contacted at the factory have always willingly offered advice, assistance, and have backed up their product when I told them I was getting nowhere with their first line of defense, the dealer. My interest is in computer languages; the first version of Apple Pascal had bugs, and Apple Fortran has some real problems (not only my opinion, but that of one of the company engineers I contacted). When asked why Apple marketed a "defective" product, he told me of some of the personnel problems the company was having in attracting competent technical people, and also, incidentally, provided me with information that fixed the problem but had not yet had time to be disseminated. And so on!

Mr. Rothenberg reports on "scuttlebutt" from Computerland regarding Apple personnel problems. Within thirty minutes of my home, there are six dealers selling Apple IIs. Within the past two months I have required parts to fix some problems that developed in my unit: a key that bounced, a defective chip in location C2, and a burned-out power light. None of the parts were in stock at Computerland, nor was an offer made to obtain them. All the parts, with the exception of the power-on light were "second sourced" (the key switch was obtained from an Apple that had been irrevocably thermalized). I'm still waiting for the power-on light and may wait a little longer before I visit Radio Shack or look in Allied Radio's industrial catalog.

One of Apple's managers, in a letter dated February 26, 1981, responded to the problems I was having with their dealers and expressed "empathy for [my] situation." The letter went on to state further, "Languages, compilers, develop-



ment environments remain mysterious problems to most of our dealers . . . they cannot fully support the knowledgeable customer. . . ." Toward the end of the letter, "We are trying to resolve the dealer situation through additional information, etc., but it will obviously take a lot of time."

Apple has a problem with its dealers, and the company's original plan, to place a good deal of reliance on them for after-sales service by offering them hefty profit margins, may not have been as successful as they thought it would be. Many times, I fear their advice, "If you have a problem with your Apple, take it to your dealer," could be a well-intentioned means of invoking disaster. With but one or two exceptions, most appear to be "Mom and Pop" franchises, probably undercapitalized, or at least unwilling to maintain a reasonable inventory of parts, and marginal on the knowledge side when it comes to knowing more than putting the disk controller card in slot 6.

This is a problem that Apple is going to have to solve if it is to sustain its growth. Factory service should be made available to those who are unable to obtain service or experience unsatisfactory service from the local dealership. The availability of quality, efficient, timely service should be a primary factor in the choice of what computer to buy! Not too many people smart enough to use a computer effectively would even pay $100 for an IBM 360 if they were not assured of ongoing, competent service (unless they wanted a whole bunch of parts).

When the dealer starts knocking the factory and gossips about personnel problems the factory may be having, I would immediately move to another dealer. Mr. Rothenberg's problems could better be solved by writing to Apple than by wasting his time listening to Computerland's nonconstructive scuttlebutt. At least, that's been my experience.
Albert Weinshelbaum, M.D., Danville, CA

On Beginners' Corner
Just wanted to drop you a note to thank you for your publication. I truly appreciate it and look forward to each issue as a new Apple owner. I was particularly pleased with the very basic but refreshingly understandable article by Craig Stinson (Beginners' Corner). Keep up the good work.
Harold Carter, Encino, CA

Your June 1981 issue included an article by Craig Stinson entitled Beginners' Corner. While I found it of general interest, much of the material duplicates that in the newer Apple II manuals.

A more serious concern is Mr. Stinson's discussion of booting a diskette, in which he advises the novice to first power on, wait for the in-use light to come on, and then after the disk is turning, to insert the diskette. The *Apple DOS Manual* makes quite a point of saying *never* remove a diskette while the disk drive is active. One would presume the same advice applies to inserting diskettes. Speaking as a slightly mature beginner, my advice to anyone is *gently* insert the diskette, close the latch door, and *only then* initiate any I/O operation (catalog, init, boot, read, load, save, etc.). If a running disk drive won't stop turning, open the latch cover to raise the heads off the diskette surface, hit reset or power off the Apple II to get the drive to shut off, and then gently remove the diskette. If there is any question about the integrity of the data on a diskette, it's a good idea to use the DOS 3.3 *FID* utility to verify all the files on the diskette.

I look forward to Mr. Stinson's future columns, but I hope he will take more care about technical details.
Thomas N. Burt, Irvine, CA

Although we usually recommend following the Apple manuals to the letter, we disagree on this point. So, incidentally, does the Apple Language System Installation and Operating Manual. *If you insert an off-center disk and then try to boot it, not only will the disk not boot, but you may put some stress on the disk because the head will not be properly fitted into the hub when it stars to spin. But, if you first let the drive start spinning, then lower the spinning head into the disk hub, the mechanism will align the disk as it descends into the hub. Incidentally, the disk is actually read from the bottom, the underside of the disk is the side with the good stuff on it.*

Also, in our experience, we've never known anyone to harm a disk by inserting it with the drive on. We assume, of course, that people will treat software with a certain amount of care and won't yank a disk out at a forty-five-degree angle relative to the plane of the drive. Removing a disk while the Apple is actually writing a file to it destroys the file, but, otherwise, evenly removing a disk while the drive is going is also harmless.

In general, we'd like to encourage you to be respectful of your equipment but not afraid of it. ()

In Defense of Us All
I was stunned after reading your comment, "These owners usually are happy by the end of six months' ownership to be able to key in a program provided from a magazine or newsletter," in the April 1981 issue of *Softalk* in the article, "A Self-Taught Programmer Insures His Future." Talk about low blows! Are Apple owners really that stupid? Are they that ignorant to the art of programming?

I have yet to see an Apple owner who has not playfully dabbled around with Basic; or someone who has not made a program that plots randomly colored dots at random locations. Although I do

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not work full-time, which is the class of people you were referring to, I feel that I speak for all Apple owners when I say, "Give me a break, I do know how this machine works."
Tom Spidell, Milwaukee, WI

Softalk *certainly had no intention of calling Apple owners stupid or ignorant. There are many highly intelligent people whose interest centers on something other than programming; they buy their Apples as tools to aid them in whatever work or hobby commands their concentrated interest. Although such people almost always dabble enough to program simple things, they seldom have any intention of learning to program well enough to create an equivalent of* Gorgon *or their own word processor. Such people may well be perfectly satisfied with being able to key in programs from given listings; it saves them money on software, yet they need not take the time from their primary interests to do complex programming themselves.*

It is a matter of interest and priorities, not intelligence.

Securing Commodities Colleagues

In connection with my work as a management consultant to the securities industry, I am in the process of compiling for publication a list of microcomputer-based systems that have been industry registered representatives. Included will be systems that range from the specific (e.g., trading or technical analysis) all the way to the comprehensive (e.g. maintaining complete customer portfolios); and from individual programs to complete turnkey (software and hardware) offerings.

I would like to hear from anyone who is selling software packages for the securities/commodities salesman, as well as any end users of such software.

Please send correspondence to me at: 38 East Curlis Avenue, Pennington, NJ 08534.
H. Pim Goodbody, Jr., Pennington, NJ

Willing To Help

I am an older science teacher, high school level; I utilize the Apple in my classroom and I own an Apple. I would like to contact someone or a group in New Jersey that helps handicapped people, introducing them to the Apple. I am interested in volunteering my services.
V. Hall, Hasbrouck Heights, NJ

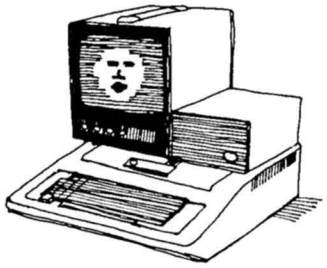
The Errors of Our Ways

The Foundation for the Advancement of Computer-Aided Education, which was profiled in the May 1981 Softalk, *was founded by Apple but is now an independent nonprofit organization, which, according to foundation administrator Peggy Redpath, "welcomes contributions from all sources." Whatever it is, it's big business with more boards than* Softalk *was evidently able to keep straight. To amend our article, the technical advisory board, which is the primary body evaluating proposals, has the opportunity to reevaluate proposals not recommended by the staff. The board of directors may choose not to fund a project recommended by the advisory board but doesn't have the opportunity to see rejected ones. In addition, what we called a panel discussion is actually a "round table type of discussion." Worst of all, we drowned in the figures. Here are the correct figures, according to Redpath: "The foundation has received 783 proposals to date, of which 110 have been funded. . . . The foundation has just made its fifth cycle of grant awards, approving 22 for funding." The foundation will be accepting proposals for the sixth cycle until August 6.*

Regarding another faux pas: Given the activity and intentions expressed at print time, we believed that the Telephone Software Connection in Torrance, California, would be compatible with the Micronet modem from Micromate Electronics by the time the June 1981 issue got to our readers. Unfortunately, the best laid plans went awry and Micronet owners cannot deal with the Telephone Software Connection via their modems at this time. We still think it was a good idea and will let you know if the connection is made in the future. ■

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THE BASIC Solution

By Wm. V. R. Smith

Last month's Basic Solution created a handy program that simulated a paper-tape calculator. Many of you ran into a little problem when you first executed the program. Line 190 as printed in the issue caused a system error.

Congratulations to those of you who solved the problem; removing the line was not the proper solution. Here is the way line 190 should read:

```
190 IF C > 47 AND C < 58 THEN 700
```

It seems our proofreaders flunk Basic 1.

This month's Basic Solution will overcome a few drawbacks caused by the disk operating system (DOS).

DOS is an amazing animal; it attaches itself to Basic and uses Basic's INPUT and PRINT commands for its own purposes. But this little trick causes a few programming problems.

The INPUT command is used by DOS when a text file is being read. Because DOS is operating in this manner, keyboard input cannot be performed without a routine that PEEKs at the keyboard. This problem is not disastrous; however, it does cause an inconvenience.

This pair of subroutines turns DOS off and back on again in such a manner that DOS never knows it happened. DOS becomes totally disconnected, which means no DOS command will work. But the INPUT and PRINT commands will function just as they would with no DOS.

Another use for these subroutines is suspending printer output while printing information on the video screen. The printer will never know that anything has happened. You can have your printer stop—right in the middle of a line, if you like—by calling the OFF subroutine. All print commands will go to the video screen until the ON subroutine is called. Then your printer will pick up right where it left off—and continue printing the rest of that line.

Your comments and solutions to problems are welcome always. If your solution is printed, you'll receive a ten-dollar credit toward any purchase at your local computer store. Mail your input to Softalk Basic Solution, 11021 Magnolia Boulevard, North Hollywood, CA 91601.

```
8000 REM***************
8001 REM*
8002 REM* TURN DOS OFF
8003 REM*
8004 REM***************
8010 IF D4=240 THEN RETURN
8020 D4=PEEK(54) : D5=PEEK(55)
8030 D6=PEEK(56) : D7=PEEK(57)
8040 POKE 54,240 : POKE 55,253
8050 POKE 56,27 : POKE 57,253
8060 RETURN
8100 REM***************
8101 REM*
8012 REM* TURN DOS ON
8103 REM*
8104 REM***************
8110 POKE 54,D4 : POKE 55,D5
8120 POKE 56,D6 : POKE 57,D7
8130 RETURN
```


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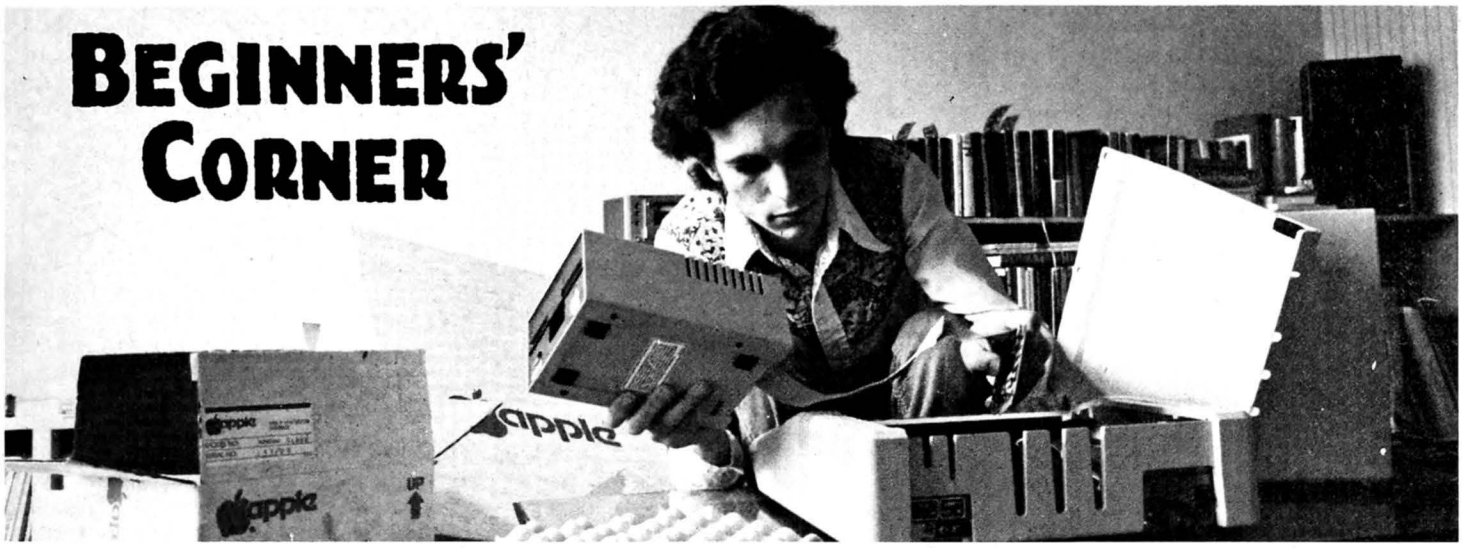
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BEGINNERS' CORNER



BY CRAIG STINSON

This month's column is a lesson in gross anatomy, with a bit of physiology thrown in. We're going to take a rambling tour of the inner Apple and point out some of the major hardware components of the system.

Certain safety precautions must be observed in the anatomy lab, of course. Since we'll be exploring the inside of the computer, you should either make sure the power is off or swear to obey the cardinal law: thou shalt insert or remove no electronic component whilst the power is on. Also, you should clear coffee cups, liquids, ashtrays, and any other potential contaminants away from the immediate vicinity of the machine.

That warning about having the power off while you insert or remove things is something you're going to be reading ad nauseam for as long as you own your computer. You'll often find it in capital letters, boldface type, or both, screaming at you from the pages of product manuals. Since you'll read it so often, you'll learn to tune it out in self-defense. And, if you're like the rest of us, some day when you're tired, harried, or otherwise not all there, you may do something embarrassing like pulling out a printer card with the power on.

If you should happen to do that, you'll probably do some damage to your computer, but the damage will not be fatal. Interestingly, the part that gets injured may be remote from the site of your misdemeanor. It may be a chip on another board or, perhaps, a memory chip. But, in any case, rearranging the machine without first turning off the power is an easy and annoying mistake to make, and that's why the books scream at you.

Probably another reason for the screaming is that, aside from obvious things like using the Apple for a coffee urn, pulling out a component with the juice on is probably the commonest way people injure their computers. Certainly there are some other creative ways to do it, but the point is that your Apple is a pretty sturdy device; you need to be respectful, but not fearful, of it.

Now that we've got warnings out of the way—and the power is off—push up on the back corners of your Apple and slide the top back and off. Next to that large rectangular object (the power supply) you'll see a green board studded with black objects. The board is known as the main board, or motherboard, of your Apple, and those black things are called integrated circuits, or chips.

At the back of the board are eight expansion slots. The general purpose of the slots is to allow your computer to communicate with various kinds of external or peripheral devices.

Certain conventions apply to the use of the slots. One that you probably already know is that slot six is generally used for the card that controls your first two disk drives. If you have more than two drives, the additional controller cards go in adjacent slots, working downward, i.e., the second controller goes in five, the third in four, and so on. Actually, any slot but zero can be used for a disk controller, so, if you wanted, you could outfit your Apple with as many as fourteen disk drives.

Slot zero is used either for an Integer card, an Applesoft card, the Apple language system, or another language card. The Integer and Applesoft cards provide the alternate Basic dialect to Apple II Pluses and standard Apple IIs, respectively. The language system offers the alternate Basic plus another programming language called Pascal. It also gives the Apple additional memory.

Slot one is usually used for cards that communicate with printers.

The remaining slots can house various other peripherals, such as modems, which allow your Apple to talk to other computers over the phone; cards that modify your video display so that you get eighty characters on a line instead of forty; and clocks, which perform all sorts of timekeeping functions, permitting you to program the Apple to do your bidding at specific times of the day.

GLOSSARY

bit—the smallest unit of data in a computer. A bit can be in either of two states; the computer reads one state as zero, the other as one.

byte—eight bits.

K—abbreviation for kilobyte.

kilobyte—1,024 bytes.

main board—the green circuit board that occupies most of the floor of your Apple.

microprocessor—the place where your computer computes. The microprocessor is functionally analogous to the central processing unit of larger computing systems. Your Apple's microprocessor is a 6502.

modem—a device that allows one computer to communicate with another over telephone lines.

Monitor—short for System Monitor. The Monitor is a program that oversees and controls the operations of the computer. It's also a tool that allows the user to inspect and/or alter the contents of RAM.

motherboard—synonym for main board.

RAM—Random Access Memory. This is the working area of your Apple, where instructions and data get stored during execution of a program. It's called random access because the microprocessor can get to any part of it directly, without having to read through it in order. Information stored in RAM is lost when the computer is turned off.

ROM—Read Only Memory—memory that can be altered only by changing the physical structure of the chip. ROM chips (called ROMs) are usually used to store information that's essential to the operation of the computer. Anything that the computer needs to know as soon as the power comes on, it will usually find in ROM.

6502—Your Apple's microprocessor. The 6502 is the large chip oriented perpendicular to the rest of the chips on the main board.



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**APPLE][is a registered trade mark of Apple Computer Inc.
Hardware requirements: 2 disk drives, DOS 3.3, APPLE][48K, 132-col. printer and Applesoft in ROM.

If you have game paddles hooked up, you'll see that they're connected just to the right and slightly in front of slot seven. This site, outlined in white on the motherboard, is called the game I/O port (the I/O stands for input/output). A number of other devices made for the Apple also plug into this spot.

There is an exception to the cardinal law stated above. You can attach or disconnect game paddles while the power is running. Just be careful not to dislodge the controller card.

Directly in front of slots three, four, and five is a large chip oriented perpendicular to the rest of the chips on the motherboard. That's the 6502—the boss chip of your Apple. The 6502 is one of those little miracles of the electronic age, a microprocessor.

The 6502 is the functional analog of the central processing unit on a mini or mainframe computer. It's the place where programs are executed. The 6502 will perform more than five hundred thousand elementary arithmetic operations per second.

The 6502 can be described as the brain and spinal cord of the Apple, except for one important point: the microprocessor has no memory. Most of the rest of the main board is devoted to two kinds of memory chips: ROM and RAM.

The first of these acronymns stands for Read-Only Memory. These are the big guys that occupy row F, directly in front of the 6502. Most Apples have six of them (not counting other ROMs on circuit boards).

Read-Only Memory has two distinguishing characteristics. First, it is nonvolatile; information stored in ROM is still there after you turn the power off. Second, it's unalterable; you can't change the contents of a ROM, without physically altering the chip. Hence the name—a ROM is meant to be read, but not written to.

The Apple uses ROMs to store instructions that it will need as soon as the power is turned on. For example, if you have an Apple II Plus, the coding required to interpret Applesoft Basic is stored in a ROM.

The Apple II—both standard and Plus—also contains a number of ROM-resident routines known collectively as the Monitor (not to be confused with your video monitor). The Monitor is a control program that oversees operation of the computer. It provides various diagnostic capabilities and other tools for machine language programming.

Chances are, the more you learn about your Apple, the more interested you'll be in the Monitor. But even while you're a beginner, you need to know one or two things about it. For example, if you should ever happen to hit the wrong key at the wrong time while running a program, it's possible that the program will quit and you'll find yourself looking at an asterisk near the bottom of the screen. The asterisk is the prompt that tells you you're in the Monitor.

If that happens, probably the first thing you'll want to know, reasonably enough, is how to get back out of the Monitor and get your program running again. We'll answer that question, but, first, let's fool around with the Monitor for a moment, just for the fun of it.

If you have a standard Apple II, you should get the asterisk as soon as you turn on the machine. If you're working with a Plus, turn on the machine and hit reset (up there in the corner, above return). That will put you in Applesoft. Type CALL -151 return, and you'll be in the Monitor.

Now type F840.F87F and return. Your computer responds with a cryptic display of letters and numbers. What it's showing you is the contents of sixty-four bytes of memory. What's a byte? We'll come to that in a bit.

Now try F832G and return. Like magic, your screen fills with black "at" signs on a white background. Type FC58G and return and, just as magically, the screen clears. Now type 3D0G Return (that's a zero after the D). Aha! Back to Basic.

One more experiment: get back to the Monitor by again typing CALL -151. This time, after you set the asterisk, type Control-B return. Basic again, but with a difference. The difference is that if you have

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Requires 48K Apple II with Applesoft in ROM or Apple III and one DOS 3.3 drive. (Apple II, Apple III and Applesoft are trademarks of Apple Computer Inc.)

arrived in the Monitor by accident, from a faulty program or an errant keystroke, 3D0G will take you back to Basic, and your program and other data will usually be intact. Control-B return will get you out of the Monitor, but will also clear your program and data from memory.*

Speaking of memory, the other kind of memory, RAM, is located within that large white square directly in front of the ROMs. RAM stands for Random Access Memory. Read-Write Memory would have been a more descriptive term, but RWM is hard to say, unless you're Welsh.

Random Access Memory, unlike Read-Only Memory, is both alterable and volatile. You can put whatever you like there, but it's gone as soon as you turn off your machine. RAM is the working area of the computer; when you load a program from disk into the computer, both the program instructions and any data used or generated by the program get stored in RAM.

Notice that the chips within the white square on your motherboard are organized in rows of eight. You may have one, two, or three rows of chips, depending on how much memory your machine has. You've probably seen the terms 16K, 32K, and 48K applied to different kinds of Apples. The K in these expressions stands for *kilobyte;* how many K you have is a measure of how much information you can store in RAM.

Knowing that a kilowatt is a thousand watts and a kilometer is five eighths of a mile, you might presume that a kilobyte is a thousand bytes (whatever they are). You would be close, but not on the money. Those ever devious computer folk have dodged the obvious once again: a kilobyte is 1,024 bytes.

The significance of 1,024 is that it is two raised to the power of ten, or two multiplied by itself ten times. The computer, for all its alleged intelligence, only knows how to handle two digits—zero and one. So, for a computer, a nice round number is one that's an exact power of two, like two, four, eight, sixteen, or thirty-two. 1,024 is that kind of number.

Your Apple's RAM is like a huge array of electrical switches. Each switch can be in either of two states, on or off. The computer reads one state as zero, the other as one, and it is the particular constellation of zeros and ones at any given moment that determines both the information and the instructions in the computer's memory.

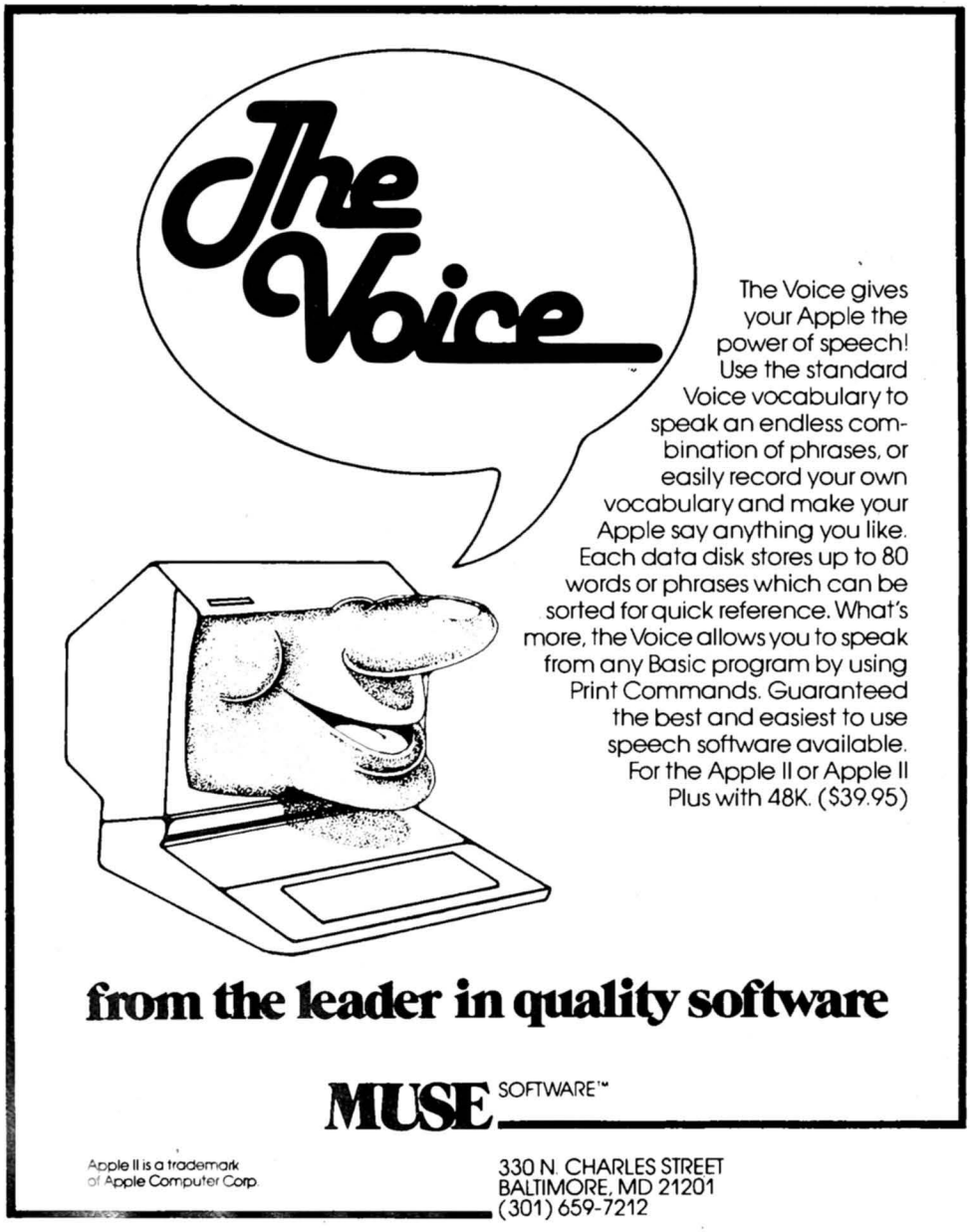
The smallest unit of information in this scheme is the individual switch, and this unit is called a *bit.* When the 6502 inspects the contents of RAM, it looks at eight bits at a time. Eight bits make up a unit called a *byte.*

Now back to gross anatomy for a moment. There's significance to the fact that the RAM chips are organized in rows of eight. Each row of chips holds 16K (16,384 bytes) of information. Whenever the 6502 wants to get a byte of information, it reads one bit from each of eight adjacent chips. It's for this reason that the random access memory of the Apple can only be expanded in increments of 16K. Half a row of chips would be useless to the computer since it cannot get a full byte from an unfilled row.

Still another important kind of memory available to the Apple is the floppy disk. Like RAM, the disk is a form of random-access, read-write memory. Its contents can be altered easily by the user. Unlike RAM, however, disk storage is nonvolatile. That's the primary purpose of disk storage; you can take your disk out of the drive and stick it on the shelf, and, and if you haven't sprayed it with malathion in the meantime, your data should still be there in six months.

We were going to talk in this article about disks in general and that other common three-letter acronymn, DOS, but we have rambled to the end of our allotted space. We'll save those topics for the next installment. ■

*Control-B may also erase from memory some of the instructions that the computer needs in order to get material from or write material to disk. Loss of these instructions could conceivably have dangerous consequences, possibly including damage to your disk, so you'd do well to avoid Control-B. 3D0G's a little harder to remember, but safer.



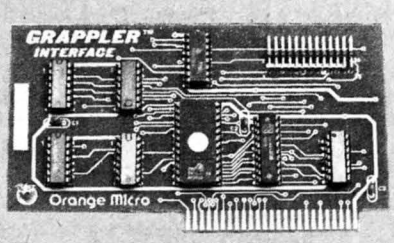
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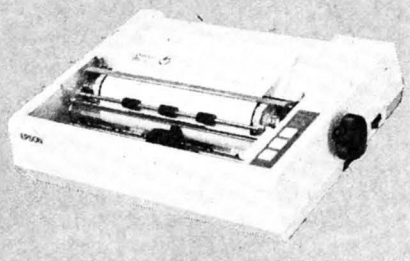
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MARKETALK News



Unless otherwise noted, all Marketalk News products can be assumed to run on both the Apple II and the Apple II Plus and to require 48K and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card.

☐ *Video Loom,* from **Laurel Software** (Boulder, CO), uses six colors and hi-res graphics to create television pictures that look like woven textiles. Program can be used to teach principles of weaving and textile design and allows weavers to select looms with as many as seventy harnesses. Other design options include colors, yarn sizes, treadling order, and pattern; all are controlled with key commands. Requires color monitor. 32K, $49.95 plus $3.50 postage.

☐ *Pegasus,* a data base management system written in UCSD Pascal, is the debut offering from **Shakti Systems** (Schaumburg, IL). User-friendly program allows maximum room in memory by paging data and program code in and out of memory. All data is sorted upon entry, speeding up access and reports. Requires language card. $195.

☐ **MicroStand** (Tolovana Park, OR), has revised its sturdy steel shelf for Apple by adding side vents to permit air flow, keeping Apple running cool. Shelf holds computer, two disk drives, and monitor. $39.95 plus $5 postage. Company also offers copy stand in Apple beige. $15.95.

☐ *The Physicians Desktop Computer Letter,* a six-page monthly featuring news, reviews, and users' evaluations of software designed for physicians and medical office managers, is available from **Information Research,** 10367 Paw Paw Lake Drive, Mattawan, MI 49071. Newsletter debuts a column on the Apple in its August issue. Yearly subscription $68.

☐ *Micro TSP* (Stanford, CA), a time series data base system that holds 24K of data in RAM, is a set of tools for statistical analysis on time series data. Merges disk files for combining time series in RAM for special applications. Does linear regressions on up to thirty-two independent variables by techniques of ordinary least squares and two-stage least squares—with or without correction for serial correlation. Regression output includes coefficient estimates, their standard errors and T statistics, plus summary statistics including R-squared, standard error of regression, Durbin-Watson statistics, and F statistics. $250.

☐ **Microproducts** (Palos Verdes, CA) announces the *6502 Development System,* a hardware/software system for development of 6502 code. Text editor for entry and maintenance of 6502 assembler text files allows auto line numbering, linking multiple text files with forward and backward pointers, forty-character and eighty-character print commands; assembler processes 6502 op-codes designated by MOS Technology plus pseudo-op-codes; disassembler disassembles and produces text files compatible with assembler; symbolic debugger executes program step-by-step, displaying instructions with registers and values. Disk, $125; on five EPROMs for Applesoft or Integer card, $320; on five EPROMs with bank switchable ROM card, $395; on five EPROMs in socket adaptor (plugs into Apple ROM sockets) $299.95. Company's *Apple II EPROM Programmer,* expands ROM software, adding Basic capability. Can be plugged into motherboard with EPROM socket adaptor and will program Intel 2716s, and other five-volt replacements for 2716. Programmer also adds to or replaces existing ROM software with operating systems of your own design. $99.95. EPROM socket adaptor, $14.95. 12K *EPROM ROM Memory Module* runs in any Apple slot and holds up to six 2716 EPROMs or 2316E ROMs. Switching type and number of devices used is controlled by onboard dip switches. $99.95. *Data Acquisition and Distribution Board* contains two eight-bit fifteen-microsecond resolution time analog-to-digital channels and two eight-bit two-microsecond settling time digital-to-analog channels. Bipolar and unipolar reference level changes are dip switch selectable for both input and output. Program requires no wait loops in Basic. Board runs in any Apple slot, allowing multiple boards to convert the Apple to a cost-effective industrial process control device. Comes with a sample four-voice music synthesis program. $249.95.

☐ *Epoch,* by Larry Miller from **Sirius Software** (Sacramento, CA), pits you and your single cruiser against time and relentless enemy in space. 3-D, hi-res, full color, real-time. Paddles optional. $34.95.

☐ Evaluate loans and investments with *Creative Financing* by **Howard Software Services** (La Jolla, CA). Package produces numerous printouts on depreciation schedules and projected profitability of investments. Complete with detailed instructions. $150.

☐ Absolutely no programming knowledge required with educational software just released from **Avant-Garde Creations** (Eugene, OR). The *ZES* system of computer aided instruction, from Zenith Coaching in Australia, has a complete menu driven system for creating lessons in any subject. Includes student record keeping system. *ZES* consists of four disks, plus 130-page manual. $250. *Courseware Modules,* another addition, can be used alone or in conjunction with the *ZES.* Modules cover specific topics and includes hi-res graphics, animation, and student monitoring. Subjects range from *Poetry to the Heart.* $29.95 each. Also from Avant-Garde comes *Block Shapes for Applesoft* or *Assembly.* Create and animate all types of shapes. Shape editing, shape drawing, music tone routines, violin sounds, noise creation are included. Three disks, 200-page documentation. $99.95.

☐ Librarians and media center personnel might enjoy *Small Computers in the Libraries,* a monthly newsletter emphasizing Apple applications in library science. Published by the University of Arizona Graduate Library School (Tucson, AZ), newsletter serves as a clearinghouse for information relevant to librarians, including reviews of books and programs. Year's subscription, $20.

☐ **Software Publishing Corporation** (Palo Alto, CA), whose *Personal Filing System* has graced the *Softalk* Top Thirty, announces *PFS: Report,* with which you can generate custom tabular reports from your *PFS* files, unrestricted by design limits. Program is a set of software problem-solving tools for nonprogrammers who need presentation-quality reports—with headings, totals, averages, counts, calculations. $95.

☐ **ATE Associates** (Northridge, CA) announces one-day seminars in microcomputer design testability. Developed for design engineers, senior test engineers, and engineering managers, course shows why traditional methods fail and how a specific strategy—diagnostic analysis—implements total board self-stimulation and stable measurement access by inexpensive passive instruments to ensure rapid diagnosis. Seminars at ATE's Microcomputer Systems Division headquarters in Redondo Beach, California, will begin in September. Companies may hire ATE to give course in-house to five to twenty students. Contact Terry Benson at ATE.

☐ **Gryphon Microproducts** (Silver Spring, MD) introduces *PUP I,* a user-friendly Pascal utility package. *PUP I* moves Integer, Applesoft, text, and binary files to Pascal disks; allows Pascal wildcards, and produces listings of Pascal text files in forty-column or eighty-column format. Automatic dating is optional with Mountain clock. $29.95.

☐ **Versa Computing** (Newbury Park, CA) announces *E Z*

Port, a peripheral that extends the I/O port to the outside of the Apple for quick, easy changeover from game paddles to joystick to whatever you plug into your game port. *E Z Port* adheres to the side of the Apple with a foam adhesive strip; a twenty-four-inch cable connects to the game I/O inside. ZIP—Zero Insertion Pressure—socket helps pin connectors last longer because no pressure is exerted within socket until ZIP's cam lever is engaged. $24.95.

☐ *Digital Counter Handbook*, a paperback primer by engineer/educator Louis E. Franzel, Jr., is claimed to be a comprehensive data source for everyone who uses electronic or mechanical digital counters. From **Sams Books** (Indianapolis, IN), book explains how counters work, from elementary flip-flop and gate counters to calculator and microprocessor counters. Discussions of specs, error sources, interfaces, and making test hookups are included. $10.95.

☐ **Mint Software** (Baton Rouge, LA) introduces *Super Apple Textwriter*, which allows *Apple Writer*, *Super Text*, and *SuperScribe* users to convert files generated under any of these word processors into files accessible by the other two. Also makes standard text files accessible by either *Apple Writer* or *SuperText*. (*SuperScribe* does this on its own.) $49.95.

☐ New from **Micro-Media** (Arlington Heights, IL): *Spellbound*, a spelling and usage drill for primary and secondary school students. Program prompts with a sentence containing a misspelled or misused word. Challenge is to find and fix seventy-five errors in each of three drills. May be altered to quiz vocabulary, agreement, and tense sequence. $19.95. *Gradekeeper*, a teacher's data base for class lists and grades, automatically updates averages after entries and allows user to check one student's standing or the standings of the whole class. $19.95. *Proportional Text Formatter* program produces proportionally spaced printing from *Apple Writer* on Centronics 737 or 739 printers. $39.95. *Generic Rate* calculates estimated equipment failure rates by converting *Military Handbook 217C* generic part failure rates to a concise, simplified program. Useful in estimating failure rates before equipment is designed. $19.95.

☐ **Edu-Ware** (Canoga Park, CA) releases *Spelling Bee* for children in kindergarten through third grade. Program is designed to develop computer literacy at an early age while building basic spelling skills. *Spelling Bee* features hi-res graphics, musical sound effects, and illustrated children's guidebook. System generator allows parent or teacher to tailor program to individual child's needs. $29.95.

☐ The **Biomation Operation** of **Gould Incorporated's Instrument Division** (Santa Clara, CA) announces the *K101-D Logic Analyzer*, which offers software designers comprehensive monitoring of time and data plus interpretative features that unravel snags and subtle hardware errors. Machine can clock data at rates up to 100 MHz into forty-eight input channels. K101-D also features simultaneous time and data domain troubleshooting. Twelve input clocks allow designer to address any multiplexed or multiphase clocked system. Unique trace control (triggering) feature, which can work on as many as sixteen levels, tailors machine for sophisticated debugging. Available in September. $23,500.

☐ **Computer Station** (Saint Louis, MO) will unveil the *Dithertizer II* at the Midwest Computer Show, October 16 through 19, in Chicago. Dithertizer II is a frame grabber, DMA type, binary video digitizer for the Apple. Company has expanded its line of graphics packages for printers with an *Enhanced Graphics* software driver for Centronics 739 printers. Eight printing options dump contents of hi-res page to printer. *Apple Plot* users can obtain hard copy of business plots and any graphics that can be loaded to the hi-res page of the Apple. Similar packages are available for Silentype and Paper Tiger printers. $44.95.

☐ *Fast Facts*, from **Richard Lorance and Associates** (Phoenix, AZ), assists financial counselors in analyzing personal financial status and investment planning needs for clients seeking advice in retirement planning, college funding, diversifying investments, borrowing money, and assessing the impact of inflation on earnings. Also helps calculate compounding and future values of investments. Key feature is speed; many planning sequences can be completed in less than a minute. $95.

☐ **Charles Mann and Associates** (Yucca Valley, CA) announces *Project Manager*, designed for managers of construction and engineering projects. Program allows development or analysis of bids; preparation and update of budget; entry, update, and tabulation of costs-to-date; and financial report preparation. System also has special midproject evaluation elements to estimate completion costs. Requires eighty-column printer for hard copy. 32K, ROM Applesoft. $94.95.

☐ **Advanced Business Technology** (Saratoga, CA) offers ABT *Padlegs*, a walnut-finished stand for KeyPad or SoftKey, which holds unit at same height and angle as the Apple. Padlegs are weighted with rubber feet to prevent movement and can be personalized with brass engraving plate. $29.95.

☐ **Broderbund Software**'s (Eugene, OR) payroll program handles as many as three hundred employees, fifteen divisions, and thirty deduction types. According to Broderbund, program computes federal, state, and local income taxes for all fifty states. With printer, program generates checks, check registers, W-2 forms, and quarterly and summary reports. Requires two disk drives, sixteen blank disks. $395.

☐ Available September 1 from **Amdek** (Arlington Heighs, IL) is the *Video-300* green phosphor monitor, which features nonglare display and resolution of 1000 television lines (center) and 800 (corner). Twelve-inch monitor weighs in at seventeen pounds and is cased in a compact plastic cabinet. Appropriate for word processing and other close work. $249.

☐ **Rainbow Computing** (Northridge, CA) has reworked *Write-On!*, their word processor, for the Apple III. Designed to be easy to learn and use, program features single keystroke margin setting, merging of predefined data files, such as mailing lists and price schedules, with text files, such as form letters. Program can read, edit, and print text files created by other programs. 96K. $249. Rainbow also debuts *Pro-Paddle*, featur-

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ing compact, sturdy metal construction, finger-grip dials, and large rectangular buttons. Paddles were designed and built by Computer Works (Harrisonburg, VA) for high accuracy movement. $39.95.

☐ **Southern California Research Group** (Goleta, CA) offers *Paddle Adapple*, a game I/O, port adapter, which allows user to select between any two devices for the game I/O, such as joysticks, light pens, and paddles, by moving a switch. Four pushbutton inputs allow up to four players to use game controllers—paddles and pushbuttons—simultaneously. Paddle Adapple can also be configured to meet specific needs, for example, inverting the X and Y axes. $29.95.

☐ **Dilithium Press's** (Beaverton, OR) book, *Thirty-Two Basic Programs for the Apple Computer*, includes practical applications, educational programs, games, and graphics—all fully documented. Authors Tom Rugg and Phil Feldman say programs are bug free: programs can also be adapted by making changes the authors suggest. $17.95.

☐ **Queue** (Fairfield, CT) offers an updated directory of educational software and software publishers for Apple and other micros, cataloguing hundreds of programs by subject matter and grade level. $8.95.

☐ **Paul Purdom and Company** (San Francisco, CA) presents DataMaster, a functional modular furniture and accessory system intended to customize the data processing environment for maximum efficiency. Oak or walnut modules feature knock-out wiring ports to keep power cables out of sight. Line includes printer, monitor, and desk-size stands; and CRT turntables. Work stations feature locking storage cabinets. Unit prices vary.

☐ **United Detector Technology** (Culver City, CA) introduces *Op-Eye*, a hi-res device that detects and indicates positions of reflective or self-luminous objects for Apple applications in robotics, production line, or machinery control. Op-Eye is high-speed with better than 5 KHz information rate. Adding a second Op-Eye head allows measurement of three-dimensional coordinates. $1,500.

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*Applesoft is a registered trademark of Apple Computers, Inc.

☐ **SSM Microcomputer Products** (San Jose, CA) announces a parallel input/output board that allows users to interface eight-bit parallel devices to the Apple. The *APIO* board provides sixteen bidirectional data lines; direction of the data lines is under software control. Onboard firmware in PROM is supplied to operate a Centronics printer and to provide a slot-independent routine for running the *APIO* in any Apple slot, using standard PR command. Assembled, $109; kit, $79.

☐ **Avalon Hill** (Baltimore, MD) introduces *Computer Major League Baseball*, and they promise it won't go on strike! Game almost plays itself; contains statistics of every major league player for every big league club. Re-create an entire season, championship series, and a world series. Play with a friend or play both sides with computer doing all the bookkeeping. Cassette, 32K, $25; disk, 48K, $30.

☐ **High Technology Software Products** (Oklahoma City, OK) eases the difficulty of converting data in *Transit*, a utility program. *Transit* converts almost any Apple II data file into an Information Master file, which can be sorted, searched, appended, and manipulated in many other ways. $50; purchased with *Information Master*, $189.

☐ **Design Technology** (Baltimore, MD) offers a new concept in computer furniture. *Design Line One Microcomputer Home and Office Play and Work Station* comes ready to assemble. Bi-level design has 28-inch-high computer level for typing and 35-inch-high monitor desk for viewing. Comes in easy-to-clean oak-grained or white veneer. Optional accessories include recessed task lighting and a disk file drawer. $185.

☐ Three strategy games come from **CE Software** (Des Moines, IA). Outwit storm troopers, robots, and mindless drones in *Mission Escape!* Up to nine players buy and sell stocks in *Wall Street.* Players of CE's *Swordthrust* will welcome wandering through a castle spotting clues and analyzing evidence in *The Case of the Sultan's Pearl*, the fourth adventure in Donald Brown's *SwordThrust* series. $24.95 each.

☐ **Educational Courseware** (Westport, CT) offers *Teacher Crate*, a series of question-and-answer programs designed to aid junior and senior high school teachers in creating and implementing lessons in spelling, history, biology, chemistry, astronomy, and computer programming. $24 to $32.

☐ **Qume Corporation** (San Jose, CA) has readied three models of their *Sprint 9* daisywheel printing terminal. Direct-drive mechanism meets high standard of print accuracy. Dupont-designed belt and pulley drive mechanism lessens printer chassis tension and increases life of parts. *935* model is a limited function, RCV-only terminal that prints thirty-five characters per second. $1,995. With interactive KSR time-sharing capability, *935* model is $2,095. Faster full control models, the *945* and *955*, can interface with minis as well as Apples. $2455 and $2555 respectively.

☐ *DUAL DOS ROMS* from **Soft CTRL Systems** (West Milford, NJ) saves effort of booting from one DOS to another, Utility plugs into Romplus or Andromeda ROMBoard, embedding both ROMs in memory. CALL command toggles between either DOS according to your requirements. DOS toggling doesn't affect any programs in memory. Message at lower right of screen tells you which DOS is being used. Utility can't be used for booting 3.2 disks. 48K, DOS 3.3. $49.95.

☐ From **Advanced Management Strategies** (Atlanta, GA), *Target* calculates and analyzes past and future business activities with ability to print or display all data entries, report specifications, and calculations for a project. Package is sold through **Westico** (Norwalk, CT). Softcard, two disk drives, 48K, DOS 3.3. $195.

☐ Responding to the demand by amateur radio enthusiasts for the microcomputer, the **Florida Gulf Coast Amateur Radio Council** is encouraging those with microcomputer products and services to attend their Suncoast Convention '81 in Clearwater, Florida, October 3 and 4. For information on booth reservations, write the Florida Gulf Coast Amateur Radio Council, Box 157, Clearwater, FL 33517.

☐ The jobs of serial interface, parallel output interface, and real-time clock/calendar have been combined on *the CPS*

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*requires a 48K, 16-sector disk based APPLE II system

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Multifunction Card by **Mountain Computer** (Scotts Valley, CA). You configure CPS from disk, setting up function parameters that may be changed with keyboard control commands. Serial and parallel output can be used simultaneously from CPS. Separate CPS functions can be assigned to Apple's various slots, into which card does not have to be plugged. Clock/calendar has time capability of from one second to ninety-nine years and is compatible with MCI Apple Clock time-acess programs. Introductory price, $239.

☐ According to **Apple**, you'd have to have a mini to get the mailing list capabilities you can now find on Apple's new *Mail List Manager*. Now, all you need is an Apple III. *List* stores, sorts, edits, and prints mailing labels and phone lists in entirety or selectively by zip, name, or any other data. Disk max is 960 labels, which can be sorted in less than two minutes. Labels can be defined up to six lines per entry and may be sorted on any two of these fields. Further information, however, can be stored with the disk entry for each item and omitted in printing. Disks can be merged to create a single larger mailing list. For printing labels, user can specify label size, number of labels across page, and space between labels. Backup disk included. Apple III, 128K, extra drive. $150.

☐ The worm has turned in the latest game from **Automated Simulations** (Mountain View, CA). In *Crush, Crumble and Chomp,* you play the role of your favorite monster in any of more than a hundred scenarios. You can choose between six man-eating monsters, but you'll always have the same basic need: to satisfy an enormous appetite by eating your opponents. In the meantime, you must battle National Guard tanks, infantry, helicopters, and a team of mad scientists. You also choose your game objective from among five: to destroy as many buildings as possible; to destroy combat units but spare citizens; to eat your way to a new high; to destroy everything in your path; or merely to survive the longest time. If you tire of these, you can create your own monsters. If this all sounds totally weird to you, you are not alone. $29.95.

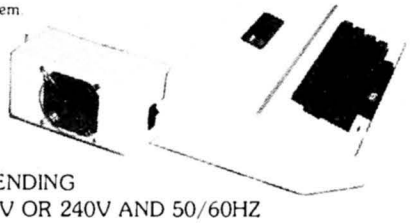


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☐ **Co-Op Software** division of **Micro Co-op** (West Chicago, IL) plans releases of two more software graphics programs late this month. One, *The Complete Graphics System—Tablet Version,* is exactly what the title conveys. The other package, *Apple Graphics Special Effects,* promises new dimensions in graphics, including a 108-color paintbrush and compact supershape tables with a feature that holds diagonal moves when scaled. *Special Effects* will provide for twelve full pictures in RAM simultaneously and for fifty on disk. Program can be used independently or in conjunction with *The Complete Graphics System.* Pricing and machine requirements are not finalized.

☐ **On-Line Systems** (Coarsegold, CA) adds another to its growing list of arcade games with the latest offering from Olaf Lubecke, *Pegasus,* a version of the arcade game *Scrambler.* You manipulate a spaceship bent on destroying an enemy city. To be successful, you must negotiate the scramble defense system, including asteroid belts, flying saucers, and several denominations of space critters out to get you. You must also be fuel conscious, hitting various fuel depots along the way, or you'll end up stranded in space. Paddles or joystick. $29.95.

☐ **International Software Libraries** announces the first operating hard-disk data base for Apple owners. Based on Personal Software's *CCA Data Management System,* the software is compatible with Corvus, Cameo, Lobo, and all other hard disk systems that recognize standard Apple DOS. Users must have a standard copy of *CCA DMS,* but software enhances the basic Apple version with DOS changes to enable accessing across multiple volumes on the hard disk. *Full Screen Mapping,* a data entry, editing, and formatting module which is also available separately for floppy disk users, also enhances the basic package. Exclusive distributor is **Jameson Electronics** (Torrance, CA), which will operate a hotline for user support. Requires original *CCA DMS* software, ROM Applesoft. $250.

☐ *Microsrv Newsletter* from **20th Century Business Systems** (Riverdale, IL) includes technical tips and practical advice to make living with your computer easier.

☐ *Word Juggler,* a word processor for the Apple III computer from **Quark Engineering** (Denver, CO), makes full use of the unique capabilities of the III: upper/lower-case keyboard, eighty-column display, and expanded memory. Use of *Word Juggler* is facilitated by keyboard templates that label command keys, eliminating need to refer to a manual. Editing functions include delete word, delete to end of line and delete to end of paragraph. Prints multiple copies. Supports a variety of printers for bold printing, underlining, superscripting and subscripting. $295.

☐ **S&H Software** (Manvel, ND) offers *Universal Boot Initializer* (UBI). Specialized UBI formatted disks contain End-User programs, or Software House programs can be "customized" or booted "universally" on any Apple II configurations. Provides for two kinds of error messages and loads language card in about two seconds. $40.

☐ **LJK** (Saint Louis, MO), whose *Letter Perfect* word processor since its inception has been configured to work with your choice of the six American eighty-column boards, has recently succeeded in configuring the program to work with the *Vision 80* board from Australia, despite the fact that LJK has yet to see the Vision 80. They did the entire job from Vision 80's documentation. The shot in the dark was shipped via express to one of the two or three Vision 80s presently in the United States, and, voila! success. *Letter Perfect* with the Vision 80 option will be available at least by the time the Vision 80—its debut almost two months overdue at this point—is.

☐ **Phoenix Software** (Lake Zurich, IL), a new software house, offers *Adventure in Time,* a text adventure in the tradition of *Adventure.* Travel through time and space to save the world, using your wits, friendly robots, and a time machine. $29.95.

☐ **Hot Water Will Shrink Anything.** *In June, the program* Computer Discovery *from* **Science Research Associates** *was mentioned as requiring 48K and DOS 3.3. Instead, the program does just fine with 32K, and it comes in DOS 3.2.1.* ◨

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TORPEDO FIRE

By John Lyon from Strategic Simulations
At last! An historically accurate battle simulation combined with realistic 3-d graphics. This game pits a submarine force against an opposing surface convoy. You may command either force when playing against a friend, or try to outwit the computer in solitaire mode. Use sonar, radar, and visual contacts -- including a 3-d periscopic view -- to help plot your strategy. But keep in mind your ships' capabilities or risk losing more than the battle. Most challenging!

Apple II & II Plus, 48K disk (3.2)...$59.95

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From Cavalier Computer
Feature-packed action game. Fire your lasers manually or automatically to clear your way as You maneuver through space avoiding asteroids and aliens. Choose the mode of play that best suits your skill level. If the action gets too heavy, you can always escape to hyperspace! HIRES graphics with super sound effects. The best -- no other "Asteroid-type" program comes close!

Apple II & II Plus, 32K disk (3.2)....$24.95

MISSILE DEFENSE

By Ken & Roberta Williams from On-Line
The Defense Early Warning System has just detected enemy ICBMs. Man your battle stations! Arm your missiles! The attack is on! As the enemy missiles flame into view, it is up to you to save your cities from certain destruction. Aim and fire your three banks of missiles wisely, because when their gone, so are you! Skill, strategy, and speed are required in this fast action game.

Apple II & II Plus, 48K disk $29.95

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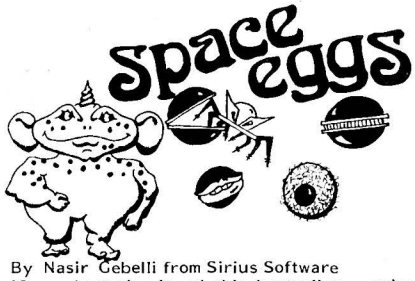
By Douglas Carlston from Broderbund
Take control of the Galactica as you navigate through an uncharted 3-D universe. In "Galactic Empire," you attempt to unify a star system that is randomly created each time you play.

"Galactic Trader" pits your bartering skills against those of the other inhabitants as you try to accumulate riches and power. But watch out for the assassins and the energy cartel -- they're out to getcha!

Diplomacy and deviousness play equal parts in "Galactic Revolution." It's a game that combines tactics, social manipulation, and Machiavellian ruthlessnes. For more intrigue, this game allows more than one player. Sound effects.

COMING SOON: "Tawala's Last Redoubt"

For Apple II & II Plus, 48K disk (DOS 3.2).
(Also available for TRS-80)
Galactic Empire.....$24.95
Galactic Trader.....$24.95
Galactic Revolution..$24.95
Control The Whole Universe -- Get All Three!



By Nasir Gebelli from Sirius Software
If you haven't played this bestseller, you're missing a real challenge -- not to mention a whole lot of fun! The space eggs are descending on your three-stage spacecraft. One shot simply hatches them into spiders, lips, wolves, or fuzzballs. Your next shot better destroy them or they're gonna getcha! Fast & fun.

Apple II & II Plus, 48K disk $29.95

ZORK



By Infocom from Personal Software
In Zork, the Great Underground Empire, unearthly creatures guard 20 treasures. Bring all the treasures back to the trophy case and you can leave alive! You must pick your way through intricate mazes, collecting objects that may help or hinder you in your quest. But keep your wits about you, because in Zork, they take no prisoners!

Apple II or II Plus, 32K disk (3.2) or
TRS-80, 32K Disk...$39.95

CREATURE VENTURE



From Highlands Computer Services
The creepy old mansion you just inherited has come with two extras -- a hidden fortune and a houseful of horrible monsters! Rid the manse of the creatures and the treasure is yours -- if you can find it. Loads of HIRES graphics and animation to illustrate your journey; the rest is up to you!

Apple & II Plus II Plus, 48K disk $24.95

Unbelievable Realtime 3-D Graphics!

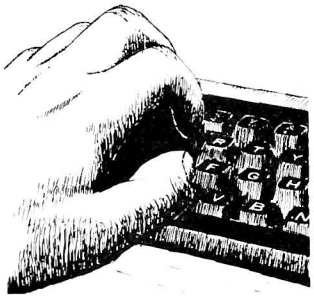
FLIGHT SIMULATION

From Sub-Logic
A graphic tour de force that will truly captivate you. If you haven't seen this brilliant program, you haven't fully utilized the capabilities of your computer! During FLIGHT SIMULATION, you instantly select instrument flight, radar, or a breathtaking pilot's-eye-view. But be sure to strap yourself in -- you're liable to get dizzy!

Once you put in some air time learning to fly your computer head for enemy territory and try to bomb the fuel depot and airstrip while fighting off five enemy warplanes. Good Luck!

Apple II & II Plus 16K tape.....$25.00
Apple II & II Plus 32K disk (3.2).$33.50
TRS-80 16K tape.....$25.00

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By Ainsworth & Baker from Microsoft
Speed up your programming and word processing with this excellent touch-typing instructional program. Divided into two sections, the program first teaches proper finger positioning. You practice keying various characters, the program adding new ones as you progress. In the practice paragraph section, you are evaluated for accuracy and rated in words per minute. The program continuously adjusts to your increasing skill, telling you which characters you miss and where you are slow. One of the most practical programs we know of for personal computers.

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Mind Your Business

BY PETER OLIVIERI



Every organization needs to keep records; records represent current and historical data about the organization and they're a very valuable resource.

Since its historical data forms the foundation from which an organization grows, a company's storehouse of data is often called a data base. Every data base has the same structure because they are all made up of files, records, and fields. For example, the data base of a particular firm might include, as a part of it, a personnel file, within which there would be records. Each record would contain information about a different employee and, within each record, there would be fields. In this data base, the employee's name would be a field.

Application Data Bases. In days gone by, data was organized according to the applications for which it was needed; thus, every application had its own file. But this approach had two built-in problems. Data contained in one file was also contained in another—a waste of time, money, and storage. For example, a bank might have had a file of checking account customers, a file of savings account customers, and a file of customers with mortgage loans. If one customer fit into all three categories, his name, address, and phone number would be present in all three files. This was inefficient from a processing standpoint and resulted in wasted storage. You can imagine the steps that were necessary when a customer's address had to be changed. The change would have to be made in every one of the files that contained that address.

The second major drawback was that, as new applications were developed, the number of these data bases increased. Sometimes they contained new data, and other times they simply contained reformatted data from existing files. This made data management complex and cumbersome.

Data Base Management Systems. Because data is vital to organizations, and because of the problems associated with accessing and using data, it was not long before data base management systems (DBMS) followed computers into the business environment.

Typically, these systems provide the following services:

(1) The DBMS contains a program that allows you to define what the data base should look like. That is, how many records will it contain? How many fields will there be in each record? Will a field contain numeric data or alphabetic data?

(2) After you've defined the data base format, one of the DBMS programs prompts you through the entry of the first set of data—that is, the initial creation of the data base.

(3) Once the data base has been created, you'll start to modify it. Records may have to be deleted and added. A particular field of record may have to be changed. These updates or modifications to the data should be handled by one of the programs in the DBMS package.

(4) Often the DBMS contains a program that allows you to search selectively through the data to extract records meeting certain criteria. For example, you may wish to print a list of all employees over sixty-five.

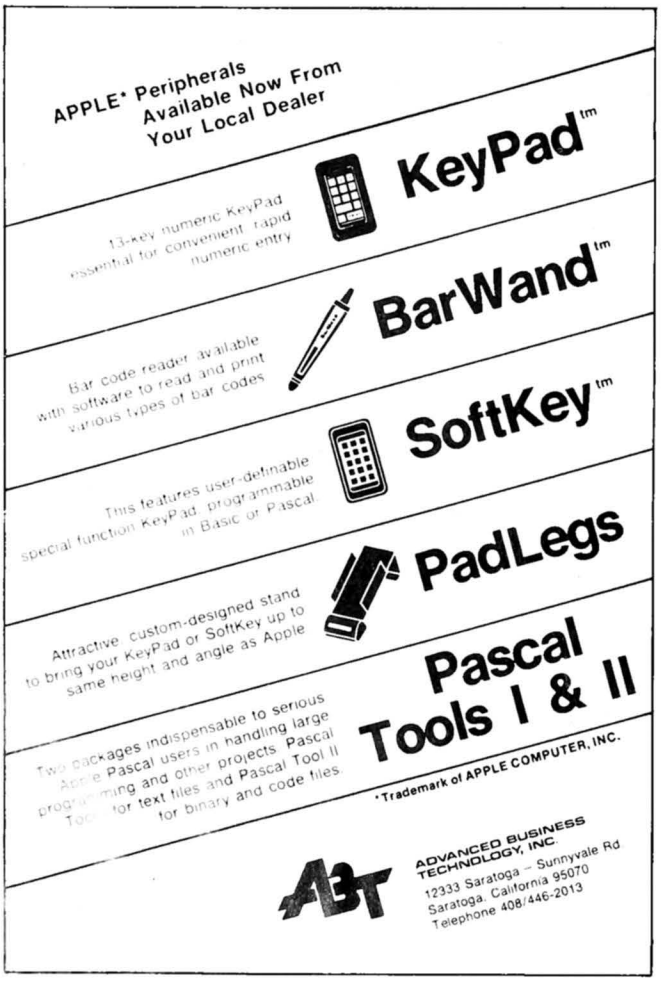
(5) Some DBMS allow the user to design a report form and then select the data to be printed on that form. This often includes the calculation of subtotals and totals for various items in the report. If a DBMS has been well designed, all these services will be accomplished through a conversational mode in which the system explains what has to be done and then guides you through each required step. The success of this approach depends, to a great extent, on the quality of the package and the people responsible for writing the program.

To Each His Own. When you purchase a business software package, it usually requires the use of a data base. Often, the package provides the instructions for creating the data base. For example, an accounts receivable package would create a file containing all the appropriate information to produce accounts receivable reports. In the same fashion, an inventory control package would provide ways to create and manipulate information on all inventory items.

What you want is one data base that can be used for a variety of different applications. It's unlikely that you'll find a single package for all your needs. But try to find packages that allow you to use as few as possible. You may find a product that handles your accounting function quite well but isn't capable of producing a mailing list or a list of employees eligible for retirement. You may find that, if the data base has been well designed, other programs can access the same data.

The market, of course, responds to the desires of those in the marketplace. The popularity of *VisiCalc* has prompted the design of many new packages that are compatible with the way *VisiCalc* creates files, allowing you to tell your DBMS to look at a file created by *VisiCalc* and print out all the values in the file that meet certain criteria. This makes these new packages much more attractive.

Setting Up a Data Base. Regardless of the package you use to create a data base, whether it's a generalized DBMS or one



that deals with a specific application, you need to do some homework before setting it up. A well-designed DBMS can be a valuable asset to an organization, providing timely, reliable, and relevant information to decision makers. Therefore, some care should be taken in advance.

The first step is to identify your organization's data requirements by finding out what reports are needed by each department. Interviews and questionnaires are common ways of gathering this information.

The second step involves determining what application packages are needed by determining what operations have to be performed on the data. Is sorting necessary? Will calculations have to be made? The following form can be useful in gathering this information:

Report Name	What Programs Are Needed for This Report
Report A	Accounting, general ledger
Report B	Mailing labels
Report C	Report writing word processor

The third step is selecting the appropriate package or packages to create the data base and interact with it. This may be a single application package (such as a general ledger program), a general DBMS, or programs that you write yourself. Most likely, it will be a combination of these.

Next month's column will describe how these steps were followed to prepare for DBMS use in an actual business.

A First Look at Some DBMS Packages. I'm now working with and evaluating two DBMS software packages, Personal Software's *CCA Data Management System* and Micro Lab's *Data Factory.*

A difficulty in reviewing software occurs because of progress. By the time a package has been examined and reviewed, the designer has often made several changes to the program. Earlier problems have been corrected and new features have been added. Should this happen to any of the products reviewed here in Mind Your Business, such changes will be described and evaluated in a subsequent column.

My plan for reviewing the current DBMS packages will be this. I'll describe the features of the two systems I've been looking at. Next month, I'll describe the remaining three (or more, if others become available). Also, next month, I'll include in the column a chart that evaluates and rates these packages. In addition, I'll list the three strongest and the three weakest aspects of each package. This way, you should be in a position to make proper choices for your particular needs.

CCA Data Management System. The *CCA Data Management System* was developed by Helmar Ben Herman, Creative Computing Applications, and Colin G. Jameson. It is published and distributed by Personal Software (Sunnyvale, CA). I reviewed the April 1980 Apple II version, which includes an update to version 5.1. It was supplied on a thirteen-sector diskette but included ample instructions for use with DOS 3.3 (sixteen-sector diskettes).

The Data Management System allows the user to create a file of information, add, delete, and update records in that file, search a file for records containing certain data in a particular field, keep a file in order by a field of your choice, print reports from a file, print mailing labels from a file, and write programs to interface with data created by *DMS.*

To use *DMS* you need an Apple II with at least one disk drive (two would be better), disk version 3.2 or 3.3, the Applesoft Basic language, and 32K or 48K, depending on how you have Applesoft Basic in your machine. While a printer is not required for *DMS* it certainly increases the usefulness of the package.

In the package is a user's guide with a detailed instruction section that explains how to start using the programs from scratch, create files, modify records, and print some elementary reports.

The second section of the book describes the package's more advanced features. These include the procedures necessary to include calculations and totals in your reports, the methods for selecting records for ultimate use in these reports, and a discussion of different file organization tech-

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You depend on good software to save you time and to have your computer help you do a job more efficiently. Our software is designed to do just that. We are one of the oldest companies supplying software for the Apple II*, and one of the very few that offers an unconditional guarantee of satisfaction or your money back! Here are a few that you'll want to add to your library:

THE CORRESPONDENT

The Correspondent is an extremely versatile program designed primarily for writing letters and other documents but comes with so many supporting utilities and features that it will be one of your most frequently used diskettes. The screen becomes a window onto a 40 to 80 column page with 4 directional scrolling to see any part of the page just as it will be printed. A special "reading mode" compresses text into a 40 column format for easy proof-reading. Editor functions include full upper/lower case & control character support, character or line insert/delete, paragraph move/copy/delete, forward and reverse tabbing, text centering, file linking and even math functions! Also featured are split screen capabilities, access/edit text files, single disk copy program, and a global find routine for use as a free form database. You can use it for letters, forms, memos, phone lists, etc. **The Correspondent** is easily the best value of performance and price of any similar program.
Price: $44.95 on disk

APPLE-DOC

Apple-Doc is one of the most powerful programming utilities you can own. From the novice to the professional, **Apple-Doc** more than pays for itself in time savings alone! You can change any element throughout the listing almost as easily as changing a single line. **Apple-Doc** includes **Variable Xref** which creates a table of every variable used in a program, every line occurence of the variable, and lets you create your own variable descriptors which can be stored in a separate disk file. **Line Number Xref** creates a table of every line in the program called by a GOTO, GOSUB, etc., and all lines each is called from. Any reference to a line not present is specifically flagged for your attention. **Constant Xref** is similar but documents all numeric constants — great for scientific and business uses. With **Replace** you can easily rename any or all occurrences of any variable making it indispensible for custom programming. Finally, **Lister** creates a professional program listing with top, bottom, & left margins quickly defined. Our all-time best seller!
Price: $34.95 on disk

LIST MASTER

List Master, an excellent companion to **Apple-Doc**, provides a number of utilities for performing large scale changes to your program listing in a high-speed and automatic way. **List Master** includes **Applespeed** which can remove REMarks, shorten variable names, combine lines, and renumbers by 1's in any Applesoft* program. **Smart Renumber** not only renumbers but also gives you the option of preserving logical blocks of line numbers you have established for various routines thereby retaining the original logic and workability in the renumbered program. Also contains merge routines that allow you to quote blocks of lines from one part of the program to another and automatically renumber appropriate line references. **Comp-list** compares any two Applesoft or integer programs and lists any lines added, deleted or changed.
Price: $34.95 on disk

All programs require 48K and Applesoft in ROM or language card. Specify DOS 3.2 or 3.3. California residents add 6% to all prices.

See these and other S.D.S. products at your local dealer, or for more information, write or call:

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niques (such as using the sequential access method or the indexed sequential access method).

The next section is for programmers. Here, you can find out exactly how *DMS* files look on a diskette so that you can write your own programs to access information in these files. One of the nice features is a sample listing of a Basic program that gives you a head start in writing that program.

The manual also lists all the messages you may encounter using the package. Each message is numbered the way it appears on your monitor for easy reference. Some are error messages, but others are simply the questions that *DMS* asks during a session. Following each message, there is a description of the message's meaning, the response you should give (or the action you should take), and, when appropriate, what the result of those actions would be. This section is nicely done and is an aid to novice and professional alike.

The first of the guide's two appendices provides a detailed example of an inventory control application, and the second takes the reader through a *DMS* session that creates a mailing list. Working through these two examples certainly helps in understanding the package.

The final guide section explains how to interface *DMS* and *VisiCalc*. There are several programs provided on the diskette to accomplish this. Obviously, *VisiCalc* users or those contemplating its use will be pleased with this additional feature.

As a wrap-up, here are some brief specifics about *DMS*: (1) each record may have up to twenty-four fields; (2) you may use formulas to calculate the contents of any of these fields (these are called computed fields); (3) a record may be up to 232 characters in length (spread over twenty-four fields)—*DMS* adds seven more characters to each record; (4) the total number of records you can store using *DMS* depends on how much room you have on your diskette. You must calculate how much space you need for your application (record length times the number of records) and compare this to what's left on your diskette (do a catalog, count up the number of used sectors, subtract this number from the total of 403 sectors on a diskette. Finally, multiply this number by 256 to determine how much free space is left).

The Data Factory. *The Data Factory* was developed by William Passauer and is published and distributed by Micro Lab (Highland Park, IL). The version I have was copyrighted in 1981 and is version 4.0.

The Data Factory lets the user create a file, add, delete, and update records, search through the file and select particular records, sort a file, and print specialized reports.

To use *The Data Factory*, you need an Apple with 48K, Applesoft in ROM, and one or two disk drives.

The user's guide provided is carefully indexed to guide the reader through the package. The first section of the manual provides information about defining the characteristics of your file, entering the data, and printing out some of it.

Then the guide describes three methods of changing or updating information in the file: (1) inspect or view a record before deciding whether or not to change it, (2) update certain fields in all or some of the records, and (3) replace a value in one or many records.

One of the features of *The Data Factory* is a procedure, called transfer, that allows you to choose records meeting your chosen criteria for transfer to another file (either a new one or a data base that already exists).

In many data base management systems, once you have described what the data base looks like—how many fields, field names, field lengths, and so on—you must stay with that format forever. Not so with *The Data Factory*. A Construct and Append feature allows you to add up to ten new fields (each time you use this option), decrease the number of fields, change a field length, change a field position, and add records to the file, as well as several other options. It's a powerful tool.

The Data Factory has a math feature that allows you to add, subtract, multiply, or divide one field with another and store the answer in another field. You may also total, average, or count any field.

The guide also covers record selection options, sorting, and using the disk properly. There is a menu item available that calculates the amount of free space on a diskette.

An inventory control application and a mailing label application are provided as samples for the user. The manual concludes with some brief comments on handling errors.

Some brief specifics about *The Data Factory*: (1) each record may contain up to eighty-eight fields, (2) a field may have up to 239 characters in it, and (3) any of these fields may be computed fields.

Letters from Our Readers. "I recently purchased a program package that was on a diskette and the instructions warned me to make a backup copy immediately. Since I had paid $125 for the package and did not want to have to buy a new one, I followed their instructions and made the copy. What I was wondering is this. I have about twenty-five other diskettes that I use off and one. Would you recommend that I make backup copies of these also? At $3.50 to $5 a diskette, it would begin to amount to a lot of money."
J. N. Los Angeles, CA

My recommendation is to make backup copies of everything that's important to you. This requires some investment in the cost of the diskettes, but the cost of re-creating information of programs lost because of bad diskettes often far surpasses the cost of the backup copy. However, there are other strategies. The strategy you adopt is somewhat dependent on what's on your diskettes. Let's look at some possibilities.

(1) If the diskette contains a program or set of programs you purchased from a vendor, back it up if you can.

Sometimes, the vendor has protected the diskette so you're not able to make a copy of it. In these cases, the vendor usually agrees to replace diskettes that are damaged in exchange for the originals.

Some vendors supply you with a backup as part of your purchase. For example, *The Controller* and *The Analyzer* business packages contain several diskettes along with a backup of each. In fact, all Apple Computer's business software comes with backup disks in the original package.

Still other vendors simply tell you to make a copy on your own. If this is the case, do just that.

(2) The diskette contains programs you have written.

In this case, you must make the decision. In the event that the original diskette is ruined, you would have to rekeyboard all the programs on a new diskette—another expense of time and money. You need to compare this with the cost of that backup diskette you might have had. This presumes, of course, that you have a listing of the programs that are on a diskette, either the original paperwork or a list made on a printer. If you don't have listings of your programs, get them! They also serve as backup and sometimes are more valuable at that moment when you really need them.

(3) The diskette contains data.

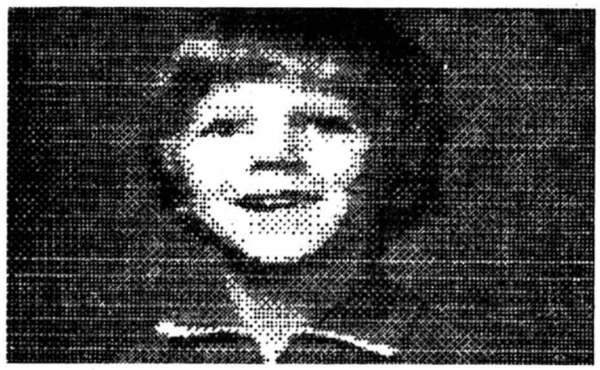
If the diskette contains data, then somehow the data had to be created and entered onto that disk. If the diskette is destroyed, that data will have to be re-created and reentered, which, of course, costs money. Indeed, in some constantly changing data files, it's impossible to re-create the data. Here, again, if at all possible, make a copy. Businesses that process lots of transactions make copies of their files on a daily basis.

Well, where does that leave us? Back up everything! There are various ways that you can accomplish this and still not go broke. You may use video or cassette tape as backup media; or you may use your own diskettes where the programs don't consume all the available space. By creating a backup diskette that contains programs grouped from several other diskettes, you can often squeeze the contents of several diskettes onto fewer diskettes.

Finally, be sure to keep backups in a safe place, away from the originals. The whole purpose of having a backup is to have your programs and data available if some disaster should prevent you from using the original. If they are stored together, it really defeats the purpose.

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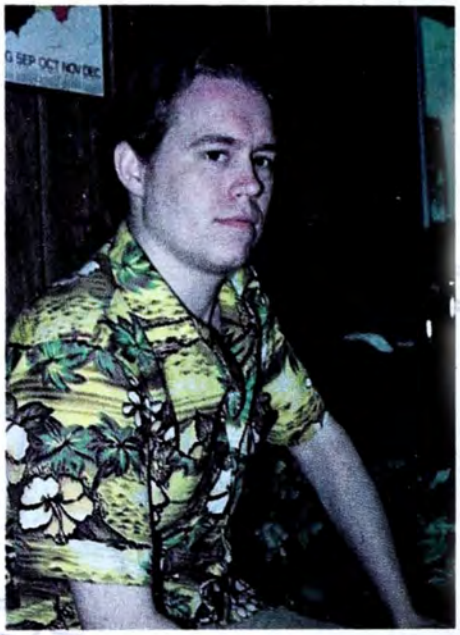
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Softalk photos





The SDS team, clockwise from the top: founder Rager Wagner, author Bill Blue, marketeer Ja-Anne Jahnson, fulfillment manager Brian Britt, tech support rep Jerry Burns, and office manager Tom Burns.

Exec SDS

Southwestern Data Systems

Assembling Useful Utilities

BY ALLAN TOMMERVIK

Roger Wagner is seemingly as staid and as respectable a software publisher as today graces the Apple market.

He was the author of one of the first hot-selling Apple utility programs, *Programer's Utility Pack*. He authored the first bestselling Apple utility, *Apple-Doc*. He's published Bill Blue's communications applications programs for the Apple and the SoftCard. He's the only major software publisher to combat piracy by providing a copy program on all his titles.

His programs reflect concern that the user get more than utility—he should also gain knowledge—from use of the software.

All this would make him a candidate for citizen of the year award should one ever be offered in microcomputerdom.

Early School Record Mimicked Einstein. It's most remarkable that he's come this far, considering that he was once on the verge of flunking mathematics and dropping out of physics in high school. Likewise, his immediate attraction for the Apple was far more instinctual than rational.

Furthermore, there's a sense of humor in the man that belies the serious intent of his products.

Who else, living virtually within walking distance of a major metropolitan area, plants corn in his backyard?

And who, of the dozen or so who practice this agricultural endeavor, plant their corn in a maze, instead of in rows?

And who, realizing that they've accomplished this in the fifth month of the year, pronounce their field "May's maize maze"?

While Wagner's hometown of Santee will never be mistaken for Kansas City or anywhere else where everything is up-to-date, it is within spitting distance of San Diego, where the natives spend far more time boating and sunning than they do planting, furrowing, hoeing, and harvesting.

But such almost anachronistic activities are part and parcel of Wagner's persona.

Wagner's passion in early life was for chemistry. In high school, he was a chem lab assistant, while struggling with physics and finding more advanced forms of mathematics a true mystery. At one point he attempted to drop physics so as to spend more time in the chem lab, manufacturing innocuous chemical weapons to be used as pranks. But his science teacher threatened him with loss of his chem lab privileges if he bailed out of physics, so he was forced to hang in there.

Math Fell Together But Teaching Fell Apart. At San Diego State University, Wagner attempted liberal arts before returning to science in the form of an astronomy major. That major changed to a physics major which was lumped with education courses to qualify him as a teacher.

The physics major was a concession to reality—his advisor having explained to him that physics was an all-purpose scientific degree that would open doors, while astronomy, for all that it had approximately the same course requirements, was a specialized major with few job openings. While Wagner was at SDSU, the world of mathematics became comprehensible to him, the pieces falling together and the logical structure becoming apparent.

Following graduation, he became head of the science department of a San Diego County high school, where the duties included teaching a class in biology among other things. As his corn planting techniques may attest, this was not his forte. He met the requirement by using his open period to monitor the other biology teacher's lecture, which he would then use as a base for his subsequent class.

His disillusionment with teaching was concurrent with the introduction of personal computers. That was in 1977.

Because It Was There. Wagner saw the Apple and felt he should have one, even though he knew nothing of programming and had absolutely no requirements for a personal computer.

He formed SDS as a sales entity to sell computers, reasoning that perhaps he would be able to buy at dealer discounts and make enough profit to pay for his Apple. In the meantime, he would use his spare time to learn programming.

In his words, "I was not an effective salesman, so I had plenty of time for programming." From this time came the Applesoft renumber program, developed to fill a void Wagner felt during his own programming efforts.

For one month, SDS had one of the hottest items around; then Apple released their own renumber program and gave it away.

Most people get discouraged when it seems clear that the fates have cast them among the unchosen. And such might well have been the implication from SDS's first venture into software marketing.

Instead, Wagner went back to programming and various other computer-oriented ventures such as helping a retail store in the San Diego area get started.

There followed *Apple-Doc*, the utility program that let you document your variables and replace them. It became the first bestselling utility for the Apple and started the SDS growth pattern.

Apple-Doc Provided the Right Medicine. To that time, Wagner had been operating out of his home. But the success of *Apple-Doc* forced him to occupy commercial space as a base from which to ship the product. And the renting of space almost always entails the hiring of someone to tend the space.

It was summer 1980 and JoAnne Johnson, a teacher in a Head Start program, was at loose ends, so she volunteered to staff the office on a part-time basis. Her status just evolved into SDS's first full-time employee, and today she's in charge of marketing.

The coincidences that seem to abound in the microcomputer industry crop up in this story also. The teacher whose lectures Wagner used to monitor so he would be fluent in biology was none other than Johnson's husband.

During this time, Wagner met and became friends with Bill Blue, author of *ASCII Express* and *Z-Term*, who at the time was heavily involved in the Apple Bulletin Board System with Craig Vaughan. The ABBS system was Vaughan's creation, but Blue had made sufficient enhancements to the system that he was listed as coauthor.

Blue's background makes him almost as unlikely as a candidate for terminal applications programming as Wagner was unlikely as a software publisher.

Blue over Tandy Opted for the Red Fruit. Blue was a mu-

sic recording engineer, honchoing several local and regional recording sessions in the San Diego area. When Tandy announced the first TRS-80, Blue thought it would be handy for a data base of telephone numbers and bought a Level I machine.

When Radio Shack announced the Level II machine, Blue discovered that his Level I programs were not convertible to Level II and began looking for another computer. Apple got the nod.

Blue's experience typifies why the necessity for protected, or locked, programs is such a disaster. He's a self-taught programmer who learned by studying the methods of the folks then selling programs. He'd study their techniques for accomplishing a given task with the same intensity that a chess master studies every variation in a given opening. The requirement for protection isolates future Bill Blues from that practical learning experience.

Perhaps the reason for the affinity between Blue and Wagner can be explained by Blue's purchase of the D. C. Hayes Micromodem. He bought the second one ever sold in San Diego. Just as Wagner didn't know why he should have an Apple, Blue had no rational reason for the modem; he just felt instinctively that the computer should be hooked up to the telephone.

This interest led him to Vaughan, with whom he collaborated until Vaughan went east to join the Source.

Blue and Wagner met at a San Diego user group meeting. They shared similar ideas on the Apple and share the challenge of exploring the computer, which was then not well documented. When Blue began writing his communications applications programs, he turned to Wagner for publishing support.

Express Questions Sped Expansion. Blue continues to work on bulletin board systems. He's author of *PMS*, *People's Message System*, and maintains three such systems while continuing to improve it.

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The marketing of *ASCII Express* was a mixed blessing for SDS. It found immediate marketplace acceptance, but generated a large volume of user-initiated inquiries for assistance. Queries were preventing Wagner and Johnson from pursuing their normal activities, necessitating more expansion.

In November 1980, Jerry Burns, a minicomputer programmer, was brought onboard to handle technical support and to do in-house programming. Burns's software will make pioneer SDS one of the last software houses to computerize their business.

With Johnson spending more and more time in marketing, an internal office manager became a must, with the result that Tom Burns, brother of Jerry, was added to the staff in April.

The thread that runs through this expansion is the same thread that runs through Wagner's programming, both from a learning and from a commercial standpoint—address the pressing need first.

Wagner explains most people are intimidated by assembly language because they look at the full body of the language and the mathematics and become intimidated. When he felt the need to code something in assembly language, he scoured the reference works for only that piece of knowledge necessary to accomplish that limited task.

In such a fashion, small subsets of knowledge grow into a full body of knowledge.

Likewise, addressing one need at a time has enabled SDS to grow from Wagner's house to its present expanded quarters.

Everyone's Guide Because He Cares about Everyone. Wagner's concern for the end user has been apparent from his first commercial program. All his utilities serve the dual purpose of performance and education.

When it became apparent that the appetite of many Apple owners for software was so great that piracy was becoming commonplace, Wagner took a unique approach to addressing the problem.

He protected his software, but he included on each disk a copy program that allowed the original purchaser a set number of copies. Each time a copy was made, the copy program decremented until it reached zero, at which time it would no longer make copies.

Wagner feels that this is the most equitable and feasible method of protecting his investment and giving the end user backup protection. Theoretically, the presence of the copy program minimizes the inducement to break the protection code while providing the user with a specified number of backups, which varies with each program.

SDS looks to expand its publishing role into other forms of software as well as other forms of publishing. In the former category, Wagner has just closed a publishing agreement to market *Speed Star*, formerly known as *Ascomp*, the Applesoft compiler developed in Tucson, Arizona.

If It's Worthwhile, It's Worth Sharing. Wagner has also pioneered a concept called the *Courier*, which provides software publishers with periodic access to retailers through a demonstration disk. Publishers can buy space on the disk to demo their most recent offerings.

The first disk has been in the hands of the retailers for some months. Wagner envisions the service expanding until *Courier* disks will serve the role of a library of available programs for the retailer. When a user asks if a particular application or entertainment program exists, the dealer will not only have the information at his fingertips, but will also have a demo of the program.

Through all of this, Wagner's ability to improvise and his puckish sense of humor pervade. His thoughtful consideration of all facets of the industry has earned him universal respect of software publishers and his humor has earned their friendship.

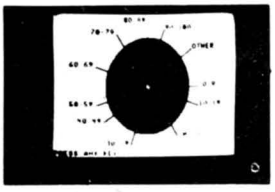
Wagner describes his activity by saying that he writes programs that he needs. If that remains the criterion for his software authoring efforts, a likely spate of practical applications software can be expected. ■

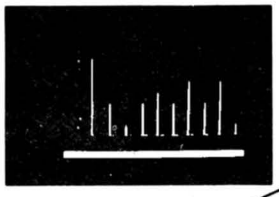
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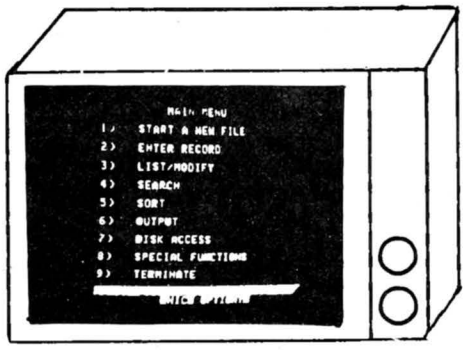
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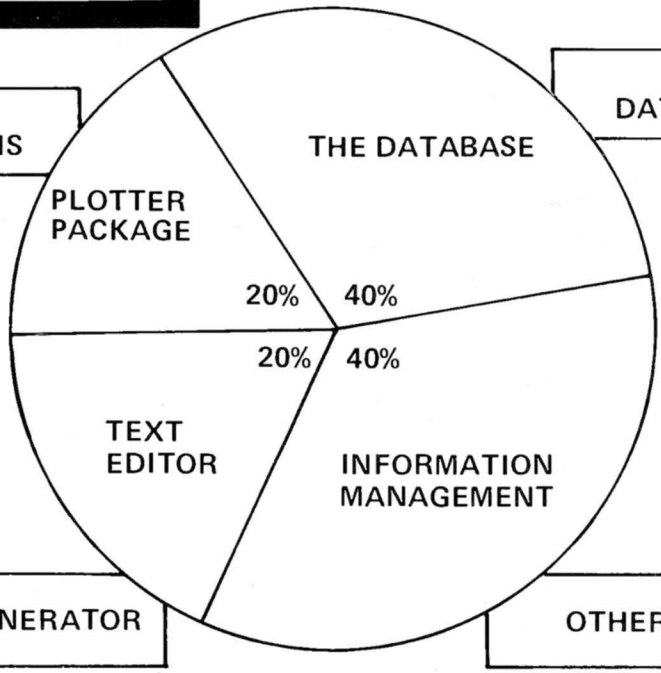






DATA PLOT & ANALYSIS

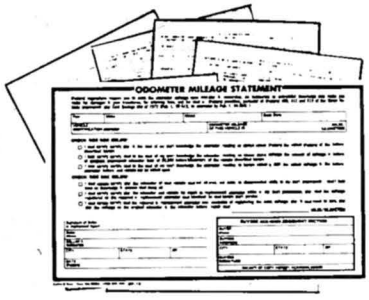
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Milling Around with Contest Winners

from page 4

Anachronisms. A very rough contest to judge! After all the arguing, after the fisticuffs, and after the dust had settled down, Gregg Ponder of Hammond, Illinois, emerged as the winner for originality of an overall list, and Gino J. Piazza of Port Chester, New York, managed to choose more of the most frequently included anachronisms to win for most representative entry overall.

Ponder's entry included the most chosen individual item as well, the first on his list, which was:

Ten BASIC Commands, by Moses
Analogs, by Paul Bunyon
Machine Language Made Easy (He, He, He, He), by the Marquis de Sade
Wife-Calc, by King Henry VIII
GoSub, by Admiral Halsey
Hangman, by Judge Roy Bean
Apple Plot, by Agatha Christie
Orchard Management, by George Washington
Joy Stick, by Buford Pussor
Apple Shogun, by Wyatt Earp

Piazza's representative entry was:

Compu-Math, by Charles Babbage
Music Theory, by Beethoven
TellStar, by Galileo
Super-Text II, by John Hancock
Tax Preparer, by Howard Hughes
Mystery Mansion, by Sherlock Holmes
Real-Time Football, by Vince Lombardi
Tank War, by General Patton
Micro-Painter, by Pablo Picasso
Adventure, by J. R. Tolkien

Tying for first place among individual anachronisms was *"What's My Line?* by Charles Darwin," submitted by Mike Curtis, Colorado Springs, Colorado. Curtis also gets kudos for runnersup *"Head-On* by Marie Antoinette," *"Cubic Rubes* by Pablo Picasso," and *"Score-To-Year Conversion Table* by Abe Lincoln."

The other four individual anachronisms and their authors are:

2. *"TellStar* by Rona Barrett"; from George Bass, Williamsburg, Virginia. Others from Bass were *"Curve Fitter* by Dolly Parton"; *"Warp Factor* by Noah and Sons"; *"Microchest* by Olive Oyl"; and *"Terror Wrist* by Truman Capote."

3. *"The Dada Factory* by Paul Klee"; from Marsha L. Hague, Rochester, Minnesota. Hague also submitted *"Wart Factor* by Merlin" and *"The Ditherizer* by D. Bumstead."

4. *"Win at the Races,* by Ben Hur"; from Gil Taylor, Vancouver, Washington. Taylor followed up with *"French Made Easy* by William the Conqueror" and *"Creature Venture* by Mary Shelley."

5. *"World Class Dominoes,* by Henry Kissinger"; from Evan Leibovitch, Brampton, Ontario, Canada. Leibovitch also offered *"Relative Strength of Residential Building Materials* by the Three Little Pigs." As a side note he tossed away *"InvisiCalc* by the Incredible Shrinking Man."

The two full-entry winners receive $50 each at their computer stores. Individual anachronism winners receive $10 to spend at the computer store. Ponder chose a selection of Apple Computer's Special Delivery Software, which he'll pick up from Main Street Computer in Decatur, Illinois. Piazza wants Sirius Software's *Cyber Strike* and the first *Demo Disk* from Avant-Garde.

Computer Camp. It's seldom enjoyable to make an error, but in this case it's a pleasure, because the outcome is that *Softalk* is sending an additional winner to camp. In choosing the winning essays for the Computer Camp contest, only one essay was disqualified—that because it seemed obvious that the essay had been written by the child's parents. Fortunately, we had an opportunity to meet that child's father; he denied helping his son and suggested we speak to the boy. We did and were quickly convinced that Greg Galperin, ten years old, had indeed written his own essay; he spent an entire week with a thesaurus writing it, and the end product was worthy of a much older person. When Greg was eight, his dad helped him open a savings account, and Greg quickly became annoyed that he

GOTO 89

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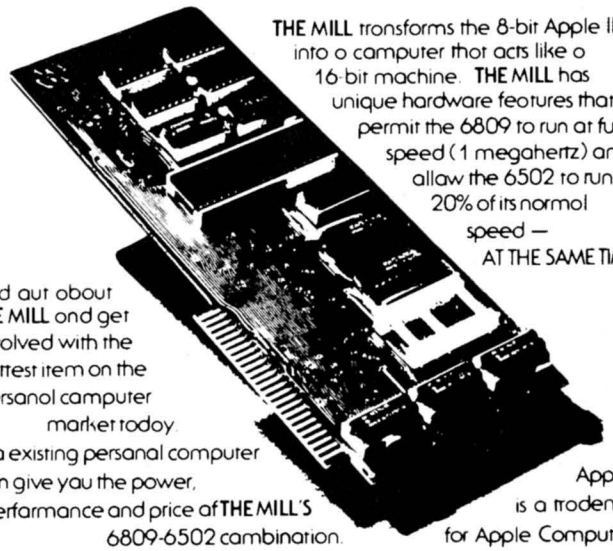
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TRADETALK



☐ New York's a helluva town—even in sultry August. So the **Big Apple Users Group** of New York, in conjunction with the data processing and systems analysis department of New York University, is opening the doors of NYU's Tisch Hall August 22 to all Apple enthusiasts for its second annual Apple Fair. Sharing hosting duties are several eastern user groups including the **New Jersey Apple Corps, Apple Power, Philadelphia Area Apple Users, Apple List, Apple Share,** and the **Staten Island Apple Users Group.** Fair is a convention and trade show, with booths, seminars, and workshops packing the all-day agenda. Admission is free; no reservations. Activities begin at 10 a.m. NYU, 40 West Fourth Street, New York City.

☐ At **Dakin5** (Denver, CO), president **Eugene Carr** and vice-president of marketing **William Boyts** are proud of receiving the International Computer Program's Million Dollar Award for selling more than one million dollars' worth of *The Controller,* an accounting system introduced less than two years ago, marketed through Apple.

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☐ They may not necessarily know how to hula, but all ten employees of **The Computer Center** (Honolulu, HI) sure know their Apples. Reason? Owner **Bill Schwab** requires each of the workers in his year-old shop to own an Apple. Schwab believes his is the only retail organization in the United States that has such a requirement, making his potentially one of the most knowledgeable staffs in the business. Surprisingly, The Computer Center is not an Apple distributor, but, not surprisingly, Apple is the biggest seller of all micros sold there.

☐ The second annual **Educational Software Symposium,** sponsored by **Queue** (Fairfied, CT), is scheduled for October 15 and 16 at the Stouffer's Inn, White Plains, New York. Symposium features seminars, panels, and user interest group meetings on such topics as educational software design and evaluation, computers in elementary education, and computers in studies such as foreign languages and mathematics. Registration is $45 advance; $55 at the door. Register with Monica F. Kantrowitz, Queue, 5 Chapel Hill Drive, Fairfield, CT 06432.

☐ As **Software Resources** (Cambridge, MA) pops the champagne cork in honor of its first anniversary, **Larry V. Moore** steps into the organization's newly created position of executive vice-president and director of marketing. Moore, formerly v.p. of financial services at Data Resources, has overall responsibility for marketing and sales in his new post. Software resources is developer of *Trend-Spotter* and other financial software for the Apple.

☐ At **Sirius Software** (Sacramento, CA), **Jerry Jewell** and **Terry Bradley** are getting even more serious about software. Bradley, secretary-treasurer of the software company, recently sold his Computerland interest to put full-time energy into Sirius, and organization president Jewell, originally manager of Bradley's Computerland franchise, is now devoting all his attention to his position at Sirius, too.

☐ **Datasouth Computer** (Charlotte, NC), manufacturer of the DS180 printer for Apple, has appointed **Boston Data Sales** (Framingham, MA) its distributor in New England.

☐ Responding to the demand by amateur radio enthusiasts for the microcomputer, the **Florida Gulf Coast Amateur Radio Council** is encouraging those with microcomputer products and services to attend their Suncoast Convention in Clearwater, Florida, October 3 and 4. For more information, write the Florida Gulf Coast Amateur Radio Council, Box 157, Clearwater, FL 33517.

☐ **Programs Unlimited** (Jericho, NY) sells hardware and systems, but it's devoted primarily to selling software. The store is touted as a software supermarket—the first in a proposed chain. Like music stores with listening booths, Programs Unlimited allows customers to try out programs on demonstration models of the micros they own. The store's goals are to offer as wide a range of software as possible and to ensure that customers buy what they want to buy. Chief entrepreneur and president **Richard Taylor** is a genuine eclectic: he is both a noted software designer and a former leading tenor with the New York City Opera.

☐ **Street Electronics** (Anaheim, CA), maker of the *Echo II* speech synthesizer for Apple, has grown from a one-man business in Portland, Oregon, to an enterprise employing a full-time staff of four. Since December, owner Milo Street has added engineer Dana Street, marketing director Andy Clare, and inventory controller Steve Street. If they grow anymore, do you suppose they'll provide road maps to visitors to find the right person?

☐ Lots of state-hopping at **CompuServe** (Columbus, OH), the computer services company that offers news and information from eleven major newspapers and other media to Apple owners via its information service network, *Micronet.* Company has relocated its Stamford, Connecticut, office to 274 Riverside Avenue, Westport, CT 06880. Marketing offices have been opened at 911 Main Street, Suite 1000, Kansas City, MO 64105, and at 200 Market Street, Suite 1303, Philadelphia, PA 19103. CompuServe's twenty-six marketing offices serve more than seven hundred corporations, financial institutions, and government agencies.

☐ **Peachtree Software** (Atlanta, GA), which just purchased **Small Business Applications** of Houston, Texas, has been purchased in turn by **Management Science America** (Atlanta, GA), developers and marketers of nine financial application software packages for mini and mainframe computers. Peachtree will operate as a subsidiary of MSA, providing financial and business application software to micro users.

☐ The offices of **Information Unlimited Software** (Berkeley, CA) look out on California mountains scarred with fault lines—a daily reminder of the threat of earthquakes in the San Francisco Bay Area. **Evan Scharf,** vice president of marketing, decided he and his col-

leagues at IUS and other California businesses should do something that could help avert disaster in the event of a major quake. Scharf found out that California Governor Jerry Brown's emergency task force on earthquake preparedness—made up of community and industry representatives—had been operating for months without funding. As a civic gesture, according to Scharf, and as a nudge to other businesses to help shoulder the cost of earthquake preparedness, IUS made the first cash contribution to the task force. Scharf says IUS's $1,000 donation will be used to research and develop emergency procedures, and, he says, an IUS staff member will be appointed to the task force's directions and controls group to develop management information systems.

☐ Programmer **Bob Davis**, former production manager of **On-Line Systems** (Coarsegold, CA), steps up to the position of head of special projects; he'll oversee Apple software development, and technician **Diane Siegal** moves up to the production manager's spot. Programmer **Rorke Weigandt** is the new face at On-Line; he'll be developing programs for the Apple and writing documentation. *Lisa* is the new program at On-Line; **Randy Hyde** will now market his *Lisa* assembler through the company. As if these developments weren't enough to keep things lively at On-Line, the company will see to it that most everyone in West Coast software shakes out the cobwebs during the weekend of August 8. On-Line's hosting a weekend of white water river rafting and partying on California's Stanislaus River. Guest list includes names from **Sirius Software** (Sacramento, CA), **Strategic Simulations** (Mountain View, CA), **Information Unlimited Software** (Berkeley, CA), **Rainbow Computing** (Northridge, CA), and **Personal Software** (Sunnyvale, CA). If you've got a hankering to reenact scenes from *Deliverance*, if you've got $125 tucked into your life preserver, and if you're one of the first fifty to ask, On-Line will take your reservation. BYOB, of course.

☐ **Apple** (Cupertino, CA) has made three of its top managers corporate vice-presidents. **Wil Houde**, general manager of Apple's personal computer division, and **John Vennard**, general manager of the peripherals division, ascend to vice-presidents' posts, retaining offices in Cupertino. London-based **Thomas J. Lawrence**, managing director of Apple in Europe, has also assumed v.p. duties. John Couch, vice-president of the personal office systems division, rounds out the foursome of officers under Apple prexy Mike Markkula.

☐ **Micro Data Base Systems** (Lafayette, IN) has installed over seven hundred of its *MDBS* packages since 1980, company says. New installations are added at an average rate of fifty per month.

☐ Students at **Computer Camp** (Santa Barbara, CA) have the opportunity to learn Pascal this summer, thanks to **Roy Hicks**, owner of **R. H. Electronics** (Buellton, CA). Hicks loaned the camp five of his *Super Ram II* 16K expansion cards, so the campers are able to operate Pascal in their Apple IIs.

☐ **Ferox Microsystems** (Arlington, VA), developers of the *Decision Support System/Finance* package for the Apple, announces the appointment of **Dr. Thomas Woteki** as vice-president for research and development. Woteki, who has been a professor, researcher, and technical manager at Princeton and the University of Texas, also writes for *Byte* magazine, the Washington Apple Pi newsletter, and *Apple Orchard*, the publication of the International Apple Corps. Former software development controller **William Shrouds** comes onboard at Ferox as vice-president for finance.

☐ "Personal Computing for the Handicapped," a one-day exhibit at the Exploratorium, 3601 Lyon Street, San Francisco (in the Palace of Fine Arts), begins at noon, August 22. Devices, methods, and computer programs to help handicapped people overcome difficulties in learning, working, and living in community settings will be demonstrated. The eighty exhibits are regional entries to the national search organized by the **Applied Physics Laboratory, Johns Hopkins University** (Baltimore, MD), with support from the **National Science Foundation** and **Radio Shack.** Entrants consist of students, amateurs, and professionals in the field who've developed computer-based aids such as a voice control device for running household appliances without use of arms and legs. Aids for people who are blind, deaf, mentally retarded, or have learning disabilities will also be demonstrated. Entries will be judged and the top winner will receive a computer system. The Exploratorium is wheel chair accessible and the handicapped and general public are welcome. Exhibit is free, once you buy admission to the museum.

☐ **Apple Computer** (Cupertino, CA) and **Business and Professional Software** (Cambridge, MA) have combined talents to produce a family of business graphics packages. Apple has set release of the first package for this autumn.

☐ Eugene, Oregon, seems a long way from the center of the microcomputer industry, but two firms there have had definite impacts in the Apple market. As previously chronicled, **Broderbund Software** published *Apple Galaxian*, now known as *Alien Rain*, the first entertainment program to lead *Softalk*'s Top Thirty list. Not making nearly the best-selling splash of a *Galaxian* or a *Snoggle* but, nevertheless, quietly making inroads on the market is **Avant-Garde Creations**, a company whose software features inexpensive prices and lack of the noxious protection devices found elsewhere. Avant-Garde recently expanded with the addition of four staff members—**Robert and Kathy Clarke** are now responsible for order fulfillment, **Eric Martin** has assumed responsibility for graphics and artwork, and **Ken Roberts** has been added as an outside salesman, visiting computer stores and making the retailers familiar with the Avant-Garde line.

☐ Expansion is not limited to west coast firms, however. **Micro Co-op** (West Chicago, IL) has found it necessary to redefine responsibilities within its organization to cope with growth. **Mark Pelczarski**, author of the company's *Complete Graphics System*, now assumes the position of director of software development and procurement for the **Co-op Software** division. In addition to further product contributions of his own, Pelczarski will be actively beating the bushes for authors with worthwhile programs to publish. Meanwhile, **Patricia Glenn** will be functioning as director of operations for the parent Micro Co-op, which functions as a cooperative software merchandiser.

☐ **Edu-Ware Services Inc.** (Canoga Park, CA) welcomes two new programmers to its staff. **David Metzner**, who has traveled from Ballwin, MO, for the job, has extensive background in Applesoft, 6502 Assembly, and Pascal. **Robert C. McNalley**, a native of Hollywood, didn't have as far to travel. He will assume responsibility for coding Edu-Ware's Applesoft programs into Atari Basic. ◨

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baseball, hot dogs,

BY RICHARD L. COLEMAN



". . . A chicken in every pot, and two cars in every garage."
—Herbert Hoover

And a computer in every home. Hoover might add that now that the invention of the microprocessor has revolutionized the field of electronics, making it possible for the average family to have its own personal computer.

Many experts are predicting the escalation of the revolution into the field of microcomputers itself, likening the coming demand for them to that for CB radios a few years ago. Manufacturers are now producing microcomputer peripheral devices for home appliance control, security, and environment control.

When the microcomputer was first introduced to the public in the mid-seventies it was considered a novelty or just another electronic toy like the video games. As its popularity grows and as awareness of its capacities spreads, more people are accepting the microcomputer as a useful home appliance, especially in families where both spouses work. When there's less time to spend on routine home management, microcomputers can relieve some of this burden by taking over many of the home and family related tasks.

Freedom for the Homemaker and Justice for All. In the past, the homemaker has benefited most from such inventions as the refrigerator and gas and electric ranges. It's the homemaker again who has benefited most from the recent advent of the microwave oven. And the homemaker ultimately will benefit most when microcomputers become an integral component of household equipment. That day is coming soon; eventually, the microcomputer will become the household nerve center.

One major problem delays the onset of this phenomenon. How will people, in many cases inexperienced in this area, learn to use microcomputers for home management? Obviously, some means of widespread information dissemination is

apple pie, and Applesoft

needed. To begin with, schools and colleges must address the task of informing and educating the general public in the uses of the microcomputer.

Recognizing the micro's potential for handling a myriad of home and family related tasks, the College of Home Economics at Louisiana Tech University in Ruston, Louisiana, is quietly starting its own computer revolution and boldly stepping into the computer age. The college has initiated a new educational program to acquaint students with the potentials of home microcomputers.

Home Ec Leaves the Hearth. By the way, if you think home economics is still just "stitchin' and stewin'," you're in the dark ages. Home ec is now a recognized professional area that seeks innovative solutions to the challenges of contemporary families, from home enhancement of education to coping with inflation and designing new lifestyles. The academic major offers students (male and female alike) preparation for varied careers, such as fashion design, child care, nutrition, health, and management, as well as for effective personal and family living.

It has been predicted that computer ignorance will be the next great challenge to education. To meet this challenge, the College of Home Economics's new program has a threefold purpose: to acquaint the student with the available microcomputer hardware and software; to teach the Basic language; and to provide practical experiences in using microcomputers for home management problems.

To participate in this unique program, students register for a course entitled "Microcomputers in Home Management," for which they receive three hours of college credit. The course begins with the assumption that the student knows absolutely nothing about microcomputers. And so, the first words of their instructor are, paraphrasing legendary football coach Vince Lombardi, "Ladies and gentlemen, this is a microcomputer!"

In the course, students learn about many of the brands and models of microcomputers currently manufactured for home use and see demonstrations of computers in action. The various topics discussed in the course include software uses for meal planning, for home budgeting, as tutorials and study aids, and for entertainment. Also included are discussions of home security systems and environmental systems controlled by the microcomputer and information networks such as MicroNet.

Students get their practical experience in the home ec microcomputer laboratory, which is currently equipped with three 48K Apple II Plus systems with DOS 3.3 in each and two printers between them.

From Prisons to Universities, Everyone's Playing Games. From their first day in the laboratory, students are involved in hands-on exercises with the computers. One of the greatest obstacles to be overcome is the student's fear of the computer. Many are afraid they'll type the wrong thing and somehow break the machine.

Much of the fear is alleviated as the students' experience increases. As the first programs they run, students are urged to choose game programs with many graphics. Most people are familiar with the popular video games, and the transition from playing the games in a video arcade to playing them on a computer is easy. From here, the student moves on to running turnkey programs with which they solve some common home management problems: menu planning for the next week, balancing the budget, converting a recipe for five people to serve twenty-five, or converting recipe measures to metric equivalents. As the students' confidence builds, they're encouraged to begin writing simple programs of their own.

By the end of the term, students are freely conversing about RAMs and ROMs, subroutines and data storage, reals and strings, and the virtues of Apple versus other micros. A surprising number of students leave the course determined to have their own Apples as a result of their experiences with them in the microcomputer laboratory.

Teach Your Apple Recipese

If you plan to collect recipes on a data base or to use your Apple as a recipe finder/converter/holder while you cook, you may find the computer's need to treat all portions as decimals rather than fractions a bit inconvenient. With this subroutine by Dr. Coleman, you can teach your Apple to work with the fractions you're used to.

The subroutine can be tucked away at the end of any program requiring fractional input, whether for recipes or something else. The fraction is input as a string (N$). A GOSUB to the subroutine will return with a decimal equivalent of the fraction (W), ready to use in any computation. The subroutine handles input as whole numbers, whole numbers plus fractions, fractions alone, or decimal numbers. Fractions plus whole numbers must be input in the form 6+1/2 without any intervening spaces.

```
5  HOME : VTAB 5
10  PRINT "GIVE ME A NUMBER WITH A FRACTION IN THE": INPUT "FORM
      6+1/2.";N$
20  GOSUB 10000
30  PRINT "YOUR NUMBER IN DECIMAL FORM IS ";W
40  END
10000  REM FRACTIONS MAKER BY DR. RICK COLEMAN
10010  X = 0:W = 0:Z = 0
10020  FOR II = 1 TO LEN (N$): IF ASC ( MID$ (N$,II,1 ) ) = 43 THEN 10050: REM
      LOOK FOR + SIGN
10030  IF ASC ( MID$ (N$,II,1) ) = 46 THEN 10140: REM CHECK FOR DECIMAL
      INPUT
10035  IF ASC ( MID$ (N$,II,1) ) < > 47 THEN 10040: REM CHECK FOR
      FRACTION INPUT ONLY
10037  K = II:II = 0: GOTO 10100
10040  NEXT II
10050  X = VAL ( LEFT$ (N$,II - 1) ): REM CONVERT WHOLE NUMBER TO
      NUMERICAL FORM
10060  IF II - 1 < > LEN (N$) THEN 10080: REM CHECK TO SEE IF THERE IS A
      FRACTION
10070  W = X: RETURN : REM IF NO FRACTION THEN RETURN
10080  FOR K = II TO LEN (N$): IF ASC ( MID$ (N$,K,1) ) = 47 THEN 10100: REM
      LOOK FOR / IN FRACTION
10090  NEXT K
10100  Z = VAL ( MID$ (N$,II + 1,K - 1) ): REM CONVERT NUMERATOR TO
      NUMERICAL FORM
10110  W = VAL ( RIGHT$ (N$, LEN (N$) - K) ): REM CONVERT DENOMINATOR
      TO NUMERICAL FORM
10120  W = X + Z / W: REM COMPUTE FINAL DECIMAL FORM
10130  RETURN
10140  W = VAL (N$): RETURN : REM CONVERT DECIMAL INPUT TO NUMERICAL
      FORM
```

The program holds another benefit for its students: access to a growing library of home management programs written by instructors and students. These range from graphics demonstrations to home budget programs to small business inventory programs.

Moonlighting Apples Draw More Majors. When the home ec microcomputer lab is finished for the day, the Apples aren't. They merely change their focus to recruiting. The home ec department uses displays, exhibits, and lots of personal contact between faculty members and prospective students to increase awareness of home economics studies and careers. It's not an easy task; colleges everywhere are faced with declining enrollments. But Louisiana Tech's home ec department has a star recruiter—the Apple.

A program for the Apple (devised by this writer) presents potential students with a brief summary of what modern home economics is all about, what the areas of specialization are, some information about each, and what job opportunities exist in each area. The material displayed uses the full extent of the Apple's lo-res graphics, color capabilities, and music subroutines.

Besides the flashing colors, visual displays, and catchy tunes, the message is presented with continuous interaction between potential student and the computer as the student is asked to respond to the presentation.

The program is written in Integer Basic to take advantage of the faster execution time for graphics and runs on a 32K system. It will load from either cassette or disk. The screen photographs illustrate the main features of the program, but, unfortunately, a photo can't reproduce the beeps, clicks, buzzes, tone sequences, and music that punctuate the program.

Prospects Interact with Personalized Program. There are three sections in the presentation. The first uses color graphics and tones to display continuously the different areas of specialization. When a student presses any key, the display changes to the second section. A different graphics display appears, showing a stylized version of the College of Home Economics logo. After listening to a catchy tune, the prospective student is given general information about the home ec field.

At the end of the second section, the student selects a special interest area. The third section consists of a series of subroutines, each designed to give information about a specific area of interest. At the end, the program cycles back to the first section for the next person.

The reactions of prospective students who've seen the program range from surprised delight to astonishment. The greatest surprise usually comes from those who have a very stereotyped idea of the home ec field. Most of all, they're surprised to find computers playing a major role.

And none of this need be confined to on-campus recruiting open houses. The portability of the Apple makes it easy to use for recruiting on location at high schools.

A Scoop of Apples Makes a Healthy Home Ec Department. Are Apples helping to change the image of home economics studies? Clearly, they're causing more students to consider the major. The effectiveness of this approach is evident in the number of students who stop to ask about home ec careers, and, more concretely, in the increased enrollment in the College of Home Ec. The reactions of other colleges in the university to home ec's success with Apples have also been interesting. One engineering professor was overheard to say, "Well, home ec has scooped us again!"

The influence of the Microcomputers in Home Management program is spreading to other institutions as well, and the creators of the program welcome its being used as a model for other colleges and universities.

The microcomputer is here to stay. We would do well to teach our young people to use it to its maximum potential, for it has the ability to make all our lives more comfortable and enjoyable. ◨

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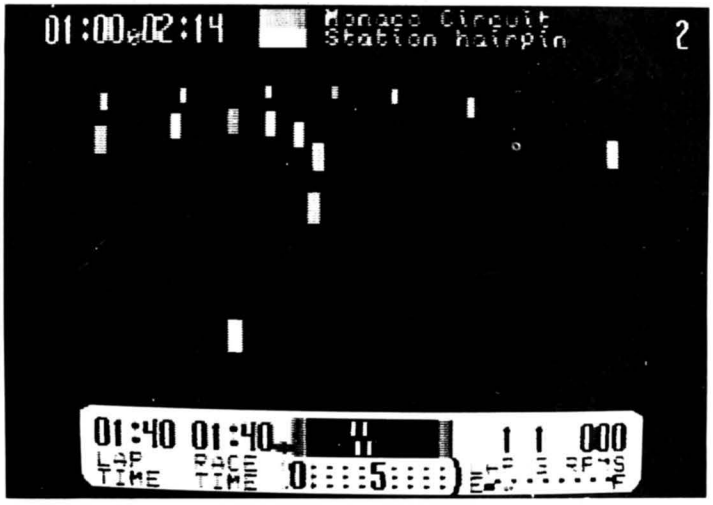
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VENTURES WITH VISICALC

BY CRAIG STINSON

Last month this space was devoted to reviews of the new sixteen-sector *VisiCalc* and its several offspring released recently by Personal Software. This month we're going to examine another *VisiCalc*—the one Apple Computer puts in the box with every Apple III they sell. We'll also take a look at a few of the utility programs offered by companies other than Personal as adjuncts to *VisiCalc* for the Apple II.

If you're used to *VisiCalc* on the II and you decide to step up to a III, you'll find that *VisiCalc* on the III is substantially the same animal you know and love. There are differences, but they have to do more with the computer than with the program.

Probably the most significant difference is memory. On the III you'll have 128K to kick around in. The worksheet is still the same size—63 columns by 254 rows—but that little number in the upper right corner of the status area starts at a reassuringly high level and may never come close to zero. If you've ever had to contend with memory shortage on the Apple II, you'll appreciate the capacity of the bigger machine.



You'll also enjoy a wider view of your data, thanks to the III's eighty-column display. Eighty characters on a line translates to a good eight or ten columns on the *VisiCalc* spreadsheet. If you're recording monthly financial information, you'll probably be able to fit half a year's worth comfortably onto one screen.

The III has other amenities as well. Its upper and lowercase display makes your labels a little easier to look at, and the four-way cursor control spares you the trouble of toggling back and forth between vertical and horizontal movement. Mobility in scrolling around your worksheet is enhanced somewhat by the fact that the keys on the III repeat if you hold them down.

Apple is currently putting together a conversion program that will allow users of Apple II *VisiCalc* to reformat their data files for the Apple III. The program is scheduled to be in the stores by mid-September—at no charge to the retailer. Presumably, dealers will pass this remarkable price on to their customers.

With respect to program development, *VisiCalc* for the III is currently at an intermediate stage between the DOS 3.2 and the DOS 3.3 versions for the II. The/E, @CHOOSE, and Boolean features of the sixteen-sector Apple II implementation are not yet available on *VisiCalc*/III. Personal Software reports that these improvements will be included in the next update for the III.

In the meantime, the III version does incorporate the Data Interchange Format (DIF) option, which is intended to facilitate the transfer of data from *VisiCalc* to other programs or from one *VisiCalc* application to another. Personal's *Programmer's Guide to the Data Interchange Format,* which spells out the structure of DIF files, is appended to the Apple III *VisiCalc* manual.

Unfortunately, *VisiTrend* and *VisiPlot,* which are designed to take advantage of DIF files from sixteen-sector Apple II *VisiCalc,* are not yet available for the Apple III. And Apple's program for converting *VisiCalc* data from DOS to SOS won't work in the reverse direction. So if you're going from II to III and you use *Plot* and *Trend,* hang on to your sixteen-sector *VisiCalc* and use it in the emulator mode.

There's another plus and another minus to *VisiCalc* on the III. The plus is a diskful of templates—ready-made models into which you can plug your own data. There are five templates, one each for personal budget, departmental budget, construction estimation, time value of money, and depreciation. Although their primary purpose may be helping beginning *VisiCalc* users to get started with the program, the templates are well enough made that old hands may find they can use them just as they are or adapt them quickly for their own purposes.

On the negative side, Personal Software's large, rather luxurious, loose-leaf manual has been replaced by a drab, brown and gray, perfect-bound item from Apple. The text, still by Personal, is as readable as before, but the book no longer



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opens flat on the desk, and it looks like it won't hold up as well under heavy use.

Yucaipa Software (Yucaipa, CA) offers some low-cost plotting, statistical, and printing utilities for Apple II *VisiCalc* users. The programs use the /PD text files from the 3.2 version or the equivalent /PF files on the sixteen-sector update. Each program is available in Muffinable DOS 3.2, requires Applesoft, and retails for $29.95. Each comes with humble but readable documentation and a tutorial demo.

V-Plot yields a text graph of a single data series. You choose the plotting character—an asterisk, dollar sign, or whatever. If you choose to plot with a capital I, you may be able to pencil the points together to make a true line graph, since the program orients dates along the y axis and your other variable on x. The program doesn't actually print the scale along either axis but, instead, lists all your data to the left of the graph.

V-Plot is set up to plot one *VisiCalc* column against another. You get to specify which columns and the range of rows. You need to avoid labels in the independent variable column, since the program won't know where to plot them. *V-Plot* needs a line printer but doesn't require graphics capability. Any size printer will do, but larger machines will give you more room for the graph.

V-Stat performs statistical analysis on a column of *VisiCalc* data. The program starts by listing the column, then sorts the numbers into ascending order. Finally, it prints the number of samples, the range, the mean, the sum of squares, the mean deviation, the median, the variance, the standard deviation, and fourteen other statistics. Since it only treats one column of data, it will not do correlation or regression analysis. *V-Stat* can send output to a printer or to the monitor.

The third Yucaipa offering, *V-Print*, is convenient chiefly as a saver of disk space. The program prints worksheets from /PD (or /PF) files. The resulting tabular output is much the same as what you get directly from *VisiCalc*'s /PP, except that *V-Print* writes the row number to the left of each line. The advantage to the program is that /PF or /PD files consume only about two thirds as much disk space as normal *VisiCalc* (/SS) files. So if you just want to mail some figures to a colleague who has a printer, you may profit from this approach.

V-Print, like its Yucaipa companions, works with entire /PF or /PD files. If you don't want to print the whole worksheet, you'll need to make that decision while you're still in the *VisiCalc* program.

A similarly named program, *Visiprint*, from Aurora Computer Enterprises (Houston, TX) (not to be confused with Aurora Systems, Madison, WI), takes a different approach. This program reads /SS files and gives you a list-style (as opposed to tabular) printout, much like the /SS,S1 option on sixteen-sector *VisiCalc*. In this type of printout, each entry is identified by its coordinate number, preceded by a symbol—">" for a formula or value, "/" for a setup command. The user can pick from the following print options: formulas and values, values only, labels only, setup commands only, and entire files. In each case, the user also gets to choose between printing row by row or column by column.

A *Visiprint* printout of an entire worksheet differs from the corresponding *VisiCalc* /SS,S1 printout in one possibly crucial respect: *VisiCalc* starts at the lower right corner of the sheet and works back toward A1; *Visiprint* displays the data in the orientation to which you're accustomed, top to bottom and left to right.

Visiprint comes in either thirteen or sixteen sectors, requires 32K, and retails for $39.95.

Data Security Concepts (Manchester, MO) offers a tool for manipulating label columns. Called *Visi-Caids*, the program will split a column of labels into two or more smaller columns. This can be handy if your labels are much wider than your numerical columns, and you want to get more data on the screen. With *Visi-Caids* you can just type your labels into wide columns and split them later.

The program includes a couple of print utilities as well. *The Formula Reader* will print or display the contents of a specified column or of an entire worksheet, showing formulas in their original states rather than as calculated values. And the *PD Reader* will output the contents of a PD or PF file, showing you the calculated numbers as opposed to the formulas from which they were derived.

Like Yucaipa's *V-Print*, the *PD Reader* on *Visi-Caids* can be a space saver. If you're not going to do any more calculating, and you just want to be able to print or display *VisiCalc* data, you can convert your files to PDs or PFs and economize on disk space.

If you want, you can also use the *PD Reader* to print an /SS file. The results of that maneuver will be the same as if you did a /SS,S1 on *VisiCalc* 3.3: you'll get an upside down and backward listing of all your labels, formulas, and nonderived values, complete with slashes, carats, and coordinate names.

Visi-Caids requires Applesoft and is available—in either operating system—for $34.95.

Computer Station (Saint Louis, MO) has a program called *VisiList*, that, like the *PD Reader* on *Visi-Caids*, will do for *VisiCalc* 3.2 what the /SS,S1 option does for *VisiCalc* 3.3. It will give a printout or screen display, from lower right corner to upper left, of your labels, formulas, and nonderived values. The program is available in Muffinable DOS 3.2 for $24.95.

VU #3, from Progressive Software (Plymouth Meeting, PA) is a utility that transfers data in either direction between Basic programs and *VisiCalc*. It will do some other things as well, such as rearranging data within a *VisiCalc* worksheet.

The program was slated for review in this space this month, but Progressive has informed us that they have significantly improved it in the process of revising it for DOS 3.3. So that review will appear in a subsequent column.

If you have developed an interesting application for *VisiCalc* that you would like to share with *Softalk*'s readers, send it to Softalk Ventures, 11021 Magnolia Boulevard, North Hollywood, CA 91601. If we use your application in a future column, you'll receive $10 in merchandise from your local retailer. ◻■

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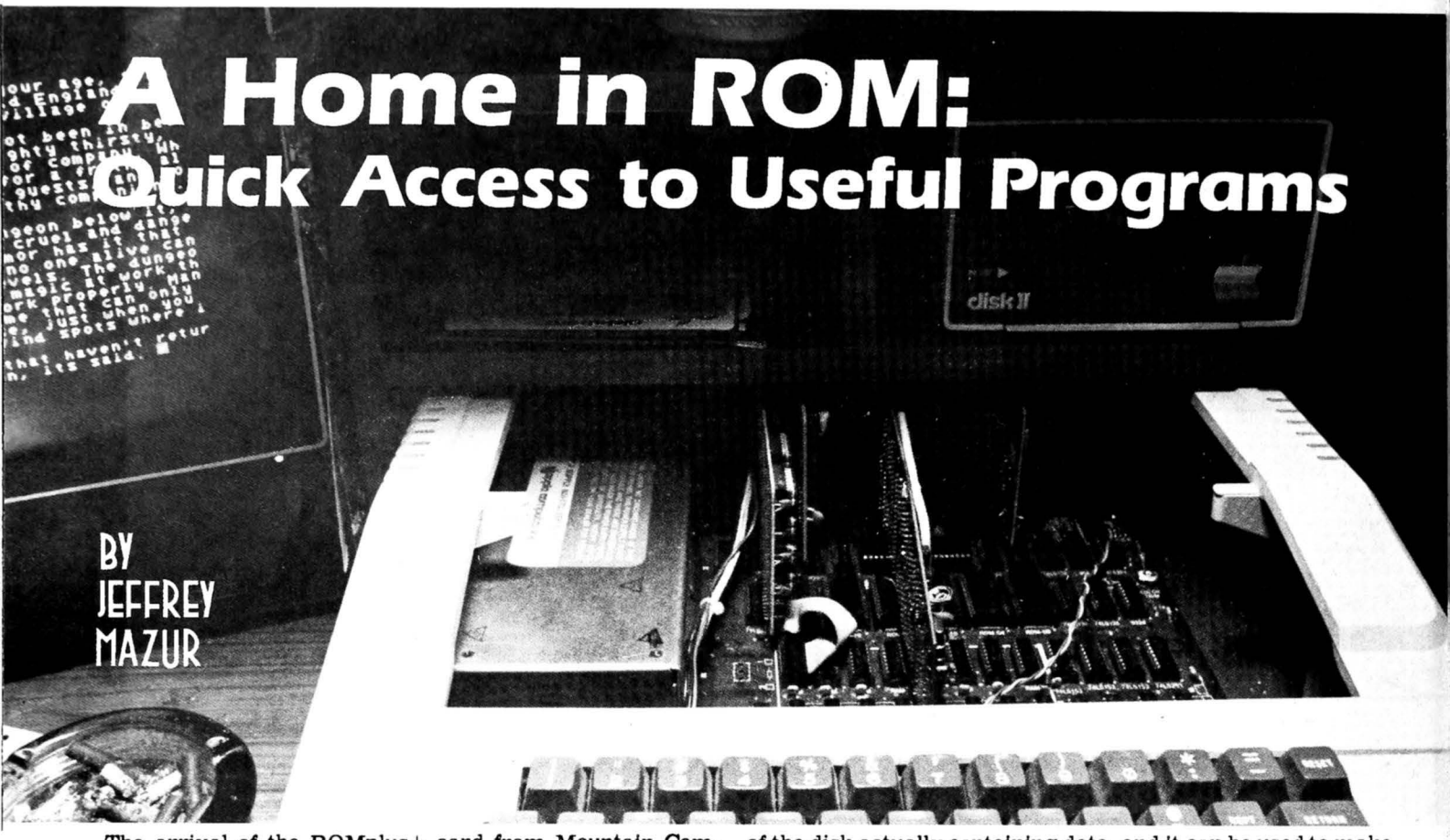
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A Home in ROM:
Quick Access to Useful Programs



BY JEFFREY MAZUR

The arrival of the ROMplus+ card from Mountain Computer a year and a half ago opened a new outlet for a variety of programs. A program stored in ROM (Read Only Memory) could be instantly executed, with just a few keystrokes, whenever the Apple was on. No disk or tape had to be read or loaded.

It has taken a little longer than anticipated, but the incubation period seems to be ending now. At least four manufacturers have introduced preprogrammed ROMs to populate the ROMplus+.

The ROMplus+ board is similar to the Applesoft or Integer ROM cards from Apple. They allow useful programs to be stored in nonvolatile memory—memory that's available to the computer as soon as the power is on. Basic language cards are used to store a complete operating system and language. The ROMplus+ provides room for as many as six ROMs, each of which can store 2K bytes of user-defined machine language programming. The board also contains control circuitry and firmware, two hardware input signals, and 256 bytes of on-board RAM. Access to the ROMplus+ is made through a peripheral (PR#) command from Basic, and individual programs on the board are run via simple control character commands. For example, to execute the Keyboard Filter routine supplied with the ROMplus+ (assuming the ROM is in socket 1 and the board is in slot 5), one would simply type PR#5, return, and control-M 1A.

Mountains of Firmware. The *Keyboard Filter* was the first program written specifically to reside on the ROMplus+. It is a comprehensive input/output enhancement that provides upper/lower-case color text (using one of the hi-res graphics pages), user-definable fonts, overstrike capability, keyboard macros, and more. In spite of all the secondary features, this approach to upper and lower case has proven less than ideal and lags behind the eighty-column board and the lower-case adapter in popularity.

Mountain Computer also offers COPYROM, which contains special copy and catalog programs. The copy portion accommodates DOS 3.2 or 3.3 diskettes and single or dual drives. It will quickly copy DOS diskettes, copying only those portions of the disk actually containing data, and it can be used to make complete replicas of Pascal and CP/M diskettes. The catalog feature includes starting address and length of all binary files.

Forging a Lead with Highlands. From Highlands Computer Services of Renton, Washington, come three editor ROMs to aid the Applesoft programmer. These ROMs basically contain the company's *CRAE—Co-Resident Applesoft Editor*—program, which provides such features as global search and replace, renumber and append, formatted listings, and automatic line numbering. With *CRAE* in ROM, you need fumble around for a disk no more. Better still, you save a lot of RAM space; the *CRAE* ROM uses 512 bytes at the top of memory for a scratch area, whereas the disk version of *CRAE* usually occupies 7K of RAM. Although the entire program requires four 2K ROMs, they are available separately, as follows.

EROM #1 adds global search and replace functions to the Applesoft interpreter. This makes it possible, for example, to find all occurrences of a particular variable in a program and to rename the variable throughout. You can also use it to remove all Control-Gs (Bells) from a program instantly or to change all PR#1s to PR#2s if you move your printer card. Or you can ease the conversion of Integer Basic programs to Applesoft by using EROM #1 to convert TABs to HTABs, and so on. Also included is a special list command that uses all forty columns to display a program listing without extra embedded spaces. This makes editing with the cursor much less tedious.

EROM #2 provides automatic line numbering, formatted memory dump, and append features. Auto line numbering simplifies the entering of new programs and works much like that function in Integer Basic. The memory dump routine asks for a starting and ending address (in hex), then produces a listing of all memory locations within this range in hex and ASCII equivalent. This can be used by advanced programmers who like to play machine language tricks with their Applesoft programs. The append command allows two programs to be joined together. You have a program to do this on your Apple System Master disk, but it's much handier having this facility in ROM, because that way you can call it up at any time, without disturbing the program you're working on.

EROM #3 completes the *CRAE* functions. This one is actually two ROMs, containing Renumber and Quote. Renumber assigns new line numbers to a program, making appropriate changes in all GOTO and GOSUB statements. Quote is used to move blocks of program lines from one part of the program to another. One of the things you can do with this is move frequently used subroutines to the beginning of the program for faster execution.

EROM #1 and EROM #2 also include five "quick and dirty" commands: any monitor command can be executed by preceding it with an asterisk; the number of free bytes left for program storage can be displayed by entering an exclamation mark; another exclamation mark, followed by a four-digit hex number, returns the decimal equivalent of that number; entering a percent sign displays the decimal length and address of the last BLOADed machine language file; and the percent sign followed by a five-digit decimal number returns the hex equivalent of that number.

Spice Your Apple. Soft CTRL Systems of West Milford, New Jersey, must have worked overtime to present its wide variety of ROMs for the ROMplus+. They offer an Applesoft EditROM, a Renumber/MergeROM, and Disk Copy/Space ROM similar to those already described. Beyond this, they have a BasicsROM to replace the Basics disk needed for booting thirteen-sector disks on a sixteen-sector controller. Even better is a two ROM set, Dual DOS ROMs, that enables you to switch between DOS 3.2 and DOS 3.3 without booting. The advantage to having this utility in ROM is conservation of RAM space, and the utility is unaffected by DOS commands such as FP, INT, MAXFILES, and so on.

Another Soft CTRL Systems ROM, CommandROM, combines most of the capabilities of Apple's *FID* (disk file maintenance) and a menu program to simplify loading and running of programs. Single-letter commands are used to catalog, lock, unlock, delete, and change drives. The number of free sectors is also displayed. You can then load or run any file simply by typing L or R followed by a letter corresponding to that shown next to the file you want. This ROM program also tells you the start and length of binary files and offers a disk map showing which sectors of any disk are in use.

Finally, for all the fans of the *Program Line Editor* from A.P.P.L.E., Renton, Washington, Soft CTRL Systems offers to put your customized version of this utility in ROM. *PLE* is a very powerful tool for writing and debugging programs on the Apple. It includes a sophisticated line editor that eliminates the need to move the cursor over an entire Basic line when making changes. Also added is the ability to put lower-case or any control characters into a Print statement. Several user-definable keyboard macros are also part of *PLE*. Of course, you must purchase the *PLE* program before Soft CTRL Systems will put it in ROM for you.

Looking Ahead. The somewhat unimpressive number of ROMs currently available for the ROMplus+ may be partially due to the underwhelming popularity of the ROMplus+. This, in turn, may reflect the relatively high price of the board and the fact that many Apple owners don't have any free slots for it. One can only wonder why Mountain Computer itself has not come out with any new ROMs for this board in the last year. However, it seems reasonable to assume that as more ROMs become available for the ROMplus+, sales of the board will increase, and that will lead to further sales of ROMs, and so on.

The ROMplus+ may find another future in the field of copy protection for valuable programs. Software piracy is becoming a bigger and bigger problem, and some manufacturers are looking toward hardware or firmware solutions. By placing all or part of their programs in ROM, software distributors can drastically inhibit illegal copying, since few pirates will want to bother copying the ROM.

If enough good software becomes available for the ROMplus+, however, we may be faced with a dilemma worse than running out of slots in the Apple: running out of sockets on the ROMplus+! ◨

---

micro lab presents



By Dan and Marilyn Meller

Gather round ye Knights and Ladies. I tell of a new game written by Sir Dan and Lady Marilyn Meller. One encounters a challenging test of skill that only the bravest should attempt. The consequences are dire.

I know thou hast seen games played on wooden boards before. While this game has a board divided into hex shapes, it cannot be played on a table top! This one is played only on an Apple. It is a new game — with animation of a type you have never before seen.

In the Kingdom of Arthain, the dying King summons his previously banished sons, Berthain and Merthain. The good King sets his sons upon a perilous quest for the Kingdom's crown to determine the next ruler. The prince who successfully fords the stream, passing unharmed through hexes of forests and lakes, to discover the secret passage to the underground mountain hall wherein the crown lays, wins the right to be King. Be cautious! Fierce, lifelike monsters of a sort that would make nightmares seem pleasant, stalk the unwary, and appear suddenly without warning.

Ah, but such journeys are not inexpensive undertakings (not to mention perilous). Gold and a map may be acquired, but the special password must be discovered. There is a bit of magic to aid the stalwart princes in their battles against an even more gruesome creature set upon rendering their frail flesh as they are within reach of their goal.

This one or two player adventure can be played on twenty skill levels. While almost any knave can slay the monsters at the easier skill levels, only the most practiced knight can win at the highest levels. One must be a skillful and expert swordsman to win the Kinghood at Level 1. He must be prepared to thrust, hack, or shield his weapon at any moment or be mercilessly destroyed. Only the alert and clear-headed will succeed. Heed my counsel and go with God!

Make haste if you wish to see this high resolution color game at your Apple dealer. One needs 48K and Applesoft in ROM. The "Crown of Arthain" is priced at $35.

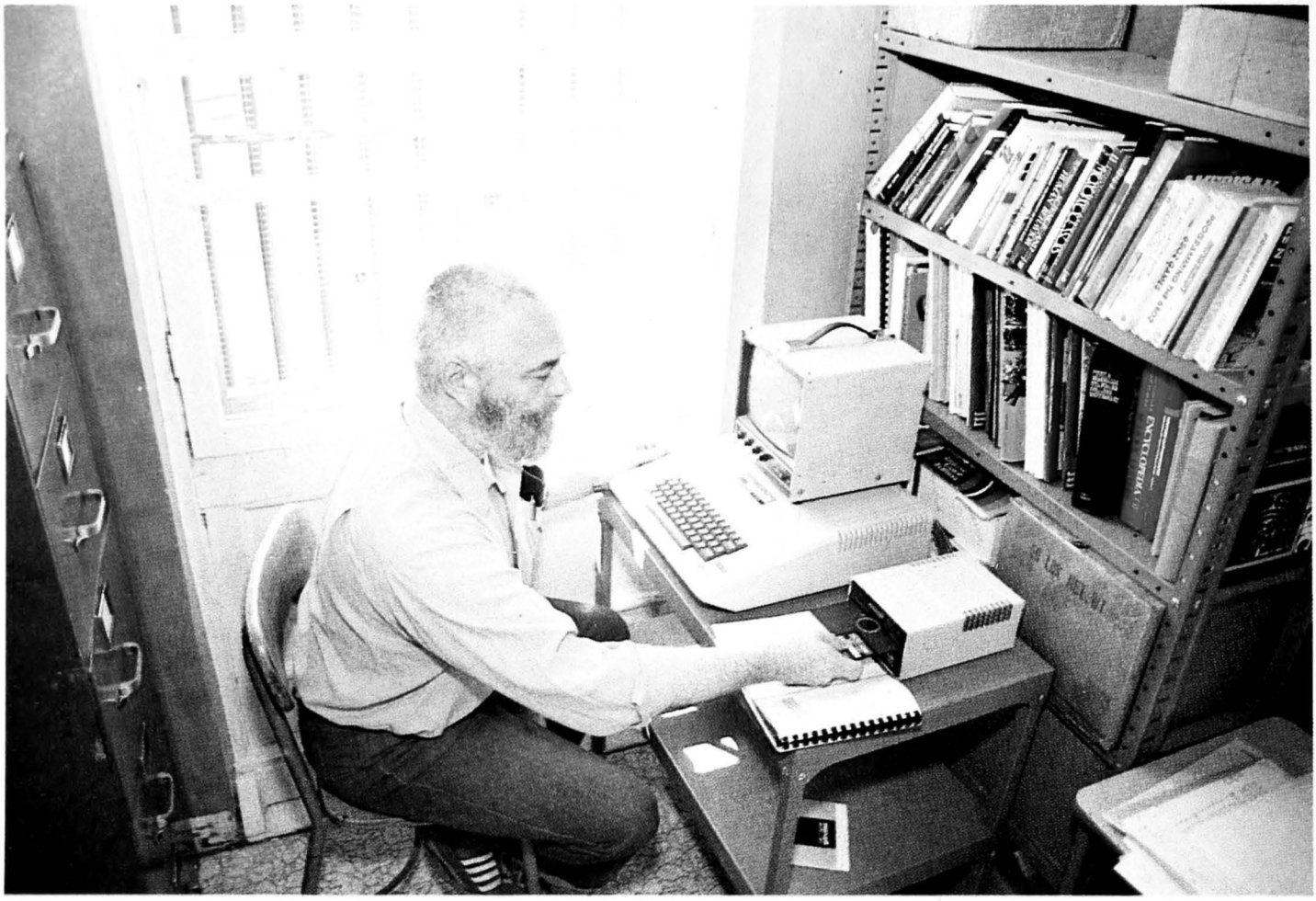
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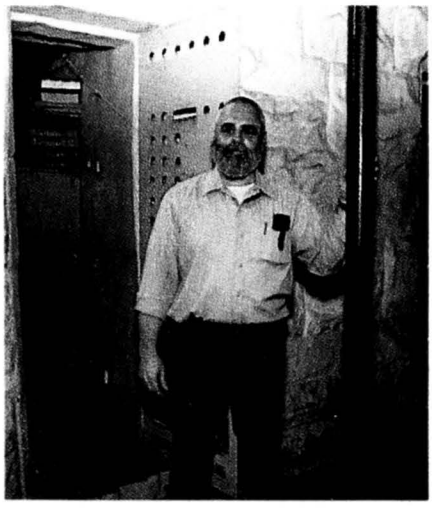
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Computers Behind Bars



BY MELISSA MILICH

Folsom Prison. Situated about twenty miles above metropolitan Sacramento, the hundred-two-year-old facility in the beautiful foothills of the Sierra Nevada has a bad reputation.

The state of California concentrates its most hardened criminals in Folsom and San Quentin. At Folsom, more than two thousand inmates are housed within the walls of the fortress; many are recent arrivals. The overcrowding has stirred tensions, and, within a thirty-day period at the beginning of this summer, nine stabbings and one death at Folsom created newspaper headlines.

Introducing an Optimistic Lifer. There's more to Folsom Prison than violence. Some inmates swear there's more danger on city streets than within the prison. One of these is Gottfried R. von Kronenberger, convicted murderer and former safecracker serving a life term.

Von Kronenberger is one of the moving forces behind the computer science program in the education department at Folsom, a program that's changing the lives of cons and ex-cons and threatens to change the reputation of the prison.

The program, now three years old, is not without controversy. Certain high level officials have wondered about the wisdom of putting computers in the hands of felons. The last thing the guards want is a carefully mapped escape route courtesy of the prison computer.

But a few spirited administrators have fought to keep the computers in, and the program at Folsom is thriving.

Four Layers of Clanging Locks. Just visiting the prison is an awesome experience. Following a security clearance, we walked through the first locked gate accompanied by Gigg Powers, principal of Folsom's education department. Up in the towers and along the walls, guards armed with rifles and binoculars continued a silent patrol.

Powers waited patiently while we were searched. There was another delay while a second security clearance was conducted on our cameras, tape recorder, and Apple computer.

Finally, the okay came through. We were ushered through a gate, which clanked shut behind us, to a waiting van in which a prisoner would drive us to still another security clearance.

This one was easier. We only had to show our gate passes. Another lock was opened and we entered the main prison yard, in which several hundred inmates stood around, some in groups, some alone.

Few women get inside, and it was little wonder that all eyes turned toward us. Powers seemed more embarrassed than we were when some of the inmates whistled.

"Hey, Powers!" someone shouted, "What class is that for?"

Powers looked up from the Apple II he was carrying and answered, "Computer science."

"Hey! Sign *me* up for that class!"

Computer Dearth Keeps Class Under Wraps. The computer science program is already popular enough, according to Gottfried von Kronenberger. He was waiting for us upstairs in the education department, which we reached after one more security clearance. Powers's office, formerly known as the principal's office, is fast becoming known as the computer room.

The prison now has three microcomputers, two printers, two disk systems, a cassette system, and a voice synthesizer. Donations and loans account for most of the equipment. There are no Apples at the moment, and the inmates have progressed enough to wish there were.

Regardless of make, any three systems would be woefully few for the interest the computer classes have generated—and without being publicized.

at Folsom Prison

Folsomer Amory Tyrel Everette plays—what else?—on Brand X.

"I'd be afraid of having an article come out in the prison paper saying there's an opening in a computer class because I think we'd probably get swamped," says von Kronenberger.

Powers says most of the students find out about the program through word of mouth. The class has a large waiting list now, and he believes it will eventually reach the point where they'll have to turn hundreds of prisoners away for lack of equipment.

Salable Skills Crucial to Rehabilitation. But why is there so much interest in computers? Why do some administrators stand so strongly behind the program and others remain unsure? Why would murderers and thieves be willing to wait patiently in line to take "Introduction to Microcomputers"?

Von Kronenberger doesn't have all the answers, but he understands some things perhaps too well.

"I've spent too many years in prison, and I know. It's dead time. It's lost time—unless you have a goal or can find something you're interested in while you're here. Something you can continue when you're in the free world."

Many of the inmates at Folsom are serving minimum sentences of fifteen years. And some of these inmates, noted von Kronenberger, start off their prison terms at a very early age.

"A lot of these long-term youngsters got off on the wrong foot, and some of them will never get off on the right foot," he says. "But the talent is there, the exuberance is there, and the youth is there. And you're going to have to give these guys something to do and something to look forward to because they get tired of sitting in their cells looking at 'Laverne and Shirley.' "

Von Kronenberger says most of the inmates at various prisons throughout the United States have little or no salable skills when they arrive. Inmates, he emphasizes, need a skill they can use after their release.

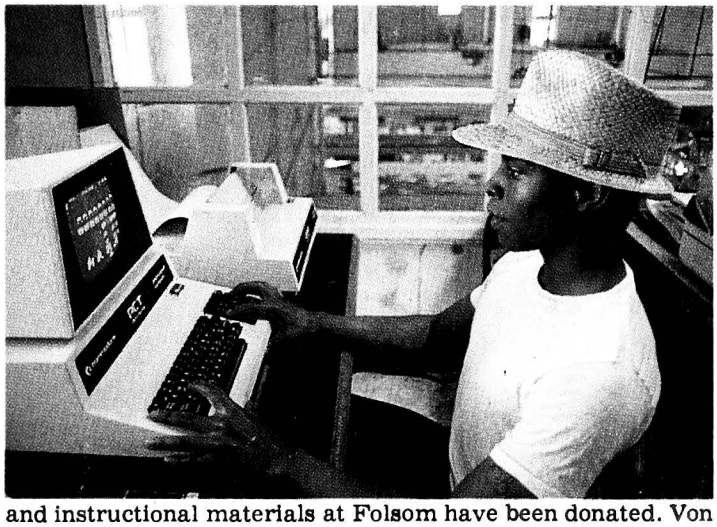
"Getting out of here is no problem. The problem is *staying* out of here."

Massachusetts Sets Precedent for Success. Several other prisons in the United States have computer education programs, and the Honeywell Project at the Massachusetts Correctional Institutions seems to be particularly successful. Honeywell set up computer programming classes at four prisons in Massachusetts beginning in the late sixties. Since that time, more than six hundred inmates have graduated from the program.

Their statistics also show that less than 3 percent of the inmates who have had enough instruction upon their release to qualify for an entry level position in the computer industry returned to prison. This can also be compared to a 30 percent statewide recidivism rate.

"It's really a good project, and, perhaps, a little further down the line when our program really gets underway here, we can also get some large computer manufacturer to sponsor us," says von Kronenberger.

One-Man Mail Crusade. Most of the computer components



and instructional materials at Folsom have been donated. Von Kronenberger has a manila folder crammed with an estimated thousand copies of letters he sent to various businesses and manufacturers requesting complimentary units of whatever particular materials or equipment they've produced. And he's still writing.

"Surprisingly, a lot of people want to help, and those that don't help give a lot of words of encouragement."

Von Kronenberger has also run into several corporations that "won't bend an inch."

"Generally, I know them. And you can almost forget it, you know. You're wasting your stamp."

But the prison does get that occasional yes. Coincidentally, during our visit, Robert Miller, supervisor of education at the prison who was on hand to answer questions, was paged to receive a telephone call. When he returned, Miller had good

news: the call had come from Diablo Systems, and they had selected one of their finest printers to send to Folsom.

"We go through this all the time," explains Powers. "I don't have a secretary, so I have to depend on the inmates. Von [Kronenberger] handles all the correspondence, and we get the calls checking to make sure we have a bona fide computer education program here."

Bona fide, yes. Rigid, no.

Like Us All, Prisoners Begin with Games. Powers believes working with computers can be a no-pressure arrangement



Maggie McGurk Softalk Photo

"Getting out of here is no problem. The problem is *staying* out of here."

and his program is set up to enhance that idea. Initially, Powers has his students come in and play video games on the computers. "It was sort of obvious the games were not threatening, and it introduces them to the machines," he says. "It was almost an obvious way to go."

So the inmates began playing *Star Wars*. Powers also structured the course so there are no examinations and no right or wrong answers. The only requirement is to work out a program. As long as it functions, it's acceptable; if not, Powers and the student go back and get it to work.

"It's kind of a no-failure type of class," he says.

Both Miller and Powers would like to have at least ten complete computer systems by the fall quarter. With the units, Powers believes he could handle about sixty students comfortably. He estimates that about three hundred inmates are now actively interested in pursuing the course.

"As an educator, I see that within the next few years all schools are going to have to have microprocessing as part of their curriculum. It's so obvious. Either that or the school is going to have to justify why they're *not* teaching it."

Powers Has To Convince Powers-That-Be. Powers admits some reluctance within the administration for the computer science program at Folsom. "I think perhaps they were a little skeptical at first. Since we're a prison, they're always concerned about what kind of positive impact it's going to have and what kind of negative impact it's going to have."

Powers says they managed to convince this faction that inmates can't use the computers to break out of prison, but there's a lot of convincing left to do. "They're still a little skeptical about what kind of information you can keep on a computer and what you can really do with it."

Besides education, the computer is used to keep records on the students, and this has met the approval of the administration. "The computer keeps track of the students, and that means control," notes Powers.

So, with administrative approval obtained, it looks as though the computer science program will keep growing.

A Computer of Many Tongues. Von Kronenberger says the offbeat mixture of equipment they have is helpful since it forces student programmers to develop programs that have transportability between the various machines.

"The more machines you can understand and can program, the better your chances in the job market."

Von Kronenberger is looking for somebody to donate Apples. "If we had the Apple, then we could load it with Fortran, Cobol, Pascal, and Forth. It'll hold just about the whole bag of

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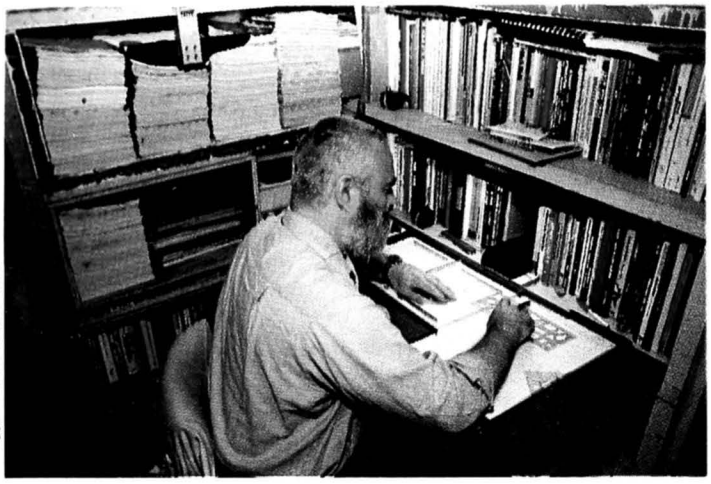
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languages. And with a 48K Apple system and the software behind it, they can teach almost any programming language commercially available."

Von Kronenberger advocates learning more than one dialect of Basic. "It's like I tell the guys in the yard: if you learn Basic and learn it well, you can develop programs while sitting in your cell."

He explained that there's a large market for freelancers to



Maggie McGurk Softalk Photo

develop software programs for drill and practice in math, reading, and language arts; for tutorials in reading and language; and for simulations in science and social studies; as well as video games.

Powers agrees. "Programming is a salable skill. If these inmates could learn how to program, a jail record in most cases would not detract from a job opportunity. And there are many types of independent programs they could do in their own homes."

Nonconformists Make Good Programmers. "Every magazine you pick up has an ad in it begging for programmers," adds von Kronenberger. "And there's a lot of unique thinking in here.

"A lot of convicts think a little different. That's one of the reasons they're in here. Many of them are more imaginative and many of them are nonconformists. And the nonconformists make the best artists—the best programmers."

Von Kronenberger believes prisoners should start earning money while in Folsom. "When you get out of here, you're in trouble, because you're released with only $200. You need more than that to pay for your room and board and help you carry over till that first paycheck arrives.

"We need to have a program here where a guy can start making some money and have some in the bank when he's released."

Von's Opportunity To Prove His Point. Von Kronenberger is up for parole this October after nine years and six months at Folsom. He's optimistic about the release and has already lined up a job setting up a new computer system for a construction business owned by a friend in Michigan.

Von Kronenberger has been involved with computers since 1960; he trained with RCA when they introduced their 301 and 501 mainframe core computers at that time. At Folsom, he's taken correspondence courses and reads just about every book on computers he can get. He's invested most of his time in the computer program at Folsom for a reason. He believes computers can greatly benefit inmates before and after their release.

The recidivism rate at Folsom doesn't presently stand out from that for California (figures are not broken out by facility in that state) which Gil Miller, administrative assistant at the prison, estimates to be about 30 percent. But a number of individuals believe this will change when Folsom starts turning out trained programmers. Time will tell if von Kronenberger will be part of that success story. ◨■

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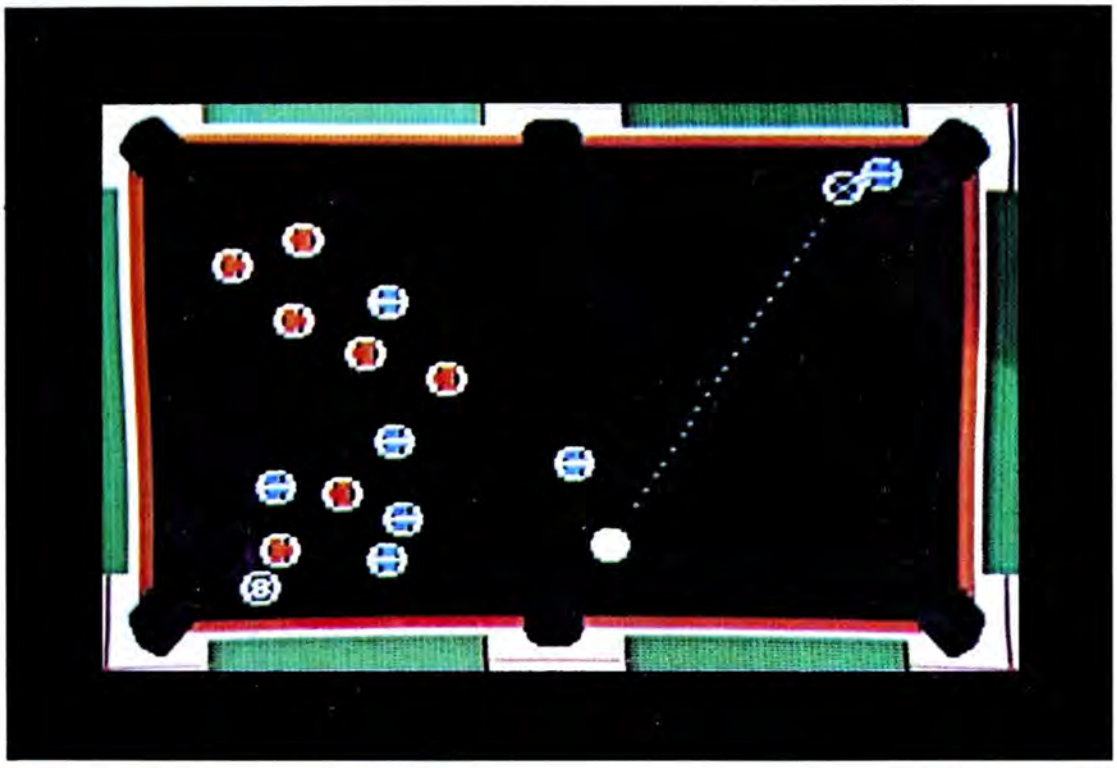
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Assembly Lines by Roger Wagner

Everyone's Guide to Assembly Language, Part 11

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—	CMP	CPX	CPY	PHA
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Indirect Indexed
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One of the more useful applications of machine language is in accessing the disk directly to store or retrieve data. You might do this to modify information already on the disk, such as when you're making custom modifications to DOS (the disk operating system), or to deal with data within files on the disk, such as when you're patching or repairing damaged or improperly written files.

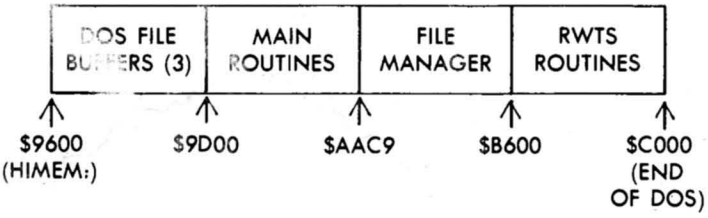
To cover DOS well requires more than a few articles such as this. My intent here, then, is to supply you with enough information at least to access any portion of a disk and to have enough basic understanding of the overall layout of DOS and disks to make some sense of what you find there.*

Here's what we'll cover in this article. First, we'll paint a general overview of what DOS is and how the data on a diskette is arranged. Then you'll learn a general access utility with which you can read and write any single block of data from a disk. With these, you'll have a starting point for your own explorations of this aspect of your Apple computer.

The Overview: DOS. An Apple without a disk drive has no way of understanding commands like CATALOG or LOAD. These new words must enter its vocabulary from somewhere. When an Apple with a disk drive attached is first turned on or a PR#6 is done, this information is loaded into the computer by a process known as *booting*.

In this process, a small amount of machine language code on the disk interface card reads in data from a small portion of the disk. This data contains the necessary code to read in another 10K of machine language referred to as DOS. This block of routines is responsible for all disk-related operations in the computer. It normally resides in the upper 10K or so of memory, from $9600 to $BFFF.

After booting, the organization of the memory used by DOS looks something like this:



*For a detailed look at DOS, I recommend the very recent book *Beneath Apple DOS*, by Don Worth and Pieter Lechner (Quality Software, Reseda, CA, 1981).

The first area contains the three buffers set aside for the flow of data to and from the disk. A buffer is a block of memory reserved to hold data temporarily while it's being transferred. The maxfiles command can alter the number of buffers reserved, and thus change the beginning address from $9600 to other values. As it happens, three buffers are almost never needed, so, in a pinch for memory, you can usually set maxfiles to two, and often to just one.

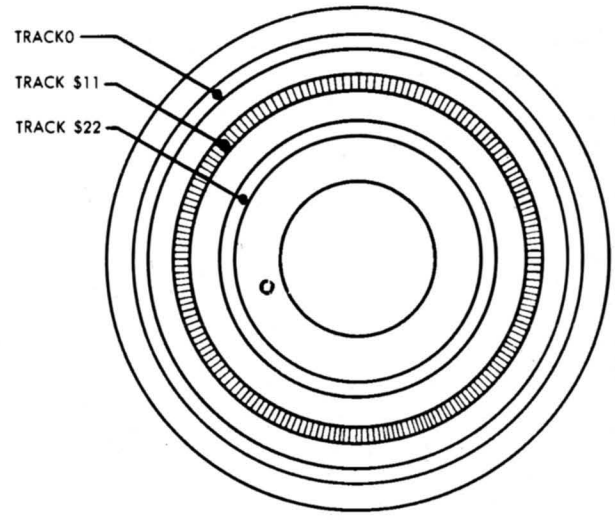
For example, if you had opened a textfile called Textfile, the data being read or written would be transferred via buffer #1. If while this file was still open, you did a catalog, buffer #2 would be put in use. If instead, you opened two other files, say Textfile2 and Textfile3, and then tried to do a catalog, you would get a NO BUFFERS AVAILABLE error (assuming maxfiles was set at three). Buffer #1 starts at $9AA6, #2 at $9853, and #3 at $9600. If maxfiles is set at three as in a normal system, it's occasionally useful to use the dead space of the unused #3 buffer for your own routines.

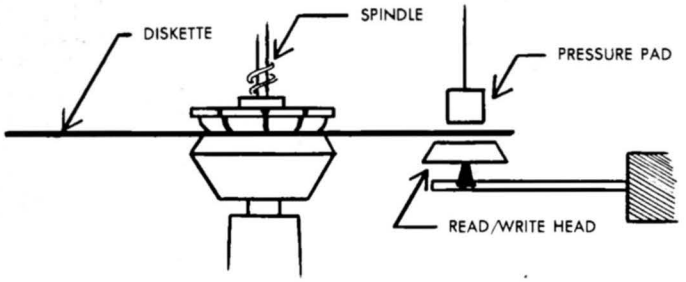
The main DOS routines starting at $9D00 are the ones responsible for interpreting commands such as catalog and, in general, for allowing DOS to talk to Basic via Control-D prefixed statements.

The file manager is a set of routines that actually executes the various commands sent via the main routines and that makes sure files are stored in a logical (well, almost) manner on the disk. This takes care of finding a file you name, checking to see if it's unlocked before a write, finding an empty space on the disk for new data, and countless other tasks required to store even the simplest file.

When the file manager gets ready to read data from or write data to the disk, it makes use of the remaining routines, called the RWTS routines. This stands for Read/Write Track Sector. To understand fully what this section does, though, it will be necessary now to look at the general organization of the disk itself.

Diskette Organization. Physically, a diskette is made of a material very similar to magnetic recording tape and is used by small portions of the surface being magnetized to store the required data in the form of ones and zeros.





But the diskette is more analogous to a record than to a continuous strip of tape. Arranged in concentric circles, there are thirty-five individual *tracks*, each of which is divided into sixteen segments called *sectors*.*

Tracks are numbered from 0 to 34 ($00 to $22), starting with Track 0 in the outer position and track 34 nearest the center. Sectors are numbered from 0 to 15 ($00 to $0F) and are interleaved for fastest access. This means that sector 1 does not immediately follow sector 0 when moving in the opposite direction from the diskette rotation. Rather, the order is:

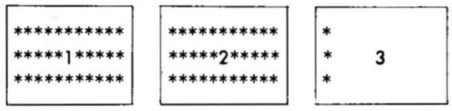
0 – D – B – 9 – 7 – 5 – 3 – 1 – E – C – A – 8 – 6 – 4 – 2 – F

By the time DOS has read in and processed one sector, it doesn't have sufficient time to read the very next sector properly. If the sectors were arranged sequentially, DOS would have to wait for another entire revolution to read the next sector. By examining the sequence, you can see that after reading sector #0, DOS can let as many as six other sectors go by and still have time to start looking for #1. This alternation of sectors is sometimes called the *skew factor* or just *sector interleaving*.

Looking for a given sector is done with two components. The first is a physical one, wherein the read/write head is positioned at a specific distance from the center to access a given track. The sector is located via software by looking for a specific pattern of identifying bytes. In addition to the 256 bytes of actual data within a sector, each sector is preceded by a group of identifying and error-checking bytes. These include, for example, something like $00/03/FE for track $00, sector $03, volume $FE. By continously reading these ID bytes until a match with the desired values occurs, a given sector may be accessed.

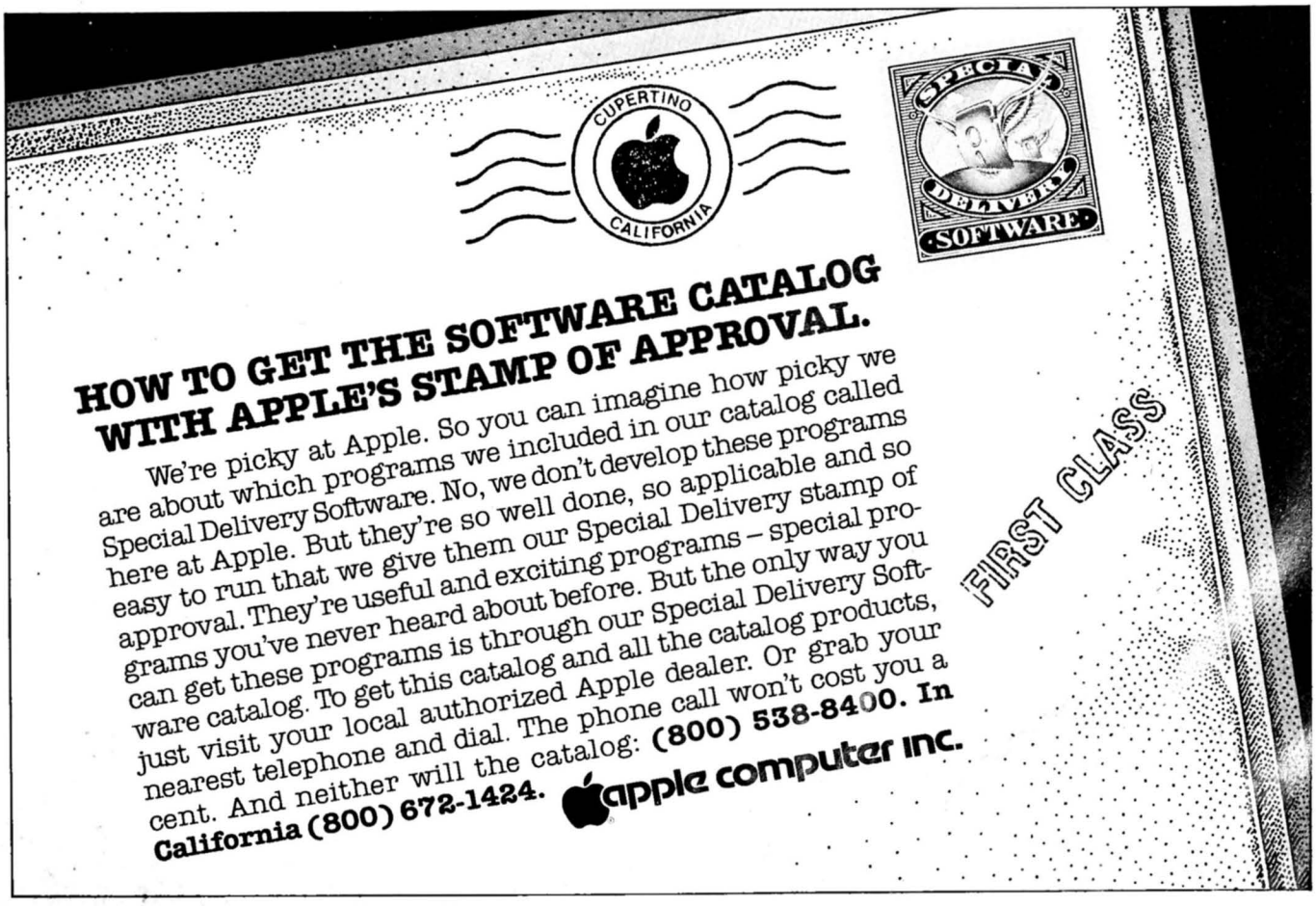
This software method of sector location is usually called *soft-sectoring*, and it's somewhat unique to the Apple. Most other microcomputers use *hard-sectoring*. This means that hardware locates the sector as well as the track. This is done by indexing holes located around the center hole of a disk. Even Apple diskettes have this hole, along with one to sixteen matching holes in the media itself, but these aren't actually used by the disk drive. This is why using the second side of a disk is just a matter of notching the edge to create another write-protect tab. We'll not go into the pros and cons of using the second side but will leave that to you. It's one of those topics guaranteed to be worth twenty to thirty minutes worth of conversation at any gathering of two or more Apple owners.

Each sector holds 256 ($100) bytes of data. This data must always be written or read as a single block. Large files are therefore always made up of multiples of 256 bytes. Thus a 520 byte file would take up three entire sectors, even though most of the third sector will be wasted space (520 = 2 × 256 + 8).



Certain tracks and sectors are reserved for specific information. Track 17 ($11) for example contains the directory. This gives each file a name, and also tells how to find out which sectors on the disk contain the data for each file. Track 17, Sector 0 contains the volume table of contents (VTOC), which is a master table of which sectors currently hold data, and which are available for storing new data. If all of track 17 is damaged,

*Throughout this discussion, we will assume DOS 3.3, which uses sixteen sectors per track. DOS 3.2 has only thirteen sectors per track but is rapidly becoming obsolete. If you're using DOS 3.2, the correction from sixteen to thirteen should be made in the topics throughout.



it may be nearly impossible to retrieve any data from the disk even though the files themselves may still be intact.

The other main reserved area is on tracks 0 through 2. This is where the DOS that will be loaded when the disk is booted is held. If any of these tracks are damaged, it will not be possible to boot on the diskette, or if the disk does boot, DOS may not function properly.

As a variation on this theme, by making certain controlled changes to DOS directly on the disk you can create your own custom version of DOS to enhance what Apple originally had in mind. These enhancements will become part of your system whenever you boot your modified diskette. Some modifications of this type are discussed at the end of this article.

To gain access to a sector to make these changes, however, we need to be able to interface with the routines already in DOS to do our own operations. This is most easily done by using the RWTS routines mentioned earlier. Fortunately, Apple has made them fairly easy to use from a user's machine language program.

To use RWTS, you must do three general operations:

1) Specify the track and sector you wish access to.

2) Specify where the data is to be loaded to or read from (that is, give the buffer address).

3) Finally, call RWTS to do the read/write operation.

If the operation is to be a read, then we would presumably do something with the data in the buffer after the read is complete. If a write is to be done, then the buffer should be loaded before calling RWTS with the appropriate data. Usually, the way all this works is to read in a sector first, then make minor changes to the buffer, and then write the sector back out to the diskette.

Steps 1 and 2 are actually done in essentially the same operation, by setting up the *IOB* table (for input/output and control block). This is described in detail (along with the sector organization) in the Apple DOS Manual, but here's enough information to "make you dangerous" as the saying goes:

The IOB table is simply a table in memory somewhere that contains a list of all the important parameters needed by RWTS to do what you want (along with some unimportant ones, too . . .).

Either you can make up your own table at a location of your choice or you can use the one already in memory, which is used by DOS in its own operations. Most people I know seem to prefer to make up their own, but my personal preference is to use the one in DOS. Since most people I know aren't at this keyboard right now, I'll explain how to set up the table in DOS.

The table is made up of seventeen bytes and starts at $B7E8. It's organized like this:

LOCATION	CODE	PURPOSE
$B7E8	$01	IOB type indicatar, must be $01.
B7E9	60	Slot number times sixteen (natice that this calculatian, like multiplying by ten in decimal, means just maving the hex digit ta the left one ploce).
B7EA	01	Drive number.
B7EB	00	Expected valume number.
B7EC	12	Track number.
B7ED	06	Sectar number.
87EE	FB	Law-arder byte af device characteristic toble.
B7EF	B7	High-order byte of D.C.T.
B7F0	00	Law-arder byte af data buffer starting address.
87F1	20	High-arder byte af data buffer.
B7F2	00	Unused.
B7F3	00	Unused.
B7F4	02	Command cade; $02 = write.
B7F5	00	Errar cade (ar lost byte of buffer read in).
87F6	00	Actual valume number
B7F7	00	Previaus slat number accessed.
B7F8	01	Previaus drive number accessed.

Because DOS has already set up this table up for you, it isn't always necessary to load every location with the appropriate values. In fact, if you're willing to continue using the last accessed disk drive, you need only specify the track and sector, set the command code, and then clear the error and volume values to 00. However, for complete accuracy, the slot and drive values should also be set so you know for sure what the entry conditions are.

Once the IOB table has been set up, the accumulator and Y register must be loaded with the high-order and low-order bytes of the IOB table, and then the JSR to RWTS must be done. Although RWTS actually starts at $B7B5, the call is usually done as a JSR $3D9. This is because DOS sets up the RWTS vector at $3D9 when it first boots. The advantage of calling here is that if Apple ever changes the location of RWTS, only the vector address at $3D9 will be changed and a call to $3D9 will still work.

A vector is the general term used for a pointer, or JMP/JSR, set up somewhere in memory to go to a certain routine. The nice part about vectors is that they're something like a telephone switchboard. Even though the user always calls the same address, the program flow can be directed to any number of different places simply by changing two bytes at the vector location.

The best way to finish explaining how to use the IOB table and RWTS is to present the following utility to access a given track and sector using RWTS. We'll then step through the program and learn why the various steps are done to use RWTS successfully.

```
 1  ************************
 2  *                      *
 3  *  GEN'L PURPOSE RWTS  *
 4  *    DOS UTILITY       *
 5  *                      *
 6  ************************
 7  *
 8  *
 9    OBJ $300
10    ORG $300
11  *
12  CTRK EQU $06
13  CSCT EQU $07
14  UDRIV EQU $08
15  USLOT EQU $09
16  BP EQU $0A ; BUFFER PTR.
17  UERR EQU $0C
18  UCMD EQU $E3
19  * USER SETS THIS TO HIS CMD
20  *
21  RWTS EQU $3D9
22  *
23  * BELOW ARE LOCS IN IOB
24  SLOT EQU $B7E9
25  DRIV EQU $B7EA
26  VOL EQU $B7EB
27  TRACK EQU $B7EC
28  SECTOR EQU $B7ED
29  BUFR EQU $B7F0
30  CMD EQU $B7F4
31  ERR EQU $B7F5
32  OSLOT EQU $B7F7
33  ODRIV EQU $B7F8
34  *
35  READ EQU $01
36  WRITE EQU $02
37  *
38  *
39  *
40  ****************************
41  *  ENTRY CONDITIONS: SET   *
42  *  TRACK, SECTOR, SLOT, DR, *
43  *  BUFFER AND COMMAND.     *
44  ****************************
45  *
46  *
47  *
48  CLEAR CLC
49    LDA #$00
50    STA ERR
51    STA UERR
52    STA VOL
53  *
54    LDA USLOT
55    STA SLOT
56  *
57    LDA UDRIV
58    STA DRIV
59  *
60    LDA CTRK
61    STA TRACK
62  *
63    LDA CSCT
64    STA SECTOR
65  *
66    LDA UCMD
67    STA CMD
68  *
69    LDA BP
70    STA BUFR
71    LDA BP+1
72    STA BUFR+1
73  *
74    LDA #$B7
75    LDY #$E8
76    JSR RWTS
77    BCC EXIT<RD/WRT>
78  *
79  ERRHAND LDA ERR
80    STA UERR
81  *
82  EXIT<RD/WRT> RTS
83  *
```

This should list from the Monitor as:

```
*300L
0300-  18          CLC
0301-  A9  00      LDA  #$00
0303-  8D  F5  B7  STA  $B7F5
0306-  85  0C      STA  $0C
0308-  8D  EB  B7  STA  $B7EB
030B-  A5  09      LDA  $09
030D-  8D  E9  B7  STA  $B7E9
0310-  A5  08      LDA  $08
```

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```
0312- 8D EA B7    STA  $B7EA
0315- A5 06       LDA  $06
0317- 8D EC B7    STA  $B7EC
031A- A5 07       LDA  $07
031C- 8D ED B7    STA  $B7ED
031F- A5 E3       LDA  $E3
0321- 8D F4 B7    STA  $B7F4
0324- A5 0A       LDA  $0A
0326- 8D F0 B7    STA  $B7F0
0329- A5 0B       LDA  $0B
032B- 8D F1 B7    STA  $B7F1
032E- A9 B7       LDA  #$B7
0330- A0 E8       LDY  #$E8
0332- 20 D9 03    JSR  $03D9
0335- 90 05       BCC  $033C
0337- AD F5 B7    LDA  $B7F5
033A- 85 0C       STA  $0C
033C- 60          RTS
```

When this program runs, it assumes the user has set the desired values for the track and sector wanted, which slot and drive to use, where the buffer is, and whether to read or write.

Starting at the first functional line, #48, the carry is cleared. This is because later on we'll want to test to see if an error occurred while trying to access the sector. If the carry flag is set upon return from RWTS, we'll know an error has happened. The error code in the IOB table can then be checked to see just what kind of error it was. The thing to remember here is that the carry is *only set* if an error occurs; it is *not cleared* if there is no error. Therefore, the carry must be cleared before access to ensure a reliable state after return from RWTS. Like wise, the error code at $B7F5 is only set if there's an error. Otherwise this location will hold the value of the last byte read into the buffer.

Once the carry is cleared, zeros are stored at the IOB error location (ERR), the user error location (UERR), and the volume number (VOL). Because the volume number is not usually a concern, this routine reads any volume number diskette. If this was a concern here, the code would have to be modified to load a user value for the acceptable volume number here.

In the next four sets of operations, the user values for the slot, drive, track, and sector numbers are put into the IOB table. Notice that, to have this work properly, you must set USLOT ($09) to sixteen times the value for the slot you wish to use. For example, to access slot #5 you would store a $50 (80 decimal) in location $09 just before calling this routine.

The next pair of statements take the user command (UCMD) and put that in the table. If you want to read a sector, set UCMD = $01. A write is UCMD = $02. A few other options are seldom used. These are described in more detail in the DOS 3.3 manual in the section on RWTS.

Next, the buffer pointer is set to the value given by the user in locations $0A and $0B. The required space is 256 bytes ($100) and can be put anywhere that this won't conflict with data already in the computer. Convenient places are the #3 DOS file buffer ($9600), the input buffer itself ($200), or an area of memory below $9600 protected by setting HIMEM to an appropriate value.* In the examples that follow, I'll use the area from $1000 to $10FF because no Basic program will be running and it's a nice number. In this case, $0A and $0B will be loaded with $00 and $10, respectively.

Last of all, the accumulator is loaded with #$B7 and the Y register with #$E8, the high-order and low-order bytes of the IOB table address.

After the call to RWTS via the vector at $3D9, the carry flag is checked for an error. If the carry is clear, there was no error and the routine returns via the RTS. If an error was encountered, the code is transferred from the IOB table to the user location. The possible error codes are:

CODE	CONDITION
$10	Disk write-protected, ond connot be written to.
$20	Volume mismatch error. Volume number found wos different thon specified.
$40	Drive error. An error other than the three described here is happening (I/O error, for exomple).
$80	Reod error. RWTS will try forty-eight times to get o good reod; if it still fails, it will return with this error code.

Examples: DOS Modifications. One of the best ways to grasp this routine is to use it to modify the DOS on a sample disk and observe the differences. Before proceeding with the examples, boot on an Apple master disk, then INIT a blank disk. This will be our test piece so to speak. *Do not* try these experiments on a disk already containing important data. If done correctly, the changes wouldn't hurt, but if an error were to occur you could lose a good deal of work!

#1: Disk-Volume Modification. First install the sector access routine at $300. Now insert the sample diskette. Enter the Monitor with CALL −151 and type in:

```
*06: 01 0D 01 60 00 10
*E3: 01
```

This assumes your diskette is in drive #1, slot #6. Now enter:

```
*300G
```

The disk motor should come on. When it stops type in:

```
*10AFL
```

You should get something like this:

```
10AF - A0 C5      LDY  #$C5
10B1 - CD D5 CC   CMP  $CCD5
10B4 - CF         ???
10B5 - D6 A0      DEC  $A0,X
10B7 - CB         ???
10B8 - D3         ???
10B9 - C9 C4      CMP  #$C4
```

This apparent nonsense is the ASCII data for the words *disk volume*, in a reverse order. This is loaded in when the disk is booted and is used in all subsequent catalog operations.

The data was retrieved from track 1, sector D, and put in a

*Note: The input buffer can only be used temporarily during your own routine. If you return to Basic, or do any input or DOS commands, data in this area will be destroyed. Other than that, it's a handy place to use.

GOTO 74

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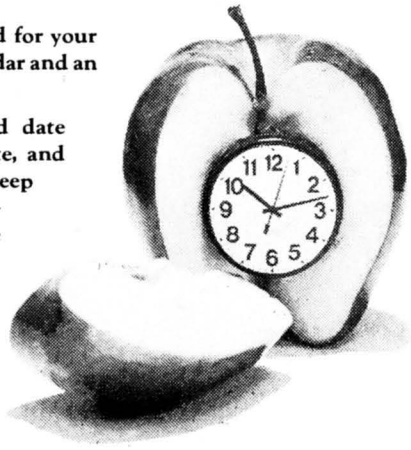
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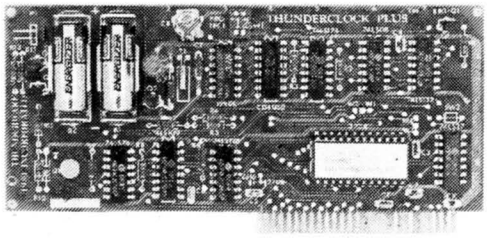
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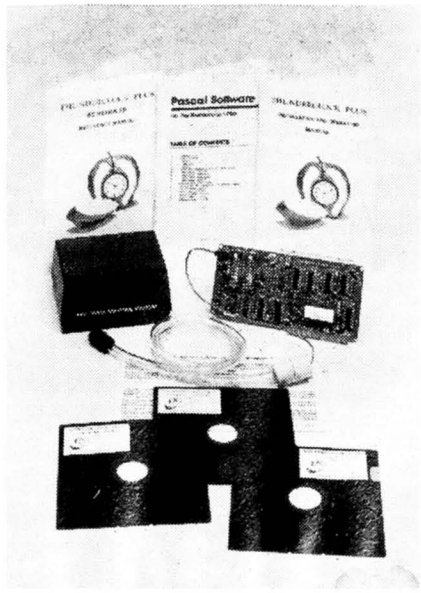
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Robots!



Can you imagine a robot that sits and thinks about something, dreams about something? A hundred years ago, people thought this was impossible. After all, what would the robot do? Play back all its memories of a subject, and then determine its feelings?

They should have known. The question today is: What will there be a hundred years from now?

Orrin Mcdravat
Moon, 2081

The bogus quotation draws attention to one thing robots and robotics cannot avoid: progress. Expansion and technological advancements could make the robot industry huge and far reaching. You've heard of the Third Industrial Revolution?

Good, you're ready.

A Robot Is a Robot Is . . . Not. Just what are robots, and what can they do for us? The first problem is to be able to identify a robot when you see one. A working definition on which everyone agrees is one technological advancement denied robots so far.

The dividing line seems to be whether or not the robot reacts to its environment. Also, a robot is supposed to be better at performing its prescribed function than a man or a woman would be: bigger, stronger, faster, and smarter. Purists also insist that a true robot, after reacting to the environment, must exhibit behavior that ordinarily would require human intelligence. Yet many so-called robots are merely automatic machines performing complex, preprogrammed tasks, like welding or spray painting. They are nothing but sophisticated, expensive parts in automation systems—deaf, dumb, and blind, bolted to the floor, and not about to start a revolution.

Although most real-life robots, like these, are senseless and perform only a limited range of tasks, no one seems to accept these limitations as binding. Technology will soon whip the problems of vision and tactile sense, and then the sky's the limit.

Cuddle Up with Your Robot on a Cold Winter Day. This brings us to a long-standing robot myth—the humanoid robot, or android. We imagine that humanoid robots would be smarter, faster, and stronger than people. So, everybody wants one! At least it's great to think about, but what would a humanoid robot do? Provide comic relief, like C3PO? Or would there soon be legions of Ceylons exterminating people right and left? (Must robots always be good or evil? Perhaps robots could be like pets, sleepy and silent, companionable in their mechanical way. A purring program would be appropriate.)

Robots are supposed to give people more time for. . . . Fill in the blank. Just imagine all the free time you would have if you never had to vacuum the floor, mow the lawn, clean the pool, trim the hedge, feed and walk the dog, or wash a dish. Whoa, there! European nobility has had all these advantages since God only knows when, and what has it done for them?

Then again, it wouldn't be so bad to have a witty, intelligent friend to put logs on the fire and fix margaritas when you're old and tired.

A Century Is More Than a Lifetime. In 1881, the British suffered defeat at the Battle of Majuba Hill and lost the Transvaal. They knew the vision of spaceships and submarines, but could they also have imagined that in a hundred years fourteen robots would be welding J-cars in southern California? Of course not. A century is a long time. And what's in store in 2081 will undoubtedly be something quite amazing. (Not the least amazing possibility is that some of us might be there to see it!)

Putting myths and the unknown future aside for the moment, real, live (so to speak) robots have an illustrious history. The Philadelphia Man invented by Benjamin Franklin (read your history books!) could eat a loaf of bread. In 1900, the celebrated Bangor Man beat all comers at checkers. The autopen that protected President Kennedy from writers' cramp became a star with its own book: *The Robot That Helped To Make a President.*

by
David
Hunter

The term robot was coined by Karl Capek in his 1921 drama, *R.U.R. (Rossum's Universal Robots)*. The artificially produced persons in this play, brutally efficient and insensitive, could also be called automatons.

Some famous real-life automatons include Silent Sam, the friendly automaton traffic controller that worked on New York's Triborough Bridge in the sixties; Moonlight Special, Ron Dilbeck's amazing micromouse that could find its way out of a maze; and Leachim, created by Michael Freeman, an automaton that taught children in the Bronx.

Yesterday's Myth Helps Us Live with Tomorrow's Reality. The manifestations of the robot myth in popular media should help people adjust to the presence of robots in their daily lives. Everybody has an idea about what a robot should be like, and it's easy to see why. In this century, a remarkable array of mechanical devices has emerged from the imaginations of writers and artists. Movies (and their peripherals, toys and posters) have given robots a face and an image. Once you've seen her, it's impossible to forget the chilling robot girl in Fritz Lang's *Metropolis.* It's also hard to forget Huey and Duey, the two silent, hard-working, almost human robots in *Silent Running.* (One would like to forget Hymie from the old "Get Smart" TV show.)

The movie *Star Wars* has done much to bring robots into the public eye. If one forgives the Laurelesque C3PO, the other 'droids seem realistic enough. A scanning device for making repairs (called Squeek), a metal nurse, and an automatic planetary probe are just a few of the gems from the robotic treasure chest that can be found in the first two *Star Wars* films.

If you've seen many of the big movies of recent years, you've probably seen the work of Robin Leyden. His credits in the field of electronic effects include *1941, Star Trek,* and *Close Encounters of the Third Kind—the Special Edition.*

Currently Leyden has a partner and a company called Anilab, short for animation laboratories. One of Anilab's concerns is closed loop servo systems, feedback systems that keep a robot or automatic machine from being "lunched." Last year's much-publicized incident at the University of Florida, where a robot popped a chip and tore off its arm, is an example of a robot that "went to lunch."

Robots are international, and so are roboticists. Alvaro Villa, president of A.V.G. Products in Valencia, hails from Colombia but has lived in the United States for twenty years. His interest in audio animatronics and amusement park robotics peaked during a term of research and development at Disney Studios. After that, he decided to form his own company.

A typical robot creature emerging from A.V.G. (destined, no doubt, to scare the wits out of some unsuspecting kid) begins as a series of sketches and paintings. From these a small model is made, and then the full-size figure is designed. A skeleton is constructed, and motors and electronic circuitry are put in place. The fiberglass outer body is applied and can be painted to look like anything from spiders to dragons. All computer programming of the figures, as well as about 80 percent of the actual writing of dialogue and recording of voices, is done on the premises.

Robots Need Plenty of Space—and Vice Versa. Robots have always had a special place in space. Automated satellites, robot scouts, remote controlled vehicles—it doesn't matter what you call them, they're all different types of robots. For decades now, dozens of these American and Russian-built robots have been crashing headlong into planets and moons or flying off into space, never to be heard from again. Best known today are the robot probes Voyager I and Voyager II. Having already brought Jupiter and Saturn into our living rooms, these probes are still out there, making their way to Uranus, Neptune, and interstellar space.

In the sixties, Goddard Space Flight Center and Pasadena's Jet Propulsion Laboratory were the kings of the plane-

Illustration by Robert Zraick

tary probes and orbiting satellites. JPL may look harmless from the outside, but inside, unseen by the neighbors, autonomous and semiautonomus machines are making decisions and performing tasks through telecommunication and teleoperation.

The JPL Planetary Rover weighs 700 pounds and is powered by an RTG (integrated radioactive thermal generator). The rover can travel at a speed of one meter per minute by means of a four-legged loopwheel mobility system using jointed suspension. It can manage twenty-four-inch obstacles or holes. Vision systems are now being perfected for use on future rovers in which cameras, computer, and manipulator will form a hand/eye system. Soon the manipulator will be able to grasp moving objects, making it possible to retrieve satellites in space.

Robot Civilization and the Industrial Age of Space. In the long run, all this is meant to help get space industrialization started. In its robotics fact sheet, JPL considers future automated space systems: imagine orbiting manufacturing modules, lunar rovers, lunar base systems, remote controlled or manned carriers to trash nuclear waste, and a network of space stations and space transportation with systems to provide onboard health care. The successful flight of the Space Shuttle was the first step, making the STS (Space Transport System) possible.

Multibeam technology will revolutionize information handling, making possible something called telecommuting, in which large multibeam antennas can broadcast preprocessed information directly to the individual. Automated instrumentation and automated material processing will make possible the mining of the moon and asteroids.

The application of robotics in space to look for next is the RMS (Remote Manipulator System) on future shuttle flights. Don't be surprised if by the year 2000 there are self-replicating robot systems in space, with a self-supporting economy. Such schemes are being discussed widely today.

The Economy of Robots. Economics goes hand in hand with robots. In a 1979 article for *Robotics Age*, Dr. Ewald Heer of JPL argues that economics will make the industrialization of space the province of robotics, automation, and teleoperation technology. Sending the Viking Lander with its onboard intelligence to Mars was much cheaper and safer than it would have been to send a human being.

Economics is not the only factor favoring robots. Let's not forget that robots are supposed to relieve drudgery. They've done this already and will do a lot more of it in the future.

The prehistory of robots in industry is the automation of the fifties. The pros and cons of automation were hotly discussed in those days, as they are today.

In the sixties, Joseph Engelberger, founder of Unimation, entered the picture. Engelberger is often considered the father of robotics. But his role has been more that of a holy man bringing robots into the world, convincing more and more businesses to make homes for the poor, soulless creatures.

For Engelberger, it all started in 1958 with a company called Consolidated Controls, which made controls and valves for aerospace, using servo technology. With George Devol of RCA, Engelberger came up with an idea for an industrial robot. In 1961, the two men put together their first machine in a General Motors plant in Trenton, New Jersey.

In a recent interview for *Robotics Age*, Engelberger made a strong case for robots, pointing out that those first robots are still working today and aren't very different in design from today's models. Their durability and reliability surely surpass what a mere human can do, Engelberger said, at least on dull and repetitive tasks.

What about the Buggy Whip Makers? In the early seventies, intelligent robots began to emerge from Stanford Research Institute. The first one, Shakey, had vision and a range finder that enabled it to explore a room, remember things, and perform simple tasks.

Rumor has it that 50 percent to 75 percent of United States factory workers could be displaced by robots by the year 2000. Sound incredible? Joseph Engelberger thinks not, with his ideas of "rationalizing the workspace." In the *Robotics Age* interview, he expressed great faith that massive unemployment will

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not result and that making factories a "friendly place for a robot to work" is the way of the future.

But what about the employment problem? According to Engelberger, "I think that if you do it [introduce robot labor] in a reasonably gentle fashion, it will work. Do it no faster than the attrition rate. That's retirements, pregnancies, and wanderlust, whatever it is that makes people leave their jobs. A robot happens to fit into that very nicely, because it does so many different things."

Robots are certainly being put to good use at the General Motors Southgate plant in southern California. Fourteen robots purchased from Cincinnati Milacron and ASEA, a Swedish company, perform 450 spot welds on car bodies in one of the first stops on the assembly line.

Another industrial robot is the T3R3 from Cincinnati Milacron, used in welding and sensing operations in auto plants. Using the same base and upper arm of the earlier T3 robot, the T3R3 has a new wrist configuration design called the Three Roll Wrist, which has all six degrees of freedom and can be guided through its task with a handheld teach pendant.

Alan M. Thompson, cofounder with Phillip C. Flora of *Robotics Age* and editorial director of the magazine, believes AI (artificial intelligence) is one wave of the future, and "radically different computer architecture" is something not far off.

"It will be ten years until AI will be doing all routine business programming," prophesies Thompson. When people can interact with the machine, the workings of which are not unlike those of today's *VisiCalc,* programming skills will become obsolete, he predicts.

What about the Third Industrial Revolution? "It won't cause mass unemployment," says Thompson. "There will be a tremendous shift of labor to front office service . . . similar to the shift from farm to city in the last century."

Robotics Age managing editor Joel Wilf supports this view. "There's no going back," he says. "No reason to ever have people do these jobs again."

Who Will Buy This Wonderful Robot? Still, it's going to take a while. The economy is sluggish, and many big companies are unwilling to invest because it takes too long to get a return.

Economics is not the only thing keeping robotics from taking off. There is a serious lack of qualified people, and colleges can't begin to keep up with the demand. Robotics is a good field for engineers, particularly those with active imaginations.

"We try to encourage growth," adds Thompson, who eagerly listens to anyone who has built a robot or is considering building one.

From the big boys in industry to the hobby roboticist is quite a leap in technology and economics. Nobody uses a Unimate to load a dishwasher. Nonetheless, quite a few people out there are fiddling around with nuts and bolts and silicon chips.

Hobby Robotics of Lilburn, Georgia, offers many items for the fledgling Dr. Frankenstein, ranging from the RBU-II (robotic mobile base unit) to the HU-II robotic hand unit. Soon the company hopes to have available the SSU-III robot dynamic structural unit (to fit on top of the base) and the SD-III robot shoulder unit.

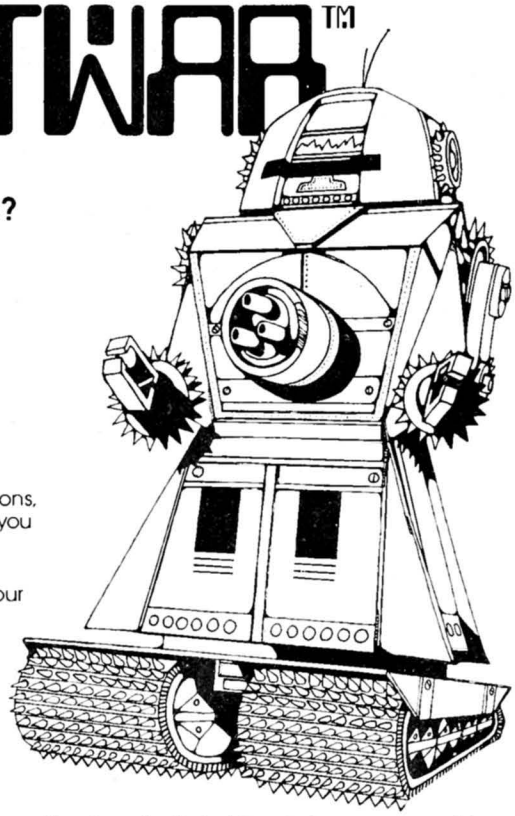
An expensive robot game is the *Boris HanDroid,* a home computer chess program with board and its own robot hand to move the pieces. With the new Boris 2.5 chess program, the game cost $1,495. (With a price tag like that, it should at least let you win now and then!) Word has it that Heathkit plans to market a three-wheeled mobile unit for under $1,000 in a year or so.

What Does All This Have To Do with Apples, for Heaven's Sake? Patience is a virtue, and perseverence has its rewards. For all of you who thought this was a magazine about Apple computers, we have a special report on Apples and robots.

Simple vision systems are now available for the Apple. United Detector Technology (Culver City, CA) offers the Op-Eye system. This hi-res, high-speed device detects and indicates the position of reflective or self-luminous objects when used as a peripheral for the Apple.

The Dithertizer II from Computer Station (Saint Louis, MO) appeared last year. This high-speed binary video digi-

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tizer uses a video camera with external sync to fill the hi-res page of the Apple with whatever it sees. When asked if Computer Station has any more products in mind for the Apple user concerned with robotics, owner Lynn Busby replied, "Certainly."

One of the most worthwhile gadgets available for the Apple is the Terrapin Turtle. This small mobile robot doesn't do much, but that's not the point. After programming a series of instructions, you can turn the turtle loose on the living room floor and see if it goes where you instructed it.

Now capable of hooking up with the Apple and other microcomputers, the Terrapin Turtle may be only the first in a series of robotic educational devices to come from Terrapin, according to company officials who would elaborate no further.

Clearly, a prerequisite for being a robot maker is an ability to keep trade secrets.

Are You Ready for Denby? A robot is worthless until it is programmed. You can get a head start before you acquire your first robot, by playing *Robot War* from Muse (Baltimore, MD). In this game, you see the effects of your robot's programming on the monitor: your robot either wins or gets blasted into scrap metal. But enough of games.

Get ready for Denby from Advanced Robotics (Newport Beach, CA). This four-and-a-half-foot tall robot, with a spherical head and a casing for the installation of an Apple or Atari, will have made his first appearance at the West Coast Computer Camp by the time you have read this.

The exciting thing is that Denby is not a one-of-a-kind robot. Advanced Robotics plans to market Denby by the end of the year for under $2,000 apiece, and hopes to be producing 500 to 750 units a month by the end of the year.

Ray Raymond of Advanced Robotics is excited about Denby, an expandable robot that could eventually be a butler or maid. Already a seven-function arm is available, complete with elbow and wrist rotation and fingers. Denby runs on a wheel drive right now, but fully functional legs are not far off. And the company makes a policy of keeping products at as low a cost as possible.

There could be a minor tidal wave when Denby appears. Already capable of picking up and carrying objects, Denby, as more hardware becomes available, will have several senses and will be very entertaining.

Looking Forward to a World with Robot Friends. Robots in the home, in the auto industry, in the textile industry, in the armed forces, in rehabilitative medicine, in space, in the air, and under the ocean: where will it stop? Recent reports put the world robot population at close to seventeen thousand. Soon, there may be Denbys all over the place.

Will robots infiltrate society and become commonplace like they have and are in science fiction? In Jack Williamson's classic 1947 "With Folded Hands," robots take over so many tasks for humans that they take over the humans. In Lester Del Rey's "Helen O'Loy," a beautiful female robot falls in love with her creator and then commits suicide. A robot outwits humans in the political arena in Isaac Asimov's "Evidence."

We are now back where we started — the future. What will there be a hundred years from now? Two hundred, five hundred, a thousand years from now?

Robots are certainly one of the brightest prospects for the future. They can help us lick the energy problem and help us conquer space. They can keep the whole thing working while mankind solves its problems. They might suggest the best solutions to those very problems.

So, if you should happen to see a mechanical person sitting around, thinking about something, don't disturb it. It may be just on the verge of a cure for all our ills. On the other hand, maybe it's just daydreaming. ◨

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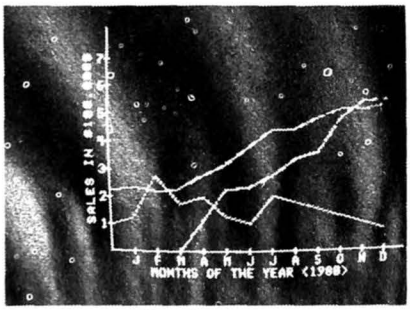
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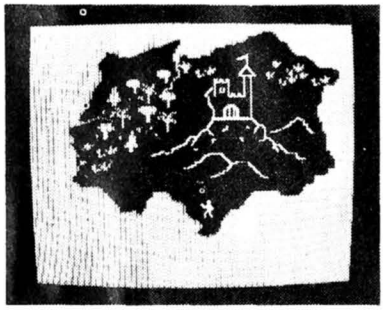
The package includes extensive shape tables and detailed instructive text on high resolution graphics.

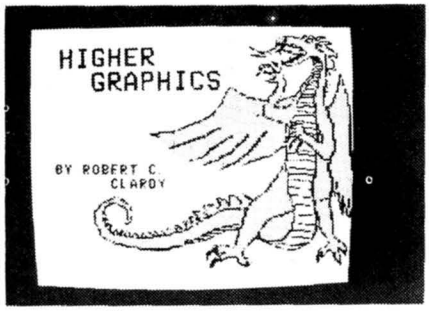
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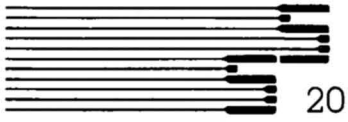
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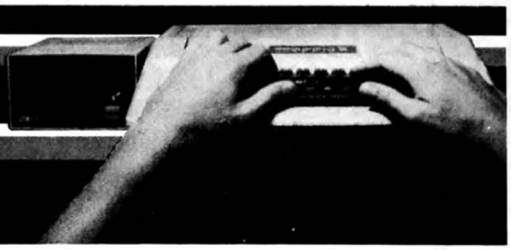


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MARKETALK Reviews



Unless noted, 48K and one disk drive are required.

Swordthrust. By Donald Brown. "A game for the Barbarian in all of us" is what CE Software doffs its introductory fantasy game. Clearly, from the game's content and execution, its creators are no barbarians.

Swordthrust is a fantasy game and a dungeon game, designed to be the starting point for many scenarios—in fact, three are already available. In addition, *Swordthrust* combines the player-created character and the frequent battle with the usually gentler adventure format. You tell your computer what to do in words. Unlike adventures that are purely that genre, *Swordthrust* will list its entire vocabulary for you.

The single most delightful facet of *Swordthrust* is the option, upon encountering another being in the adventure, to smile. In response, the other may snarl (or, here's the danger, attack you), in which case it hates you and you'd better be ready to fight; ignore you, so you can do as you please; or smile back. If it smiles back, it likes you, and from then on it goes with you, fights when you fight and fights back if you're attacked and unable to fight.

All this can change, of course. Just when you're feeling terrible because your faithful friendly wolf is near death and you give him your only healing potion, you find he's changed his mind and attacks you.

The master disk is primarily the general module in which your character is created and to which you return for supplies and further training. Its primary area is the Main Hall of the Guild of Free Rogues, where you receive your attributes, bargain for weapons and armor (and everything else), take training in use of various arms, examine the progress of your character, pay a wizard to teach you spells, bank your money, and visit the local bar in hopes of securing a hint to help in your upcoming adventure.

It also contains Adventure #1, "The King's Testing Ground," which CE calls a fairly simple adventure designed to prove and improve a beginning character's skills and to earn it money. It is not that easy—but it is clever, carefully devised, and the riddles are sufficiently subtle to be fun.

Donald Brown does not think in terms of what everyone else has done. For example, one encounter in the Adventure #2, "Vampyre Caves," is with a group of humans who just happen to be the family from the original *Dracula.* Incidentally, in at least one game, they growled.

Swordthrust promises to be great fun for a long time. MCT

Swordthrust by Donald Brown, CE Software, Des Moines, IA. ROM Applesoft. $29.95 for first in series, $24.95 for adventures II-IV.

International Gran Prix. By Richard Orban. Be warned. This program has physical side effects. You may feel the contents of your abdomen shift from one side to the other as you spin out in the Lower Mirabeau. Or perhaps midway through the eighth lap on the Karlskoga Circuit you'll suddenly notice that you haven't blinked for ten minutes, because you've been so intent on avoiding a crash. Hours later, after you've quit the program, while you're just going about your business, you may realize that you have a numb spot on your index finger because earlier you had been holding down the paddle button with such intensity.

The author of Muse's *Three Mile Island* has written another exciting real-time simulation. This one sets you behind the wheel of a grand prix racer. You get your pick of five hi-res circuits in five countries.

Since you're inside, the only part of the car you get to see is the instrument panel, which displays speed, gear, rpm, fuel, the orientation of your front wheels relative to your back ones, and your position on the road. Other information on the screen includes lap number, running lap and race times, number of laps to go, and the best lap and race times recorded.

You'll be doing well to see any of that during the race, however, since so much of your attention will be fixed on the road. What you see there are the side markers flying by at speeds up to two hundred miles per hour. You navigate with paddle zero, using the knob as steering wheel and the button as accelerator. The program also provides some aural feedback to help you stay on course. When you get close to the wall, the sound of your engine changes. If you should hit the wall, the aural report will be unmistakable.

In each of the five courses you can pick from eight difficulty levels that determine how your car will behave in the turns. At level zero you never skid. Level seven is like driving on ice; if you take the turns with much bravado, you'll see the road dance before your eyes as your back end spins out and you head for the wall.

To become expert at *Gran Prix* would require more than merely playing the game over and over again. First, you would need to plan your approach. Second, you would want to traverse your chosen track at a slow speed until you were thoroughly familiar with its obstacles. And so on. All this makes for a realistic, challenging game. ()

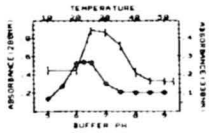
International Gran Prix, by Richard Orban. Riverbank Software (Denton, MD). $30.

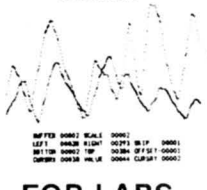
Disk-O-Doc. By Stanley Dratler, M.D. *Disk-O-Doc*, a utility program written entirely in assembly language, allows you

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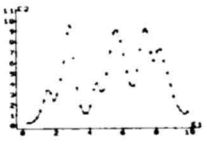
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to recover deleted files, change disk commands, and read or write information to any track or sector on a disk. It boots on either thirteen-sector or sixteen-sector DOS.

One neat trick is changing the DOS commands. This is accomplished by going to the track that contains the disk command words and updating the word you want to change. For example, you could change the command CATALOG to the letter C. This can save you typing and speed up your programming. In the process of changing the commands, you can learn much about how DOS works and how information is stored on the diskette.

Another capability of *Disk-O-Doc* is recovering lost or deleted files. This assumes only that you haven't saved any new files to the disk since what you want was deleted. If you haven't, you merely change a few locations and the file is restored.

Because you can read, write, or change any information on the disk, Dratler recommends that you be already familiar with the *Apple DOS Manual* as major disasters can occur if you do not know what you are doing. Thus this program is recommended for those already conversant with DOS. CH

Disk-O-Doc by Stanley Dratler, M.D. M.D. Software, Saint Louis, MO. $69.95.

Gorgon. By Nasir. Just when it appeared that the spate of arcade game copies had run its course, with all the best ones already reprogrammed for the Apple, the crown prince of the genre, Nasir, has come up with a superior version of Defender.

In *Gorgon,* you're given three ships to fly over Earth's landscape, defending the few remaining persons from extraterrestrial beasties. Most of these beings concentrate on putting an end to you, but one particularly nasty set of creatures makes forays to the ground to steal the remnants of humanity. These unfortunates you must save by shooting the kidnapping bird, then catching the falling person in midair and depositing him safely back on Earth.

Defending your airspace against four villainous breeds of monster is challenging enough. But included is the challenge of fuel considerations. Your three space ships have limited fuel, not replenished each time one is destroyed. In the unlikely event that you remain alive long enough, it will become necessary to go into hyperspace to refuel.

Negotiating the obstacles to the refueling station is nearly a game in itself. A moving maze of twelve space stations lies between you and more fuel, and your chances for success are slim indeed.

Gorgon plays with keyboard controls. The various skills needed to refuel, defend against space creatures, and save humanity lend the game a depth not always found in arcade games.

Naturally it features Nasir's hi-res graphics and smooth animation as the landscape scrolls past underneath your ship. In rendering the lonely people, Nasir's Apple version far outshines the arcade defender. ART

Gorgon, by Nasir, Sirius Software, Sacramento, CA. $39.95.

The Crown of Arthain. By Dan and Marilyn Meller. A new twist on fantasy adventuring, the *Crown of Arthain* is a game for two players—a commodity too rare in the world of personal computing, which has its fair share of families.

The late Arthain's crown is lost somewhere in the mountain caves and must be retrieved by one of his sons before the land can have a new ruler. The sons, estranged from each other and their father many years, begin their quests from opposite edges of the kingdom. The one who finds the crown will reign.

The kingdom is represented by a layout of hexes of varying degrees of difficulty to cross. Down the middle lies a range of impassable mountains, within one of which lie the caves where the crown is hidden. Each player begins at an outside edge and journeys across the grid to the mountains in the middle.

To add to the difficulty, the entrance to the caves is also hidden and, once found, is well guarded. Passwords are required for entry, a different one from each direction (and each game). Should you happen into the caves without the password, you will be trapped forever.

Play is done in turns and the first person to find the crown wins.

The caves themselves are a maze of which you can see only the room you're in and the doors to others. On the hexes and here, you are represented by a finely drawn hi-res warrior.

The onset of battle causes a switch to full screen of you and the monster in hi-res. You must physically manipulate the motion of the sword hand to fight the monsters.

Twenty levels of play vary mostly in how fast your reaction times must be in fighting monsters, and the variation is wide. Level one is too easy for any but a very young child and level twenty is extremely difficult. Since each player may choose a level independent of the other, parent and small child can play as equals—a super plus.

If you're a single adult looking for a game to play against the computer, this probably isn't it. But no family should be without one. MCT

The Crown of Arthain by Dan and Marilyn Meller, Micro Lab, Highland Park, IL. $35.00.

Wizardry! By Andrew Greenberg and Robert Woodhead. *Wizardry* is not a game. It's a place. Just for a moment, drop ten or twelve hundred years off your age, transplant yourself to merry old England, and imagine yourself in the village of—does it matter?

It's a village you've not been in before, you're a tad hungry, mighty thirsty, and in the mood for a bit of company. Why not stop in the tavern for a frothy ale? Gilgamesh welcomes new guests, and you're apt to find some worthy companions.

This village has a dungeon below it, with many levels. It's a cruel and dangerous place, they say. Rumor has it that few come out alive, and no one alive can describe the deepest levels. The dungeon is enchanted; there's magic at work there. Even doors don't work properly: many can't be seen, and some only work one way. Even worse, just when you master the magic, you find spots where it doesn't work.

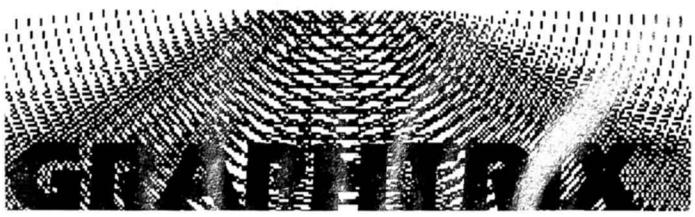
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The spirits of all that haven't returned lurk in the dungeon, it's said. A good priest can shame them back into the pit, sometimes. Evil priests roam to curse the brave into stone, to render the magician speechless, to destroy all that's good. Poisonous insects, flame-breathing dogs, wereboars and bugbears, gnolls and stirges and giant dragons mingle in packs with the vicious unseen. And many a creature is not what it seems.

And all these are on the upper levels.

Why then do good beings venture time and again into this hole of hell?

Treasure. Vast wealth is the prize for the brave and strong and fleet. And, perhaps even more alluring, knowledge—of what's below—and achievement—to be the first to reach the nadir.

Are you enthralled? Then gather a party. You see that small, gaunt man by the fire? That's Elfred, our most respected priest. He's conquered two levels of the dungeon, and he's seen the third and survived. Well, almost survived. Many years ago, he was with a young party who ventured too early too deep; all were slain. When Great heard of these brave journeyers, he determined to find their remains and bring them to the Temple of Cant. All but Elfred and one other had been dragged deeper or eaten by dragons. Elfred was saved and revived in the temple. Renfurth, his friend, was not so lucky; the dragons had left only his ashes.

Quick, the party just entering. The leader, a dwarf—although you wouldn't know it unless you tried to fight him—is our finest fighter, Great. The beautiful woman with him is a fighter too, nearly as strong and just as deadly: Atalanta. Beowulf, their mentor, follows just behind. He was our finest fighter until his student surpassed him—to his pleasure.

You are very lucky to find such a fine party for your venture. You need only a mage now, and a thief. That's right—a thief. Who better than the nimble-fingered to dismantle the traps on chests of treasure? And, if you find a halfling thief, such as—Fagin! There he is in the corner! He must have arrived while we were talking. Do take Fagin along. Being a halfling, he can see things we can't; he can anticipate traps and identify them through a sort of magic.

Drink your ale while a task be done. . . . There, we've sent for Maudlin. With such a fine group you must have the finest mage. Maudlin knows many spells, and his power to cast them seems infinite. He can surround an entire group of creatures with a fire storm. No one survives.

Now, go you all to Boltac's Trading Post and fit yourselves with weapons and armor for the fray. Take Elfred and Maudlin to nap at Adventurer's Inn to ensure the proficiency of their spell-casting ability.

Now, into the dungeon you go. Remember that you can camp anytime you're not in battle, and there you can cast spells and exchange goods.

Don't forget to take parchment to make a map. God knows, you'll need it!

Written in Pascal but bootable on any 48K Apple, *Wizardry!* is the ultimate computer Dungeons and Dragons, extremely faithful to the original. Greenberg and Woodhead merely act the role of Dungeon Master. You must generate your own characters. Elfred and the rest won't be on your version of *Wizardry*, but even if they were, you couldn't take them on an expedition or even look at them. Passwords protect each player's characters from those of other players.

The town is text; the dungeon display consists of several areas: the status report, the message area, the commands, and the window into the dungeon.

The window is one quarter of the screen; through it, you have a three-dimensional color view of the two or three next steps through the dungeon. When you encounter monsters, the image of one of the main group appears on the screen in place of the dungeon display, and the command list is replaced by the battle status.

Should you accidentally reset or lose electricity while you have a group in the dungeon, you can retrieve the entire group with one of several utility programs on the disk. However, to discourage cheating, the characters you revive with this utility will have aged ten years.

There are many more complexities in *Wizardry* and many challenges to be met in this truest of all programs to TSR's noncomputer Dungeons and Dragons. D&D fans will find *Wizardry* imperative. Others who enjoy dungeons at all will be missing much if they don't give this game a try.

It is especially good news that Sir-Tech has no intention of leaving well enough alone, but plans to make disks of numerous scenarios into which you can take your old characters. MCT

Wizardry! by Andrew Greenberg and Robert Woodhead, Sir-Tech Software (Ogdensburg, NY). 48K, $39.95.

Gobbler. By Olaf Lubecke. *Gobbler* is another Apple version of the arcade game *Pacman.* Unlike Jun Wada, author of *Snoggle,* who attempted as close a simulation as possible to the arcade game, author Olaf Lubecke has changed the maze and the movements of the puck and the ghosts to take maximum advantage of the Apple's characteristics.

The result is a faster moving game where the puck is more responsive to the keyboard commands of the player. It is also no longer the same game, in the minds of purists. Not only is the physical layout of the maze different, but the ghosts react differently. In *Pacman* and *Snoggle,* they'll hunt you down with malice aforethought and demolish the unwitting player. The ghosts in *Gobbler* seem, by comparison, almost benignly neglectful of the rampaging puck making havoc in their midst.

For all of this, *Gobbler* is a thoroughly enjoyable game. In fact, if you don't demand the verisimilitude found in *Snoggle,* you might even enjoy this one more. ART

Gobbler, by Olaf Lubecke, On-Line Systems, Coarsegold, CA. 48K, disk, $24.95.

Star Thief. By Jim Nitchals. *Star Thief* is the game that takes the asteroids concept and gives it some meaning and playing depth.

Jim Nitchals, who cowrote Cavalier Computer's *Asteroid*

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Field, brings the same smooth graphics and even the same triangular space ship to this new venture. But, by introducing a purpose higher than just the ship's salvation and by providing for two players acting as a team, Nitchals has created far more than just an asteroid lookalike.

The object of *Star Thief* is to prevent various shaped objects from stealing your power pods, which are located in the center of the screen. Controlling by either paddle or keyboard, you have an unlimited number of ships with which to prevent enemy theft. Game ends when the last pod is stolen.

This is all fine as a one-person game. But it's the two-person game where this program really shines. As you and your partner get more proficient, the screen turns into a wild melee of creatures coming for you. The virtues of team play, so often touted as the *piece de resistance* of organized athletics, become immediately and instantly recognizable. That's a lesson too often overlooked in entertainment programs for the Apple.

Star Thief is a good one-person game but a superior example of arcade play for two persons. Any family with more than one computer user needs a copy. ART

Star Thief, by Jim Nitchals, Cavalier Computer, Del Mar, CA. 32K, disk, $29.95

Track & Sector List. By Craig Robertson. It's 2:30 a.m. You've nearly finished debugging a Basic program you've been working on since early evening. It's time to file the next revision on the disk, so you delete the previous revision . . . and suddenly get a sinking feeling that you've just deleted a subroutine needed for the current revision. Has all your work gone into electronic limbo?

Fortunately, no. *Track & Sector List,* an assembly language program on disk that belongs in every Apple programmer's permanent file of utilities, can undelete the mistakenly deleted file, retrieving the subroutine. And it does more. *Track & Sector List* can discover a control character embedded in a file or program name, a maddening accident that never appears in the catalog but makes it impossible to load or run the program or read the file. *Track & Sector List*'s one-key commands make it easy to delete the control character so you can get back to programming.

Track & Sector List adopts the format of commercial disk-zap programs. It lets you display the contents of an entire disk sector on your monitor screen. Pressing the A key acts as an ASCII-hex toggle so you can see the sector's contents either in hex or in standard ASCII characters, allowing you to read file or program names in the language you wrote them in. Then, using simple one-key commands, you can modify the data to correct errors, protect a damaged sector from access by DOS to avoid I/O errors, delete an unwanted control character from a file or program name, or rescue an accidentally deleted program from oblivion. And for those more familiar with Apple's disk format, the possible uses for *Track & Sector List* are bounded only by your imagination.

Using *Track & Sector List* requires knowledge of the way Apple disks are formatted. If you're unfamiliar with this information, the thirty-two-page manual accompanying *Track & Sector List* will give you—rather foggily—the necessary background. You can get additional information about Apple disk formats in the *Apple DOS Manual* and in the *Apple Reference Manual.* Using the *Track & Sector List* manual, however, you'll be familiarized with the disk's volume table of contents (VTOC), directory, and track and sector lists in relatively short order. A little practice is all you'll need to be confident in using *Track & Sector List* for recovering from disk I/O errors or load, read, and write hang-ups. For assembly language programmers, *Track & Sector List* is indispensable when debugging programs using the Apple RWTS (read and write track and sector) routines. EM

Track & Sector List by Craig Robertson, Softagon, Morristown, NJ. 16K, Disk. $29.95.

Super Stellar Trek. By Tom Burlew. This is one of the few instances in memory in which the word *super* was misused by virtue of understating the facts. This version of *Stellar Trek* is not just super, it's stupendous, magnificent, and a programmer's execution of a gamer's delight.

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Theoretically, this is merely an upgrade of Tom Burlew's earlier *Stellar Trek,* a program that found consistent commercial acceptance. But this is actually a completely new game built around the graphics, animation, and commands of the old version.

What makes this version so supremely better that it's like a new game are tighter programming that makes for faster reaction by the Apple and the injection of a real-time factor.

It's no longer enough just to wipe out the Klingons within the allotted time span. Now it must be done in real time. You no longer take turns with the enemy in battle. If you don't shoot, they will, again and again; and, if you get it together, you can attempt to get in two sallies to their one. Each of the five levels of difficulty adds enemies, shortens the time available, and lessens the number of starbases where you can refuel. That's an ominous combination that makes success at the emeritus level of play one of the supreme achievements of Apple gamesmanship.

Burlew's conceived of two innovations that other programmers may want to emulate. First, he's incorporated a self-scoring mechanism within the program that tells the player how he did and when he's ready to advance to the next level.

Second, he's used this scoring mechanism to set up a tournament level of play. In tournament level, several players take turns playing the same scenario, with the scoring mechanism reporting on which player did the best.

All in all, *Super Stellar Trek* ranks as one of the best ten game offerings of any kind for the Apple this year. ART

Super Stellar Trek by Tom Burlew, Rainbow Computing, Northridge, CA. 48K, disk. $39.95

Curve Fitter and Visichart. By Dr. Paul Warme. Dr. Paul Warme is interested in the Apple as an inexpensive tool for acquiring and processing laboratory data, and his interest shows in his software and its documentation. Warme's programs utilize machine language subroutines; they're fast. And they make effective use of the Apple's memory mapped video. The manuals are good, despite fuzzy print that makes them difficult to read. They provide straightforward introductions to the features of the programs, sets of interactive tutorials, and hints from Warme on how to get the most out of each package.

Warme's programs are flexible. Data can be entered from the keyboard, from disk files, or from laboratory instruments via an analog-to-digital converter. Warme's programs are user-friendly. All previously selected options automatically become the defaults, so a user can step through a program up to the point where a change is required. The allowable range of input values is indicated for each option; a bell sounds and a warning message is printed if an attempt is made to enter data outside the indicated range.

Fitting Experimental Data. Curve Fitter makes it easy for scientists to fit curves to their data. You can scale the data by adding or dividing by a constant or by converting to logarithmic form; you can smooth the data by n-point averaging, you can interpolate between data points; and you can use the fitted curve to evaluate unknown samples. The choice of interpolation methods offered by Warme—polynomial, cubic spline, Stineman, and least squares—includes all the choices from at least two mainframe curve-fitting packages.

Curve Fitter includes five demonstration packages. The demonstrations may be run interactively or in automatic mode. The variety of options offered by *Curve Fitter* can make the step-by-step process appear tedious; interactive data entry can be time consuming even exercising all of *Curve Fitter*'s default options. The trade-off is flexibility. You can toggle back and forth between automatic and interactive mode when only a few changes are required.

Curve Fitter has excellent file handling capabilities. Values of the input or output variables or the resulting graphs are easily saved even on a one-disk system. However, realistically, anyone contemplating the purchase of a desktop computer for use in a laboratory or small business ought to purchase two disk drives from the start.

Plotting Experimental Data. Visichart may suffer by comparison with *VisiPlot,* the latest release from Personal Software, but *Visichart*'s price of $75 makes it attractive. *Visichart* can't compete with *VisiPlot* in display options, but it does offer unique features of its own. These include the abilities to read off data points from existing curves; to perform numerical operations on an entire data set; and to acquire data from an analog-to-digital converter.

Visichart also includes some special functions that are useful in chromatography and spectrophotometry. For example, a normalization function adjusts one data set to have the same average value as another data set.

The Bottom Line. Warme's software proves that a microcomputer has a role in the laboratory; and it proves that the Apple is more than a hobbyist computer, even without a SoftCard. PC

Curve Fitter and *Visichart* by Dr. Paul Warme, Interactive Microware, State College, PA. *Curve Fitter,* $35; *Visichart,* $75. Both programs, along with the company's *Scientific Plotter* ($25 separately), are available in a single package at $120.

Starmines. By Steve Baker. Here's an update on the old Star Wars genre of shoot 'em ups for the Apple. Steve Baker improves the form with some slick animation and bright colors.

The entire screen is your spaceship and your gun port is shown at the bottom. Brightly colored rectangles swoop out of the background to attack—some come at an angle and some, the dangerous ones, come right at you. Rapid fire while conserving energy is a must to succeed at the game.

Purpose of the game is to work your way through five levels of difficulty to a final graphic payoff. At the upper levels, the enemy ships come so rapidly that it's a true challenge, particularly considering fuel scarcity.

Softape, publisher of the game, adds its own innovation to Baker's work. This is the first disk marketed with a label printed in full color. It doesn't make the game play better, but it's a nifty touch. ART

Starmines, by Steve Baker, Softape, North Hollywood, CA. 48K, disk, $29.95

LISP for the Apple II

Pegasys Systems' new P-LISP interpreter is a full implementation of the well-known Artificial Intelligence language. Written in machine code, this powerful interpreter includes the following features:

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P-LISP is supplied on disk with User Manual for $99.95. The manual is available separately for $10.00. Please specify DOS 3.2 or 3.3.

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Assembly Lines

from page 60

buffer starting at $1000. The sequence we're interested in starts at byte $AF in that sector. To modify that, type in:

```
*10AF: A0 D4 D3 C5 D4 A0 AD
*E3: 02
*300G
```

The first line rewrites the ASCII data there, the E3:02 changes the command to "write," and the 300G puts it back on the disk.

Now reboot on the disk and then type in CATALOG. When the catalog prints to the screen, the new characters "DISK – TEST 254" should appear. By using an ASCII character chart, you can modify this part of the diskette to say anything you wish within the twelve-character limit.

#2: Catalog Keypress Modification. Reinstall the sector access utility, put the sample disk in the drive again, and type in:

```
*06: 01 0D 01 60 00 10
*E3: 01
*300G
```

This will read track 1, sector $0D, into the buffer. Type in:

```
*1039L
```

The first line listed should be:

```
1039 – 20 0C FD JSR $FD0C
```

Change this to:

```
*1039: 4C DF BC (JMP $BCDF)
```

And rewrite to the disk:

```
*E3: 02
```

Now read in the section corresponding to $BCDF (track 0, sector 6) by typing:

```
*06: 00 06
*E3: 01
*300G
```

And alter this section with:

```
*10DF: 20 0C FD C9 8D D0 03 4C 2C AE 4C 3C AE
*E3: 02
*300G
```

As it happens, this part of the disk isn't used and provides a nice place to put this new modification.

When you reboot after making this change, place a disk with a long catalog on it in the drive and type in CATALOG.

When the listing pauses after the first group of names, press return. The listing should stop leaving the names just shown on the screen. If instead of pressing return you press any other key, the catalog will continue just as it normally would, going on to the next group of names.

Both these modifications will go into effect whenever you boot on the sample disk. These features can also be propagated to other disks by booting on the sample disk and using the new DOS to init fresh disks.

Many modifications to the existing DOS can be made this way, and we haven't even started to talk about storing binary data in general. Perhaps next month!

A Few Extra Tidbits for You. (1) The first time you call the access utility from the Monitor, it will return with just the asterisk prompt. After that, unless you hit reset or do a catalog, it will return with the asterisk and a beep. This is because the status storage byte for the Monitor ($48) gets set to a nonzero value by RWTS. If the beep annoys you, modify the access utility to set $48 back to #$00 before returning.

(2) If you set the slot/drive values to something other than your active drive, the active drive will still be the one accessed when you do, for example, the next catalog. This is because DOS doesn't actually look at the last-slot/drive-accessed values when doing a catalog. Instead, it looks at $AA66 for the volume number (usually $00), at $AA68 for the drive number, and at $AA6A for the slot number (times sixteen). If you have Basic or machine language programs that you wish to change the active drive values without having to do a catalog or give another command, then just poke or STA the desired values into these three locations. Have fun! ◨

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by BILL BLUE

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Ascii Express II works with the Hayes Micromodem II, Apple communications card, the CCS Asynchronous Serial card, SSM-AIO Board, Lynx Telephone Linkage System, and many other communications devices.

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If you have a Z-80 card, you owe it to yourself to check this one out before you buy any communications software. If you don't have the Z-80 Softcard, you may want to get one just to run this package!

*Note: CP/M and Apple DOS files are not directly compatible.

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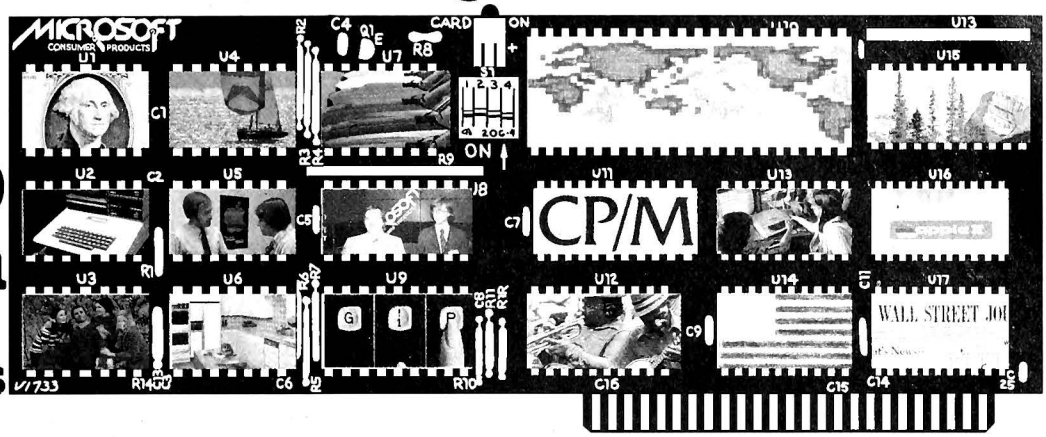
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SOFTCARD Symposium

by Greg Tibbetts



When the editors of Softalk *approached me to do this column, I was very flattered; but that's not the reason I decided to do it. My decision comes from a deep-seated belief that the SoftCard is the tool that gives Apple owners the best of both worlds: the world of the Apple and the world of CP/M.*

In keeping with that belief, I want this space each month to be an interactive forum where the ideas of both the manufacturer and the users can combine to realize the full potential of this product. Given this approach, your contributions are of prime importance.

I also strongly believe in letting people know where I stand; therefore, I want you to know up front that I am employed by Microsoft as manager of technical support. Be that as it may, I wish to present as objective a format as possible, and I'll work toward that end.

The primary purpose of this month's column is to discuss exactly what the SoftCard is and isn't; that was the question most frequently asked of Microsoft at the Apple Expo during its recent tour of the country. Discussing the nature of the SoftCard requires that we define some terms, so let's get on with it.

The SoftCard is a plug-in circuit board for Apple II and Apple II Plus computers that, when installed, allows the user to run the CP/M operating system. With it, the Apple can execute software that was previously reserved exclusively for 8080 and Z-80 based microcomputers. Now we have some terms to talk about. The first things we should discuss are the terms *8080* and *Z-80.*

All microcomputers are based on one or more devices called *microprocessors.* These are the components that do the majority of the work and are responsible for maintaining system timing and other control functions. If the computer could be likened to a body, then the processor would be its brain.

There are many different kinds of microprocessors, each with advantages and disadvantages. The Apple is based on the 6502 processor, a reasonably efficient component that provides a good basis for qualities we've always enjoyed in the Apple.

The 8080, by Intel, and the Z-80, by Zilog, are two other processors commonly found in personal computers today. Each of these units has its own unique features and, of course, its own proponents. One concrete advantage owners of 8080 and Z-80 systems have enjoyed is the ability to upgrade to the CP/M operating system—which brings us to our second definition.

Introducing the Two Bs. *CP/M,* which stands for *Control Program/Microprocessor,* is a sophisticated kind of DOS (disk operating system) for 8080 and Z-80 based systems, created by a California company called Digital Research. CP/M is best visualized as a black box made up of two pieces of software: a module called the *BDOS* (Basic Disk Operating System) and another called the *BIOS* (Basic Input/Output System).

Together, these two modules produce a universality unparalleled in the microcomputer field. Because the BDOS remains virtually unchanged no matter what computer hardware CP/M is installed in, any user software that runs within the framework of the BDOS can run without major modification in any computer running standard CP/M.

As you might have guessed by now, the BIOS is the module that changes from system to system. It's the function of this unit to act as a translator between the standard BDOS input and output, and the unique input and output required by the specific hardware of the user.

This is how a user who writes programs on one type of computer can have them run on a variety of different computers without substantial changes. As long as the different machines are all running standard Digital Research CP/M of the same release, the user software can be regarded as universal. Although there are exceptions to this universality, such as advanced graphics that may be available on some CP/M systems and not on others, most programs written under CP/M are amazingly portable.

There are two common releases of CP/M in the field, version 1.4 and version 2.2. The SoftCard comes with version 2.2, the newer and more versatile of the two.

In implementing the SoftCard, Microsoft had to realize two major achievements: first, they had to design a hardware add-on that would make the Apple become, on request only, a Z-80 based system; second, they had to produce a new BIOS that resolved the complex problems of interfacing to a dual processor system and that allowed the standard Digital Research BDOS to be used.

Both these operations turned out to be very successful. The circuit board itself has experienced a less than one-half of one percent failure rate in the field. Although the software has not had quite that success, with a number of bugs surfacing in the field, it appears to be very stable in the current release.

For those of you who own the SoftCard, the current version of SoftCard CP/M is 2.20B, and, recently, you should have received notice of Software Update Number 3, a field correction procedure to bring your version up to that standard. If you haven't received it, copies can be obtained by writing to Microsoft.

But What Does It Do? Now that we've discussed what the SoftCard is, let's consider the specific features that it and CP/M bring to your Apple.

Unlike Apple DOS, which requires the user to be in either Integer or Applesoft Basic, CP/M is structured to provide an interactive command mode with DOS itself. This is accomplished with a program called *CCP (Console Command Processor),* that runs whenever CP/M is active and no other program is running.

The *CCP* monitors the keyboard for user input and processes this input as it's received. Commands given to the *CCP* take two forms; either they're built-in commands to perform disk-related functions or they're actual program names. In the program names form, they're called *transient commands;* when entered, they cause the program to be loaded from disk and executed.

In the current version of CP/M, there are six commands to perform disk-related functions: DIR displays a directory of the valid files on the diskette; ERA deletes an entry from the directory and allows the space taken up by that disk file to be reused; REN renames a disk file; SAVE saves some portion of the computer's memory on the diskette under a given name;

TYPE causes a disk file to be read into the computer and listed to the screen; and USER essentially allows the user to create more than one directory on a single diskette and to control access to the multiple directories. Obviously, there may be any number of transient commands, depending on the number of programs purchased or written by the user.

The SoftCard comes with certain standard transient commands plus a few additional ones required for this implementation. In future columns, we'll explore some of these and introduce you to some new uses for them.

For present consideration, there are transient commands included to copy diskettes, transfer and examine files, create system and data disks, and perform the functions necessary to examine and alter the status of the system and its related disk files.

In addition, there are several programs included that, although transient commands under a strict interpretation of the term, are more like applications programs themselves. In this category are *ED*, a line and character oriented editor; *ASM*, an 8080 assembler; and *DDT*, an 8080 debugging tool that acts in many ways like the existing Apple Monitor program.

Finally, the latest version of Microsoft Basic is included in two forms: *Gbasic*, the standard version of Microsoft's 5.0 interpreter with certain Apple-specific commands added, including hi-res graphics; and *Mbasic*, from which the hi-res graphics have been removed to save memory for larger user programs that don't require the graphics feature.

Many specific applications programs have been written in Microsoft Basic for use under CP/M. These include accounting packages and other business software as well as programs for personal use. Ask your computer dealer for more information about the availability of CP/M programs for your Apple.

Mbasic and Gbasic won't immediately execute Basic programs written for other operating systems when the version of Microsoft Basic itself is different—such as Radio Shack's Level II Basic, which is a form of Microsoft's version 4.51, and Applesoft, which is a version of Microsoft's standard 6502 Basic. With varying degrees of effort, these programs can usually be modified to produce acceptable results. The amount of effort required is dependent on the complexity of the program and the user's familiarity with the Basic language itself.

Non-Basic programs written for other operating systems (in 8080 or Z-80 machine code) aren't that clear-cut. Most such software won't work, since it's usually heavily dependent on the protocol required by the operating system. For this reason, it's best to stay with routines written specifically to run with CP/M if they are in machine code.

Getting Around the Problems. From a user standpoint, Microsoft faced only two problems that had no good solution. The first was the job of producing a version of the operating system software that would read a CP/M disk directly. Most CP/M systems are built around eight-inch disk drives—not a common Apple configuration.

Even more important, most five-and-a-quarter-inch CP/M systems either have hard sector disk format or use hardware in the drive itself to locate and access the disk sectors. This is done through the small hole located to the side of the center spindle hole on your disks. Sector-seeking operations are sequenced to the instant the two holes line up. Obviously, this requires disk drives capable of sensing this sector hole and recognizing it. Apple's Disk II hardware lacks the hole sensor because the Apple system is soft-sectored and based on dynamic sector recognition. In the Apple system, all sectors are identified by bits written directly on the disk as part of the sector. On a standard CP/M disk, this information may not exist in the way the Apple disk drive needs it. Therefore, the Apple has no way to find information on a CP/M disk even if it knows the track and sector on which the information is stored. Because of this, to read standard CP/M disks, Apple users would have to replace their Apple disk drives; this seemed an unreasonable requirement. Instead, Apple CP/M—the five-and-a-quarter-inch variety—was born with a unique disk format. There are

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SOFTAPE

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few eight-inch disk controller boards yet configured for SoftCard CP/M, but, according to the people developing them, the eight-inch variety will be standard in every respect.

The other problem that affects the universality of CP/M software is some authors' reliance on the similarity of most BIOS implementations on larger (eight-inch type) CP/M systems. Aspects of their programs count on the storage of information at certain locations in the BIOS. Although this practice isn't overtly recommended, it has worked in the past in most of the CP/M world. It will not, however, work with Apple CP/M.

While the BDOS for Apple CP/M is unchanged from the more standard variety, the BIOS portion has little in common with its larger brothers. This makes using many of the tricks known in CP/M somewhat difficult with SoftCard. The problem applies mainly to assembly language programs, however, and even these usually can be altered to work by reverting to standard BDOS calls for input/output—if the software was written by the user or the user has the source code.

The Detour Becomes Main Street. The growing size of the SoftCard user base is already helping to offset both problems. More and more, software producers are downloading their standard CP/M product lines to Apple format disks, with the required alterations. In the process, they're modifying their programs for Apple's forty-column screen and limited keyboard and enhancing their products with the sound and hi-res graphics that take advantage of the Apple's additional capabilities.

As the SoftCard's popularity grows, both problems are becoming less signficant. Software authors are already making products specifically for the CP/M-equipped Apple; you'll be seeing reports of such products in this column as they're introduced. If you have access to an eight-inch CP/M system, through your dealer or through a CP/M user group, you can download software to your Apple system by using the programs that come with the SoftCard. Finally, some user groups and dealers will download software for you for a fee, the cost of the software, and the cost of the media. We'll report on these services in this column.

Getting Along with Its Neighbors. The SoftCard is generally compatible with other hardware in that no inherent conflicts prevent it from residing in the Apple simultaneously with other hardware products. However, some procedures must be followed to get particular peripherals to work in conjunction with the SoftCard. In most cases, difficulties result from a peripheral device's containing ROM firmware or a RAM-resident driver program written in 6502 machine code rather than in 8080 or Z-80 code. Often, all that's necessary to make such a peripheral operative is the installation in CP/M of a short routine to turn off the SoftCard and call the required 6502 routine.

We'll discuss ways of doing this in a future column devoted to interfacing with peripheral devices. Once again, your input will be very valuable, especially because of the wide variety of peripherals users want to interface. If you've written routines that allow specific devices to work and if you're willing to have your routines become public domain, send them to *Softalk* at the address given at the end of this column. We'll give you credit if we print your routine.

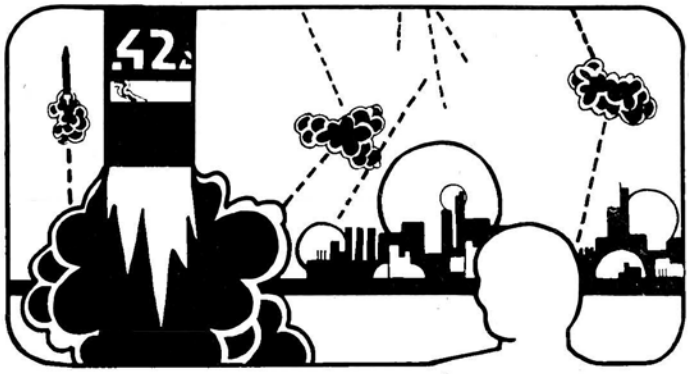
So far, we've discussed general and specific features of CP/M and of the SoftCard, yet we've barely scratched the surface in either case.

In future columns, we'll look at specific things to do with the SoftCard to make your Apple more useful. We're counting on your input to direct the selection of topics for discussion.

In the meantime, we'll deal with subjects commonly confusing to users and/or inadequately treated in the SoftCard manuals.

I'm truly interested in your input, whether it is suggestions, comments (both positive and negative), or any routines you wish to contribute. This is more your column than mine; help me keep it responsive to your needs.

Send questions, topics, ideas, and routines to Softalk Symposium, 11021 Magnolia Boulevard, North Hollywood, CA 91601. ◨





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THE PASCAL PATH

By Jim Merritt

Tools of the Craft, Part 2

Variables: Analogy: a Calculator's Registers. If you use a pocket calculator, you're probably already familiar with *memory registers,* since they're featured on most current models in all price ranges. A calculator's register is an electronic storage bin that holds a number indefinitely (even when the calculator is off, on some recent models). You may instruct the calculator to save into a register whatever number is on the display. Doing so overwrites and therefore erases any number that was previously in the register. Later, as often as you wish, you can recall the number to the display for use in a variety of calculations.

The value of memory registers is clear to anyone who ever tried to evaluate a complicated expression on one of those early calculators whose design predated memory features or parentheses keys. (Try figuring the formula ax^2+bx+c for a=2, b=3, c=6, and x=1.718 on your "cheapie four-banger"!) Registers permit you to store intermediate results that are often necessary to bridge the gaps between formulas during long chains of calculation. Before registers were available, the calculator user often had to record temporary results on paper. The transfer of numbers from display to paper and back again was not only tedious, it was also a potential source of error, since the user could easily make mistakes in copying or reentering the temporary results. It is quicker, easier, and more accurate to use a calculator's registers, rather than pencil and paper, for your scratch pad.

Recalling last month's discussion of data and data typing, you can think of a calculator as a computer whose only data type is similar to Pascal's *Real.* That is, the calculator can handle only numbers, each of which has a whole part and a fractional part. (Of course, an empty fractional part is not usually displayed.) Each register is a place where exactly one Real number may be stored. A calculator usually offers a small, fixed number of registers, which may be named, for example, A, B, C, or numbered, depending upon the whim of the manufacturer.

Like a calculator, Pascal provides storage bins for data, called *variables* instead of registers. *Unlike* a calculator, however, Pascal doesn't restrict you to using only a limited number of variables in your programs, but permits you to use as many as you wish and to give them any names you choose.

Variables: Declaration Is Mandatory. Variables are user-defined objects, similar to constants and custom data types, and must be declared before they may be used in a program. The VAR section of the declaration area, where variables are declared, follows any CONST or TYPE section and precedes all other sections, as shown in Figure 1.

Each variable declaration associates a variable name with a data type. As you might expect, the name of a variable must be a valid identifier. By declaring a

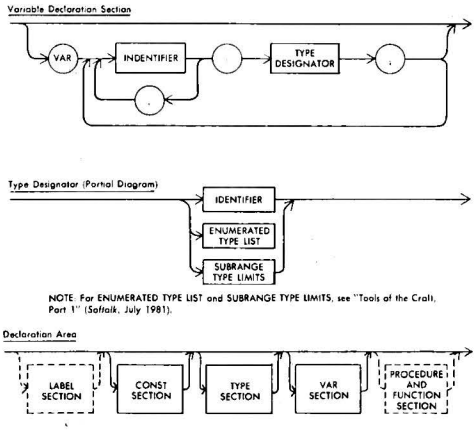


FIGURE 1

data type along with the variable name, you tell the Pascal compiler what kind of data you expect to store in the variable. The compiler may then reserve only as much computer memory space for the variable as is necessary to accommodate data of the specified type, thus helping to ensure that you use the minimum amount of computer resources needed to get the job done.

That the compiler can optimize the amount of internal storage space used by variables is a partial justification for the creation and use of subrange data types, which we discussed in the last column. In general, if a data type includes a large number of different possible datum values, a variable suited for that type will require more storage space than a variable for a type that provides a much smaller number of possible values. For example, here is a subrange type:

```
TYPE
  HalfAsBig=
    0..255;
```

In many instances under Apple Pascal, the type "HalfAsBig" requires only half as much storage space as its base type, Integer (whose range of values extends from −32768 to +32767). For good or bad, however, the Apple Pascal compiler will not optimize storage space unless you explicitly direct it to do so, and we won't be covering the techniques you must use to invoke such optimizations until we have traveled farther along the Path.

Variables: Pascal Fights Errors with Data Typing. Another, perhaps more compelling, reason for declaring the type of a variable (and for using subrange types) is to permit the Pascal compiler to act as your watchdog, making sure you don't inadvertently try to put the wrong kind of data into the variable. For example, you dare not try to shoehorn a Real number into an Integer variable, because a Real datum in Apple Pascal requires twice as much storage space as an Integer datum. The Pascal compiler will report a syntax error whenever it catches a mistake like this. But suppose it didn't. To store a Real datum into a space tailored for an Integer, either some of the Real number must be shaved away (*truncated,* in computer science terms), or the part of the Real number that doesn't fit in the Integer variable must extend into subsequent memory space, almost certainly overwriting other information.

Some computer languages permit either of these bizarre situations to occur without warning to the computer programmer or user. The assumption made by the designers of such languages is that the programmer is always right, and always has a good reason for doing a strange thing, such as putting data of one type into a variable of another type. Unfortunately, this faith in a programmer's omniscience is rarely justified. Programmers are human, after all, and make mistakes like anyone else. This very error—putting certain kinds of data where it doesn't belong—is quite commonly committed.

Apple Pascal employs two methods of

detecting when a program is trying to put the wrong kind of data into a variable. As a first line of defense, the compiler can tell whether the type of a datum is grossly different from the type of a variable. For example, "A," obviously a Char datum, cannot be placed into an Integer variable; attempts to do so will be detected and rejected by the compiler.

The other method involves keeping an eye on the actual values of data as it is manipulated by the running program, long after compilation is complete. This is called *run-time range checking.* For example, suppose that you had a variable, ExampleVar, declared as being of type HalfAsBig:

```
VAR
  ExampleVar
   :HalfAsBig;
```

Now suppose that, in the program, you put the value of 128 into ExampleVar. The Pascal compiler would be satisfied that 128 is in the permissible HalfAsBig range of 0..255, and so would permit you to do this. But it would also permit you, later in the program, to *increase* the value stored in ExampleVar by 128. The compiler has no way of knowing what value might be in the variable at this point. All it knows is that the value of the increase itself is within the acceptable range for the type of the variable. Adding 128 to a variable that already contains 128 yields a value of 256, which is outside the HalfAsBig range, and so cannot be put into ExampleVar. This kind of problem can only be detected during the execution of a program. When it is, a *run-time error* occurs, meaning that program execution is halted by the system, and an error message appears on the console screen.

Assignment. The process of putting a datum value into a variable is more properly called *assignment.* In Pascal, you assign a value to a variable with an *assignment statement.* Figure 2 shows the syntax diagram for an assignment statement. First comes the name of a variable, then the assignment *symbol* :=, then an expression that denotes the value that is to be placed in the variable. (The syntax diagram for an expression is given in Figure 3. The ghost patterns, those traced with dashed lines instead of solid ones, will be discussed in future installments.)

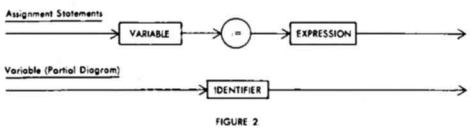
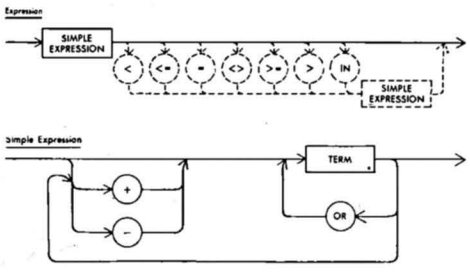
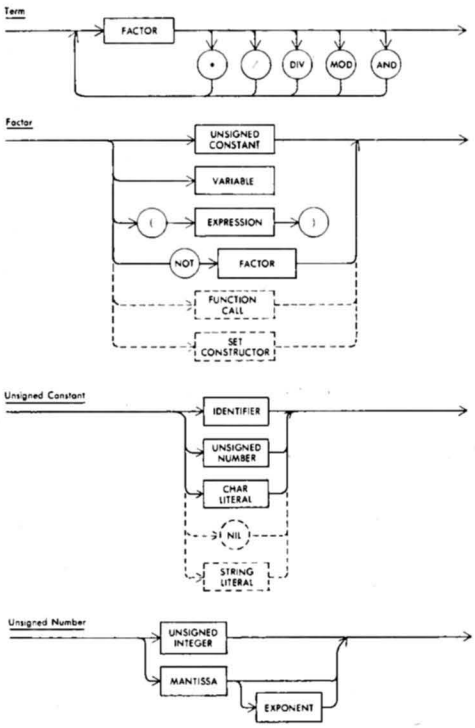


FIGURE 2





NOTE: Diagrams for IDENTIFIER, CHAR LITERAL, UNSIGNED INTEGER, MANTISSA, and EXPONENT appeared in Pascal Path "Tools of the Craft, Part 1."

FIGURE 3

When an assignment statement is executed, the expression that follows the assignment symbol is computed, and the resulting value is stored in the specified variable. Of course, the data type of the value represented by the expression must match that of the variable. Consider the following example program:

```
PROGRAM
 Assignment;

VAR
 MiscInt1,
 MiscInt2
  :Integer;
 MiscChar
  :Char;

BEGIN
 MiscInt1 := 0;
 MiscInt2 := 0;
 WriteLn(MiscInt1);
 WriteLn(MiscInt2);
 WriteLn;

                  MiscInt2 := 100;
                  WriteLn(MiscInt1);
                  WriteLn(MiscInt2);
                  WriteLn;

                  MiscInt1 := MiscInt2;
                  WriteLn(MiscInt1);
                  WriteLn(MiscInt2);

                  WriteLn;
                  MiscChar := 'A';
                  WriteLn(MiscChar);
                  MiscChar := MiscInt2;
                 END.
```

If you try to compile this program, the compiler will note a syntax error, number 129, in the line that precedes the END keyword. Error 129, as explained in the "Compiler Error Messages" table of the *Apple Pascal Language Reference Manual,* means, "Type conflict of operands." In other words, the type of the expression in the assignment statement (Integer, since MiscInt2 has been declared as an Integer variable) is not the same as that of the destination variable (MiscChar, declared as having type Char). The compiler will not let you put an Integer value into a variable that is supposed to contain Char data. Use the editor to remove the offending line in this program; after surgery, it should compile without difficulty. The execution of "Assignment" yields this output on your screen:

```
0
0

0
100

100
100
A
```

The first two assignments, to MiscInt1 and MiscInt2, respectively, serve merely to put some arbitrary values into these variables. An experienced programmer would say that we use the first assignment statements in this program to *initialize* the variables to some known values. One of the most important things to learn about using variables is that you can never be sure what (if anything) is in them until you put something in them yourself. A variable name actually refers to a sequence of one or more memory locations within the computer. When a program starts executing, *anything* can be in these memory locations, including totally irrelevant information from the execution of other programs, or even random garbage that sometimes appears in memory when the computer's power is turned on. To get an idea of the kind of junk information that variables typically contain prior to initialization, try compiling and executing "Assignment" after removing the first two assignment statements, as well as the assignment statement involving MiscChar. I can't predict what kind of output you'll get, but I can show you what my computer did:

```
805
-14552

8005
100

100
100
```

An invisible character, *outside* the ASCII range! ASCII characters usually correspond to numbers from 0 to 127. This corresponded to 257!

Soon, we'll start writing programs whose operation depends upon (and changes with) the values contained in certain key variables. Such programs are apt to display unexpected, perhaps disastrous, behavior if their key variables are used without first having been initialized. You might as well start getting into the habit: it is your responsibility as programmer to initialize all of your variables with known values before using them in programs. (As if that weren't enough, you also have to choose *appropriate* initial values. Here, 0 was appropriate—in fact, any values would have been. As you'll see, the constraints of a

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problem don't always permit you such freedom of choice.)

Getting back to "Assignment," WriteLn statements are used after every set of assignments to show you the effects these assignments have on the variables. After the initialization assignments, both MiscInt1 and MiscInt2 contain the same value, 0, and the display produced by the subsequent WriteLn statement demonstrates this. Next, MiscInt2 is given the value of 100, but MiscInt1 is left unaffected. Finally, MiscInt1 gets the value of MiscInt2, and the variable MiscChar, unused until this point, receives the character value A.

The assignment statements in "Assignment" show that either a literal or the name of a variable may be used as an expression. As discussed last time, a named constant can be used anywhere a literal of the same type can:

```
PROGRAM
 AssignConst;              :Integer;

 CONST                     BEGIN
  IntConst= 23;             Int1 := 23;
                            Int2 := IntConst;
 VAR                        WriteLn(Int1);
  Int1,                     WriteLn(Int2);
  Int2                      END.
```

The assignments in the program above put identical values into the variables Int1 and Int2.

When a literal constant is used as an expression, the expression value is the obvious value of the literal. When a constant name is used, the value of the expression is the constant value referred to by the name. The expression value of a variable name is the current contents of the specified variable.

Note that a constant is *not* a variable. In particular, a constant doesn't *contain* anything—it *stands for* something. You cannot assign a value to a constant. (Try it, and see!) Its value has been fixed, permanently, in its declaration.

Operators. Expressions can be more complicated than just single constants or variables. You can create quite complicated expressions by combining variables and/or constants with *operators*. An operator combines or transforms one or two values (called its *operands*) into a single result. Right now, we'll concern ourselves only with the operators that Pascal provides for Real, Integer, and Boolean types:

Integer

−A	Negation of A
A − B	Difference between A and B (subtraction)
A + B	Sum of A and B (addition)
A * B	Product of A and B (multiplication)
DIV	A divided by B (Integer division—no remainder or fractional quotient is produced)
MOD	Remainder when A is divided by B (modulus)

Real

−A	Negation of A
A − B	Difference between A and B (subtraction)
A + B	Sum of A and B (addition)
A * B	Product of A and B (multiplication)
A / B	A divided by B (Real division)

Boolean

NOT A	True only if A is False
A AND B	True only if both A and B are True
A OR B	True if either A or B is True

You have already used three of the Integer operators—those for addition, subtraction, and multiplication—in the program "SomeExpressions." In general, appearance, behavior, and usage of Pascal's numeric operators agree with what you learned in grade school arithmetic class. The only exceptions are the use of the asterisk to denote multiplication and the operators DIV and MOD, which are likely to be unfamiliar to most people. The use of the asterisk was explained in a previous column. DIV and MOD are made necessary because of the nature of Integer arithmetic. Simply, Integers cannot include fractional portions the way Reals can. Integers must be whole numbers. Dividing 5 by 3 gives "1 and 2/3" or 1.666 . . . , which is not a whole number. Another way to express the result, in terms of Integers, is to say that dividing 5 by 3 gives 1 with a remainder of 2. This is the view taken by Integer arithmetic in Pascal. The expression "5 DIV 3" represents a value of 1, the quotient when 5 is divided by 3. "5 MOD 3" yields the remainder, 2.

As shown in the preceding table, division of Real numbers uses the familiar forward slash (/). The Real expression "5 / 3" gives the expected result, 1.66666.

A Demonstration of Run-Time Range Checking. Now that you've become acquainted with all the terms and concepts involved, here's a program that embodies the subrange type conflict we mentioned earlier:

```
PROGRAM
 RangeErr;

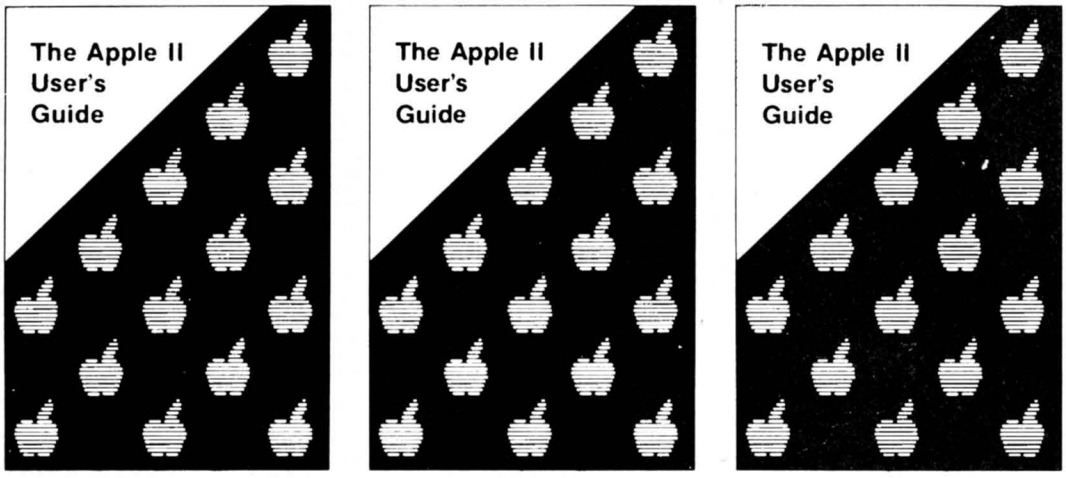
 TYPE
  HalfAsBig=
   0..255;

 VAR
  OnlyVar
   :HalfAsBig;

BEGIN
 OnlyVar := 128;
 WriteLn('OnlyVar (Initial): ',OnlyVar);
 OnlyVar := OnlyVar + 128;
 WriteLn('OnlyVar (Final): ',OnlyVar);
END.
```

This program will compile perfectly, but will fail during execution after displaying the initial contents of OnlyVar. Spe-

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cifically, this is what you should get when you execute the program:

```
OnlyVar (Initial): 128

Value range error
S# 1, P# 1, I# 70
Type <space> to continue
```

(The "I" number may be different on your system. Why this is so and what these numbers signify must wait for a future column.) When you press the space bar, the system will reinitialize itself and give you the Main Prompt Line. Yes, even the operating system carries the burden of having to initialize variables before using them, and it must do this (on a grand scale, indeed) every time one of your programs causes a run-time error. To avoid this inconvenience, I always write error-free programs, and you should, too.

Boolean Operators—an Introductory Exercise. The true utility of Boolean operators, which combine and affect only the values True and False, will become apparent next month, when we begin to study decision making and control flow. For now, I want you to postulate two Boolean variables, Bool1 and Bool2, then write down all the values of the following three expressions for all possible combinations of Bool1 and Bool2:

NOT Bool1
Bool1 AND Bool2
Bool1 OR Bool2

For example, what is Bool1 OR Bool2 when Bool1 is True and Bool2 is False? When both are True? When both are False? When Bool1 is False and Bool2 is True? Analyze each expression with similar thoroughness.

Precedence. Operators and operands may be strung together in arbitrarily long expressions. Here's an example:

```
2+3*2+3
```

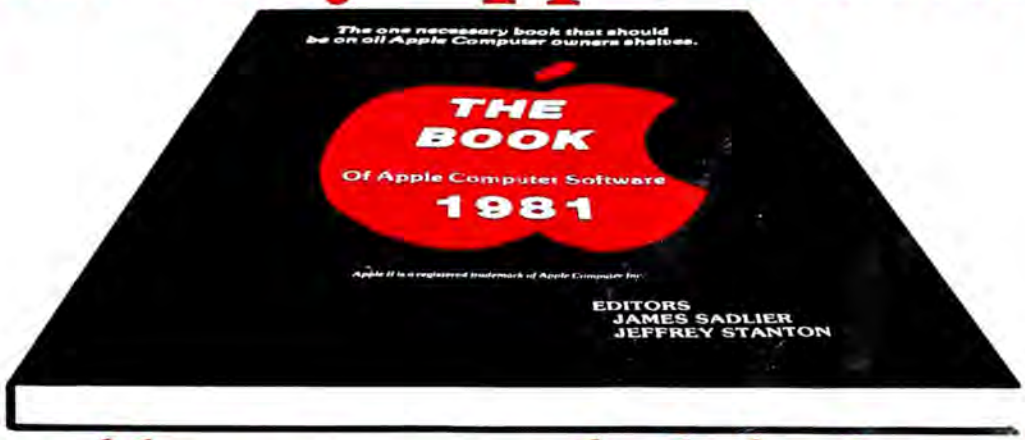
What is the value of this expression? Is it 11, 13, 17, or 25? Well, the correct answer is "all of the above," depending on your point of view. To get 13, simply process the operators in a strictly linear sequence, starting from the left, accumulating a partial result as you go (2 plus 3 is 5; times 2 is 10; plus 3 is 13.) The person who follows the rules of grade school algebra (perform multiplication and division before addition and subtraction) will arrive at 11, since 3 times 2 is evaluated first to get 6, then added to 2 and 3 to yield the final result. On slightly shakier ground stands the individual who intuits that the expression means the sum of 2 and 3 multiplied by the sum of 2 and 3. For this fellow, 5 times 5 gives 25. Finally, there is even a programming language (APL, to be specific) that, as in the first example, processes the operators and operands in linear order, but starts at the right-hand side of the expression and progresses to the left! The person who thinks in terms of this language will translate the expression as follows: 3 plus 2 is 5; times 3 is 15; plus 2 is 17.

None of these several conflicting interpretations is inherently wrong (although some may run counter to your own intuition), and each might be preferable to the others in some situations. To be consistent, however, a programming language must use only one method for interpreting all expressions. It shouldn't, for example, evaluate some expressions from right to left, and others from left to right. Consequently, each programming language has a single set of guidelines, called *rules of precedence,* that dictate how all expressions will be interpreted.

Extra Credit Exercise: The adventurous may discern Pascal's rules of precedence from its syntax diagrams. By tracing some complicated sample expressions through these diagrams as if you were the compiler, you can see which parts of an expression have higher precedence; that is, which parts (and so, which operators) are condensed first. If you're feeling particularly analytical, make up some of your own long expressions and trace them during the month between this column and the next.

Pascal's precedence rules can be expressed in words, like so: In any expression, operations with higher precedence are performed before those of lower precedence. In the chart following, the operators we've studied are presented in descending order of precedence. That is, the Boolean operator NOT has the high-

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est precedence, the "additive" operators (+, −, and OR) the lowest. All operators on any given line of the chart have the same precedence. When two or more operations having the same precedence occur in an expression, these operations are performed first-come, first-served, from left-to-right, after all higher-precedence operations have been performed.

Apple Pascal Operator Precedence (Part 1)

NOT (highest precedence)
*, /, DIV, MOD, AND
+, −, OR

Knowing what you know now, predict the value that Pascal produces for 2+3*2+3.

Quiz #1: If you'd like even more practice, try using the precedence rules to evaluate the following expressions, then check your answers against those given at the end of the column:

2*10*10+4*10−6
8 + 5 DIV 3
3+4*3+4+6*7+6*7
7+3*5/8
NOT True AND False OR NOT False OR True

Parentheses. The rules of precedence prescribe the *automatic* grouping of operators and operands. You need not, however, be bound by this method of grouping when writing your programs. You can override Pascal's normal operator precedence by encapsulating parts of an expression within parentheses. *Parenthetical subexpressions* are always evaluated independently of the rest of an expression. Whenever subexpressions are *nested*—that is, one parenthetical subexpression is contained within another—the inner one is always evaluated first.

To demonstrate the power of parentheses, note the values of the following variations on our original sample:

2+(3*2)+3
(2+3)*(2+3)
((2+3)*2)+3
2+(3*(2+3))

Pascal's rules of precedence imply that the value of 2+3*2+3 is exactly the same as that of 2+(3*2)+3. However, by careful positioning of parentheses in the other three variations, we force Pascal to evaluate the same operators and operands according to each of the three alternate precedence schemes we discussed.

Exercise: Write, compile, and execute a program that displays the values of the practice sample expressions given in the preceding section on Precedence. (Hint: The finished program will bear a strong resemblance to "SomeExpressions.") When you're satisfied that this program compiles and executes correctly, regroup some of the expressions using parentheses, then compile and execute the modified program to see the new values. Note that the number of left parens must equal the number of right parens in each of your modified expressions. (Another way of saying this is that you must be sure to *close* every parenthetical subexpression you *open*.) If you fail to close one or more subexpressions, the compiler will detect syntax errors in your program!

Extra Credit: Modify your program to use variables and assignment statements. Instead of displaying each expression's value by embedding it in a WriteLn statement (as in "SomeExpressions"), assign the expression to a variable, then display the variable's value. You will have to decide how many variables to use and what their types must be. Don't forget that you must declare any variables before using them in assignment or WriteLn statements.

Mixing Integer and Real Values in Numeric Expressions. All operators require that their operands be of certain types. For example, DIV and MOD each require two Integer operands, and always produce Integer results—you can't, by definition, perform DIV and MOD on Real numbers, Booleans, or Chars! All the other numeric operators, however, can take both Integer and Real operands, in any combination. Three numeric operators (*, −, and +) produce either Integer or Real results. If both operands are Integer, the result is Integer. If at least one of the operands is Real, then the result is Real. The Real division operator (/) accepts Integer and Real operands, but always gives a Real result.

Quiz #2: Determine the type (Real or Integer) of each numeric expression given below. Answers appear at the end of the column.

(7 DIV 3 MOD 2 + 4)
(6 DIV 2 + 5.0)
(0 * 0.0 + 0 − 0)
(1 / 2 + 6)
(13 * (42 − 3))

What's Coming Up. I'd like to thank you for accompanying me this far along the Pascal Path. We've laid a considerable grammatical foundation for ourselves over the course of the last few installments. Ironically, the illustration of our most challenging topics so far has required only trivial programs. Next time, however, we'll begin to work with larger, more interesting programs, as we examine the concepts of *decision* and *control flow*. While you're waiting, why not take some time to review the entire Pascal Path series, and make sure you're comfortable with all the material we've covered to this point. If anything remains unclear to you, please drop me a line in care of *Softalk*, and I'll respond as soon as possible, directly to you (whenever appropriate), or in a future installment of this column ■

Answers to Quizzes. *Quiz #1: 234; 9; True; 103; 8.87500. Quiz #2: Integer; Real; Real; Real; Integer.*

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Milling Around with Contest Winners

from page 34

seldom knew exactly what was in his account, since interest in that bank is compounded daily. So he wrote a program on the family's new Apple to tell him to the day how much was in the account including interest. Yes, he wrote his own essay.

Computer Camp winning essays will appear next month.

The Mill. The almost limitless ingenuity of Apple owners at harnessing their computers to diverse tasks is amazing. The entries for the Mill contest in the May issue are another example.

Contestants were asked to describe how they would develop an Apple system using the Mill, which contains a 6809 microprocessor. Ideas ranged from medical applications to graphics and included harnessing the Unix operating system to the Apple as well as developing several forms of multitasking.

The contest was broken into two categories—the programmers' category was for entrants with the proven ability to develop their ideas, and the blue-sky category was for the imaginative Apple user, whether he had the technical knowhow to perform on his idea or not.

Cye Waldman of Leucadia, California, and Eric Goez of San Diego, California, assisted *Softalk* in determining which proposals were winners.

In the programmers' category, the winners were Jim Peterson of Fenton, Michigan, and A. B. Winston of Seattle, Washington. Peterson postulated a system using the 6809 chip as a multitasking executive while the 6502 served as an intelligent I/O controller.

Winston postulated a hi-res graphics coprocessor wherein the 6502 chip would control user program functions while the faster 6809 would control hi-res calculating and plot functions.

Blue-sky winners were Richard M. Wurster of Baltimore, Maryland, and Michael J. Fitz of Oxnard, California. Wurster postulated a medical monitoring system for use in a physiology laboratory, the speed of the 6809 permitting rapid measurements of systolic and diastolic blood pressure.

Fitz foresaw turning the Apple into a sixteen-bit processor, with the 6809 chip processing the lower-order byte and the 6502 handling the higher-order byte. Among the applications could be implementation of matrix operations or a true p-code interpreter for Pascal or other high-level languages.

All winners received Mills so they can attempt to turn their visions into reality.

contemplating a byte



For one full year, as of this issue, many of you have been wondering how long we would continue sending you *Softalk* free without trying to put the touch on you for something, whether a subscription, software, peripherals, kidney beans, defective grommets, or spare Edsel parts. Now comes the magic moment.

Softalk commissioned graphics artist Robert Zraick to do this month'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 being sold at $6.00, (plus $1.50 to cover shipping and handling), two hundred artist's proofs, signed by Robert Zraick, are available at $75.

Robert Zraick's art will grace any computer room, and your purchase will help others become more self-sufficient.

Orders may be sent to:

SOFTALK

Softalk Poster
11021 Magnolia Boulevard
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Dealer inquiries invited.



This may be the first Apple II game that is copied for the arcade machines. *RASTER BLASTER* for the Apple II and Apple II Plus is so technically sophisticated and fun to play that it is sure to attract the attention of the big arcade manufacturers. But you can get it right now for your Apple.

RASTER BLASTER

Video Pinball for the Apple II

Dealers Inquiries Invited

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Softalk Presents The Bestsellers

Games dominated the Top Thirty list in June. The plethora of new entertainment product combined with the first full month of release of the new Personal Software business programs to prevent the summer sales doldrums from setting in.

Leading the list again was *Raster Blaster*. Bill Budge's latest effort has the largest lead over its nearest competitor of any list leader since *VisiCalc* in October. *Raster Blaster* in June was the fastest-selling program ever developed for the Apple computer.

Indicating that the concept of animation and graphics is vital to entertainment software are the runnerup programs—*Pool 1.5* by Innovative Software Design and Nasir's *Gorgon*. Both feature slick animation, colorful graphics, and variety in game situations.

Nasir almost made the lower rungs of the Top Thirty his personal fiefdom by placing four of his programs in the top fifteen. In addition to *Gorgon*, *Space Eggs* was seventh, *Pulsar II* was fourteenth, and *Autobahn* was fifteenth.

Sirius Software, publisher of Nasir's works, also had two other programs—*Orbitron* and *Gamma Goblins*—in the Top Thirty to rank as the leading publisher for the month in terms of volume.

Personal Software's *VisiCalc*, partially feeling the impact of the changeover from the 3.2 version to the 3.3 version, fell to fourth place, its lowest rating ever. However, *VisiTrend/VisiPlot* and *VisiDex* reached the lower rungs of the Top Thirty, and *VisiTerm* and *VisiPlot*, as a self-standing program, both made the specialty Top Tens to make Personal by far the largest software purveyor in dollar terms.

Business 10

This Month	Last Month	
1.	1.	*VisiCalc*, Software Arts/Dan Bricklin and Robert Frankston, Personal Software
2.	2.	*DB Master*, Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
3.	8.	*Apple Writer*, Apple Computer
4.	—	*VisiTrend/VisiPlot*, Micro Finance Systems, Mitch Kapor, Personal Software
5.	—	*VisiDex*, Peter Jennings, Personal Software
6.	—	*Apple PIE*, Tom Crossley, Programma
7.	—	*Magic Window*, Gary Shannon and Bill Depew, Artsci
8.	5.	*VisiPlot*, Micro Finance Systems/Mitch Kapor, Personal Software
9.	—	*PFS: Report*, John Page, Software Publishing Corporation
10.	3.	*Supertext II*, Ed Zaron, MUSE

Home/Hobby 10

This Month	Last Month	
1.	1.	*DOS 3.3*, Apple Computer
2.	4.	*Typing Tutor*, Image Producers, Microsoft
3.	2.	*DOS Tool Kit*, Apple Computer
4.	5.	*Super Disk Copy*, Charles Hartley, Sensible Software
5.	—	*Home Money Minder*, Bob Schoenburg and Steve Pollack, Continental Software
6.	—	*Disk Recovery*, Roger Tuttleman, Sensible Software
7.	—	*VisiTerm*, Tom Keith, Personal Software
8.	—	*ASCII Express*, Bill Blue, Southwestern Data Systems
9.	7.	*Program Line Editor*, Neil Konzen, Synergistic Software
10.	9.	*Multi-Disk Catalog*, Roger Tuttleman, Sensible Software

High Technology

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Transit is a super new accessory software package that literally doubles the usefulness of your Apple II™ software, such as VisiCalc™, The Store Manager™, and many, many others.

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VisiCalc™	The Store Manager™
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Information Master – $150
Information Master/Transit – $189

For more information contact your local computer dealer, or call or write us.

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Oklahoma City, OK 73113
405-840-9900

The Bestsellers

Gorgon was the only program new to the list to reach the top ten. Other new programs in the Top Thirty were *Robot War* from MUSE, *Orbitron*, *Gobbler* from On-Line Systems, *Ultima* from California Pacific, *Gamma Goblins*, *VisiTrend/VisiPlot*, and *VisiDex*. Rejoining the Top Thirty were *Asteroid Field* from Cavalier Software and *Apple Writer* from Apple Computer.

The specialty lists also underwent significant change. New programs in the Business Ten were *VisiTrend/VisiPlot*, *VisiDex*, *Magic Window*, from Artsci, and *PFS: Report* from Software Publishing Corporation. Rejoining that list was *Apple PIE* from Programma.

New to the Home/Hobby Ten were *Disk Recovery* from Sensible Software and *VisiTerm*. Rejoining the list were *Home Money Minder* from Continental Software and *ASCII Express* from Southwestern Data Systems.

Apple-franchised retail stores representing approximately 8.5 percent of all sales of Apples and Apple-related products volunteered to participate in the poll.

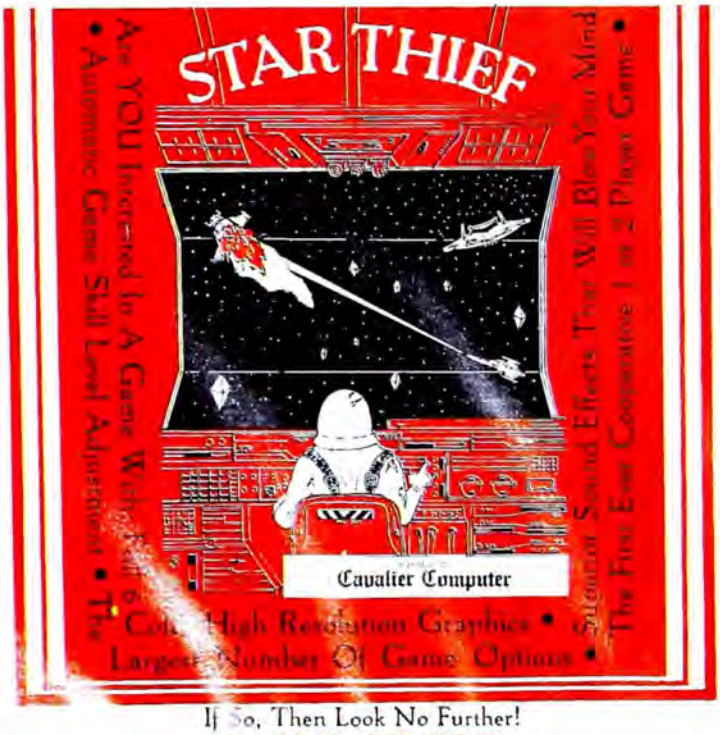
Respondents were contacted early in July to ascertain their sales leaders for the month of June.

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 July represented every geographical area of the continental United States as well as Hawaii.

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 5.1 percent, which translates roughly into the theoretical possibility of a change of four points, plus or minus, in any index number.



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Dealer Inquiries Invited

One of the more interesting revelations from the month of June came from Burr Chambless of Computerware in Encinitas, California.

DB Master was his leading seller, not all that unusual, but *Apple Pilot* was tenth, a very unusual occurrence. It seems sales of both programs were fueled by educational seminars conducted in the San Diego area. Teachers and administrators needing additional coursework to keep their credentials in good standing were given a computer course option.

For the administrators, the course was on the use of *DB Master*. For the high school teachers, the course was on the use of *Apple Pilot*.

Impressed educators loaded up on both programs at the end of the seminars.

In general, more software is now being sold by more vendors for more money than at any previous time. The Apple market appears almost immune to the ravages of inflation, high interest rates, a surfeit of product, and other factors.

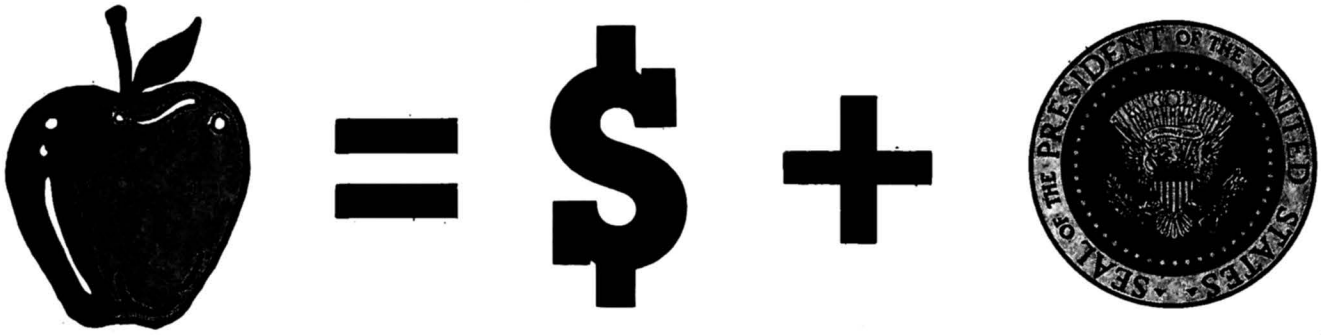
The advent in July of the three Applesoft compilers at prices ranging from $85 to $200 should test the breadth and strength of the Apple marketplace.

For the first time since the *Softalk* Top Thirty poll commenced in the October 1980 issue, *Sargon II* was missing from the list. The old warhorse continues to sell significant quantities but was overwhelmed by the spate of new, fast-moving entertainment product. ◨

The Top Thirty

This Month	Last Month	Index	
1.	1.	97.53	*Raster Blaster*, Bill Budge, BudgeCo
2.	8.	61.48	*Pool 1.5*, Don Hoffman, Howard de St. Germain, and Dave Morock, Innovative Design Software
3.	—	50.12	*Gorgon*, Nasir, Sirius Software
4.	2.	46.66	*VisiCalc*, Software Arts/Dan Bricklin and Robert Frankston, Personal Software
5.	12.	38.52	*Flight Simulator*, Bruce Artwick, SubLogic
6.	6.	31.60	*DOS 3.3*, Apple Computer
7.	3.	29.38	*Space Eggs*, Nasir, Sirius Software
8.	6.	29.13	*His-Res Adventure #2: The Wizard and the Princess*, Roberta and Ken Williams, On-Line Systems
9.	11.	26.17	*Sabotage*, Mark Allen, On-Line Systems
10.	9.	24.20	*Alien Rain*, Tony Suzuki, Broderbund Software
11.	27.	23.70	*Typing Tutor*, Image Producers, Microsoft
12.	13.	23.46	*Olympic Decathlon*, Tim Smith, Microsoft
13.	—	22.22	*Robot War*, Silas Warner, MUSE
14.	14.	21.48	*Pulsar II*, Nasir, Sirius Software
15.	17.	20.74	*Autobahn*, Nasir, Sirius Software
16.	5.	19.51	*Snoggle*, Jun Wada, Broderbund Software
17.	4.	19.26	*DB Master*, Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
18.	—	17.78	*Orbitron*, Erik Knopp, Sirius Software
19.	—	17.53	*Gobbler*, Olaf Lubecke, On-Line Systems
	19.	17.53	*DOS Tool Kit*, Apple Computer
21.	10.	17.04	*Zork*, Mark S. Blank, Timothy Anderson, Bruce Daniels, P. D. Leblins, Scott Cutler, and Joel Berez/Infocom, Personal Software
22.	—	16.79	*Ultima*, Lord British, California Pacific
23.	23.	16.30	*Hi-Res Adventure #1: Mystery House*, Ken and Roberta Williams, On-Line Systems
24.	—	14.81	*Asteroid Field*, Jim Nitchals, Richard Moore, and Barry Printz, Cavalier Software
	—	14.81	*Apple Writer*, Apple Computer
26.	—	14.32	*Gamma Goblins*, Tony and Benny Gno, Sirius Software
27.	15.	13.83	*Warp Factor*, Paul Murray, Strategic Simulations
	—	13.83	*VisiTrend/VisiPlot*, Micro Finance Systems/Mitch Kapor, Personal Software
29.	—	13.09	*VisiDex*, Peter Jennings, Personal Software
30.	20.	12.84	*Missile Defense*, Dave Clark, On-Line Systems

THE FORMULA FOR MONEY AND POWER.



How can an Apple® possibly get you the two things in life you'd love to have — money and power? Only if it's equipped with our latest software, two strategy games so well designed they blur the distinction between make-believe and reality: CARTELS & CUTTHROATS™ and PRESIDENT ELECT.™

MEGABUCKS. That's what's at stake in CARTELS & CUTTHROATS, a business game which puts you in charge of your very own multi-million-dollar manufacturing plant. The jungle of the real business world has been faithfully duplicated. You must confront the problems of an unsteady economy fraught with inflation and high interest rates, government intervention, and tough labor demands.

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Your business skills will be fully taxed. Can you react to an opponent's advertising blitz before you lose the competitive edge? Will you automate your factories — risking labor's wrath — in order to cut production costs? How will you handle labor demands during profitable years, or productivity declines during recessions?

Designed for one to six players, with the computer capable of playing up to five positions, CARTELS & CUTTHROATS provides a full range of options, from simpler games for beginners to an advanced version that will stump even experienced businessmen.

POWER OF THE PRESIDENCY. PRESIDENT ELECT takes into account every major electoral factor to make it the most accurate model of the campaign process ever made. It is the perfect release for the armchair politician in all of us who's wanted to run for the President of the United States.

POLITICAL CLIMATE. You can contest any election from 1960 to 1984 using actual historical candidates or ones you make up.

The computer reflects the political climate of the period chosen based on the prevailing economic factors and U.S. and foreign news. The candidates' political persuasions are determined by their answers (either preprogrammed or player-entered) to over 20 issues as diverse as ERA, the SALT treaty, tax cuts....

THE CAMPAIGN. On the campaign trail, you must allocate your money among key-state, regional, and national advertising. Campaign stops must be carefully planned to avoid fatigue. You must decide on the pros and cons of debate as well as grapple with national and international crises.

If you've run a smart race, you'll be rewarded by weekly polls that show favorable shifts in the popular vote and a Hi-Res color map of the U.S. that reflects an increase in your electoral votes.

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PRESIDENT ELECT is a three-player game representing the Republican, Democratic, and possible third-party candidates. The computer can play any or all three positions.

All you need to play both games are an Apple II with Applesoft ROM card, 48K memory, and a mini floppy disc drive. Each for $39.95, both come with their respective program disc, a rule book, and various player-aid charts.

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Cranston Manor



HI-RES ADVENTURE # 3

by
Harold DeWitz & Ken Williams

$34.95
Disk
48K REQ
DOS 3.2 or 3.3

Cranston Manor is an adventure game set in contemporary times in Coarsegold, California.

It seems that old man Cranston was not exactly your run-of-the-mill type millionare. Exactly how he made his fortune is unknown (it appears he wasn't a man known for either scruples or morals). Before his untimely death, he had amassed an uncalculated fortune in jewels, gold and various other rare and expensive items. Cranston was aware of the fact he was dying. He had lived a life of excessive luxury, pleasure and sin, and knew that soon he would end up "paying the piper"! Being a greedy and covetous old man, he figured that if he couldn't take it with him, no one would take it when he was gone. He hid his treasures throughout the mansion and property encompassing it.

Old man Cranston is now the "late" old man Cranston. Rumor has it that his disembodied spirit roams the estate guarding the hidden riches. You are placed in the deserted town of Coarsegold (smothered by Cranston's greed and plotting) and it is your goal to find the treasure so that the town may once again become the center of life for the thousands who once lived there. It won't be easy, and it won't be without it's terrifying risks!

Cranston Manor has over 200 pictures in living Hi-Res Color and is sure to bring you and yours many hours of fun and adventure. Harold DeWitz, the author of Cranston Manor, has worked long and hard to make his game meet the quality standards of On Line Systems so that you enjoy Hi-Res adventure at it's best. To get started on this new adventure, check with your local computer store or simply use the enclosed order form . . . and watch out for the spirits of evil old men!

ON-LINE systems

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