



# The Perfect Fit

The Micromodem II data communications system and the Apple II\* computer. What better combination to maximize the capabilities of your personal computer!

This popular direct connect modem can transmit data between an Apple II and another Apple II, a terminal, another microcomputer, minicomputer or even a large time-sharing computer anywhere in North America. The Micromodem II has unique automatic dialing and answer capabilities which further increases the communications possibilities between the Apple II and another computer or terminal.

You can send and/or receive messages or data when you are out of your office, home or out of town. Your branch business locations can communicate with each other regarding inventory and other matters over the phone. Or you can communicate with friends across the country. And you can access information utilities like the SOURCE for various business and personal applications.

The Micromodem II consists of two parts. One part includes the printed circuit board which holds the Micromodem II, ROM firmware and the serial interface. The board plugs directly into the Apple II providing all the functions of a serial interface card plus programmable auto dialing and auto answer capabilities. The on-board ROM firmware enables the Micromodem II to operate in any of three modes to perform different tasks-terminal mode, remote console and program control mode.

The other part of the Micromodem II datacomm system is a Microcoupler which connects the Micromodem board and Apple II to a telephone line. The Microcoupler gets a dial tone, dials numbers, answers the phone and hangs up when a transmission is over. There are none of the losses or distortions associated with acoustic couplers. The Microcoupler is compatible with any North American standard telephone lines and is FCC-approved for direct connection in the U.S. It works with standard dial phone service or Touch-tone service.

The Micromodem II is completely compatible with Bell 103-type modems. Full and half-duplex operating modes are available as well as speed selectable transmission rates of 110 and 300 bps.

Why not increase your Apple II's capabilities by outfitting it with the sophisticated Micromodem II data communications system? The Micromodem II is available at retail computer stores nationwide. For the store nearest you, call or write:

 **Hayes**

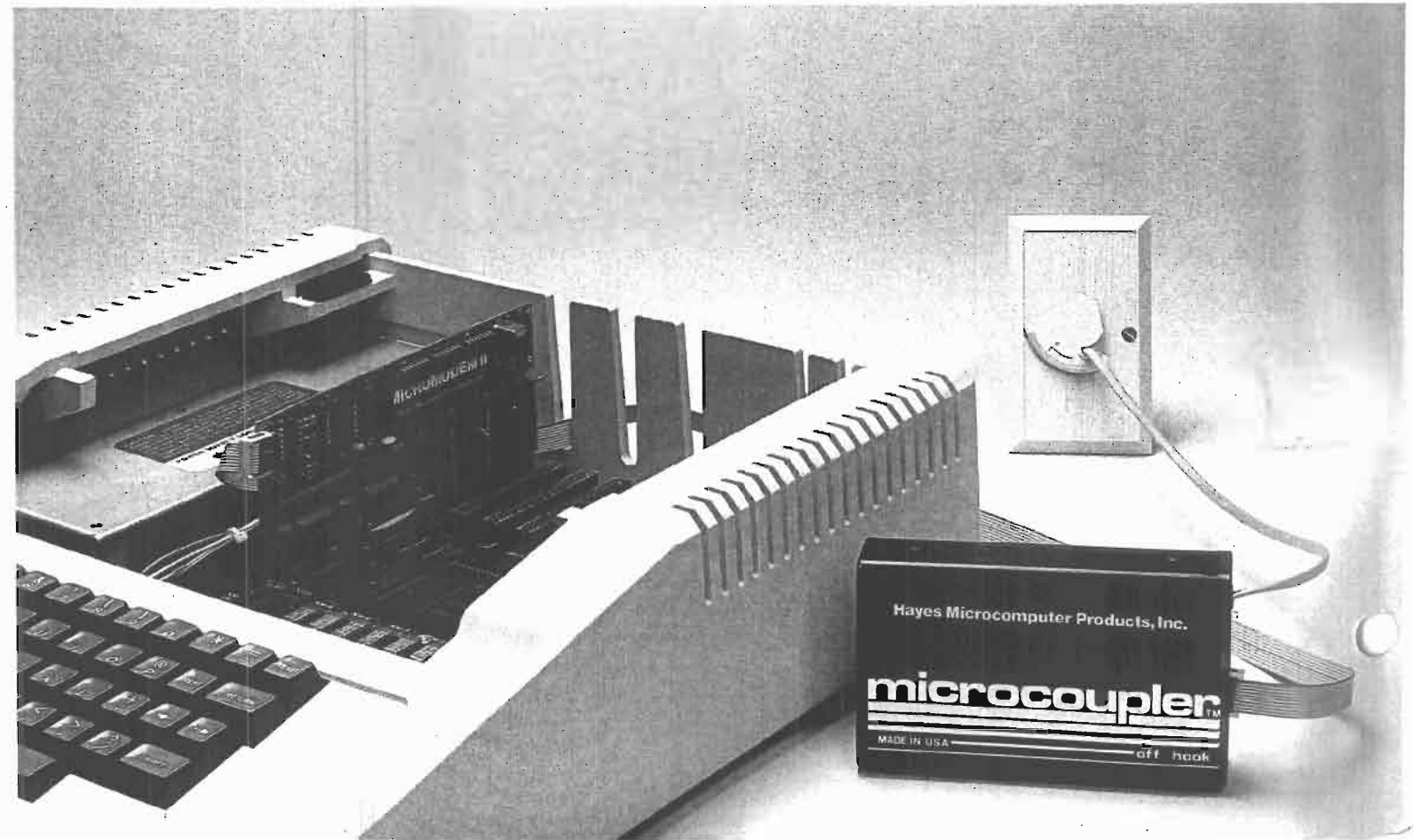
**Hayes Microcomputer Products Inc.**

5835 Peachtree Corners East, Norcross, Georgia 30092 (404) 449-8791

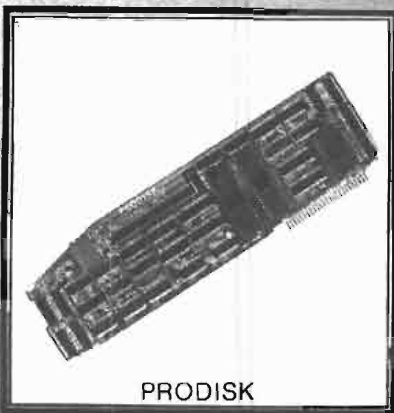
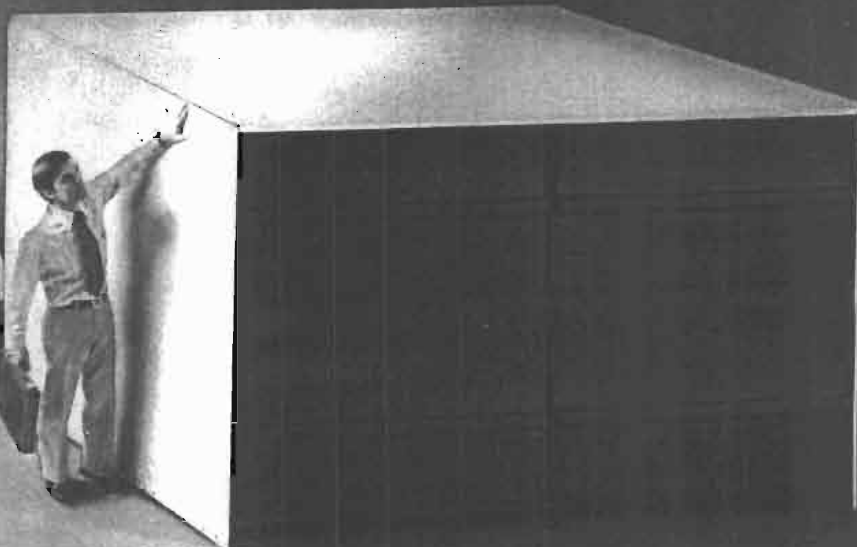
\* Micromodem II is a trademark of Hayes Microcomputer Products, Inc.

\* Apple II is a registered trademark of Apple Computer Inc.

The Micromodem II can also be used with the Bel. & Howell computer.



**Our new Prodisk card gives the small businessman big business storage.**



**PRODISK**

**BIG IS RIGHT!**

**Up to 5 million bytes of on-line storage with 8" floppies. And, without stealing power from your Apple II!**

Your business is more complicated than anyone realizes. Or, you're growing faster than expected. Does that mean you have to trade in your reliable Apple II for a bigger, more costly system? Or, is there a simple, reasonable solution?

You bet there is, now that Programma International has introduced the Teeter Electronics PRODISK controller card.

PRODISK is like having the storage capability of ten Apples! Because with just four 8" floppy disk drives, its on-line storage capacity goes to a business-size 5 million bytes. Plus it delivers high-speed transfer of a half million bits per second.

With storage and speed like that you can really get a handle on your entire business. And, it won't interfere with your Apple's operation. You see, the new PRODISK card is powered from the drives, not the Apple. Since there's no significant power drain, other cards can be used with no problem.

**Technically Inclined?**

The card operates under Apple DOS 3.1 or 3.2, with 48K Apple II. It has full compatibility with mini-disks. Handles from one to four 8" floppy drives. Single or double density disks use DMA transfer techniques . . . with high speed transfer of half million bits per second.

**Priced Right**

The amazing PRODISK controller card is priced at \$645.00. And it's a tax deductible business expense. Its low price works out to be even lower! Same for the special Programma 8" floppy disk drives (800 or 850 Shugart equivalent). Example: two single sided drives, priced at \$1549.00.

Get big business storage capacity for your small business right now . . . with PRODISK, available at your better computer stores, or direct from Programma International.

**Big power for small business**

**PROGRAMMA**

Programma International Inc.  
2908 No. Naomi Street  
Burbank, CA 91504  
(213) 954-0240



Apple II and Apple DOS are trademarks of Apple Computer, Inc.

# A BRILLIANT FUTURE FOR YOUR AIM-65 WITH THE BANKER MEMORY™



Your 36K of free address space is the AIM's most valuable and limited resource. With today's large capacity RAM boards, ROM boards, disk systems, video boards, and other expansion accessories it is easy to deplete this resource before the application requirement is satisfied. MTU has solved this problem.

THE BANKER MEMORY contains 32K of RAM, 4 PROM sockets for 2716/2732/2332, a PROM programmer, 40 bits of parallel I/O, and 4 timers from two 6522 I/O chips. Addressing is extremely flexible with the RAM independently addressable in 4K blocks, PROM's independently addressable, and I/O addressable anywhere on a 64 byte boundary (even in AIM's I/O area at AXXX by adding a single jumper to the AIM).

This may sound familiar, but read on! Unlike other AIM compatible memory boards, THE BANKER MEMORY has on-board bank-switching logic! The four 8K blocks of RAM plus the 4 PROM sockets make up 8 resources, each associated with a bit in an Enable Register. Through this Enable Register resources may be turned on and off under software control. When a resource is off, its address space is freed for other uses. You can even put BANKER resources at the same address and switch among them for virtually unlimited RAM and PROM expansion! You can even have multiple page zeros and stacks! Do you need 160K byte of memory? It only takes 5 of THE BANKER MEMORY boards and you end up with 5 page zeros and stacks to boot!

There's more! The BANKER MEMORY also incorporates 18 bit addressing which allows for the 256K address spaces of the future. RAM, PROM, and I/O each has its own full 18 bit address decoder which allows these resources to be in different 64K banks. This board and other MTU products, such as our 320 by 200 dot VISIBLE MEMORY and Floppy Disk Controller with 16K DMA RAM, can turn your AIM into a truly powerful 6502 computer that far surpasses the packaged systems in functional performance.

INTRODUCTORY SPECIAL K-1032-1 32K BANKER MEMORY FULLY ASSEMBLED AND TESTED \$395.00 (\$450.00 as of March 1, 1980) or the K-1032-2 16K RAM only with bank switching and 18 bit address bus only \$295.00

Isn't it time you took a closer look at MTU — we offer you power now with an eye to the future.

WRITE OR CALL TODAY FOR OUR 48 PAGE FALL 1980 6502 CATALOG

International requests include \$1.00

VISA and MASTERCARD accepted

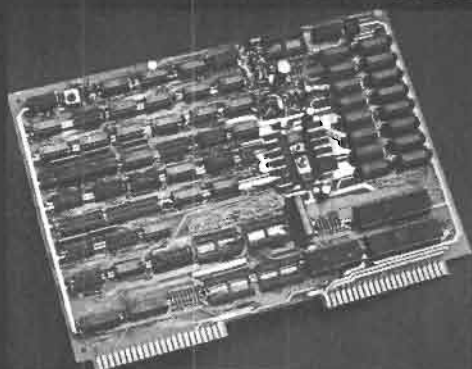


Photo credit:  
SUPERNOVA CRAB NEBULA:  
Palomar Observatory,  
California Institute of Technology

**MTU**  
**Micro Technology Unlimited**  
2806 Hillsborough Street  
P.O. Box 12106  
Raleigh, NC 27605, U.S.A.  
(919) 833-1458

# MICRO™

## THE 6502 JOURNAL

### STAFF

Editor/Publisher  
ROBERT M. TRIPP

Associate Publisher  
RICHARD RETTIG

Associate Editor  
MARY ANN CURTIS

Special Projects Editor  
MARJORIE MORSE

Art Director  
GARY W. FISH

Typesetting  
EMMALYN H. BENTLEY

Advertising Manager  
L. CATHERINE BLAND

Circulation Manager  
CAROL A. STARK

MICRO Specialists  
APPLE: FORD CAVALLARI  
PET: LOREN WRIGHT  
OSI: PAUL GEFFEN

Comptroller  
DONNA M. TRIPP

Bookkeeper  
KAY COLLINS

**MICRO™** is published monthly by:  
MICRO INK, Inc., Chelmsford, MA 01824  
Second Class postage paid at:  
Chelmsford, MA 01824 and additional  
offices  
Publication Number: COTR 395770  
ISSN: 0271-9002

Subscription Rates:	Per Year
U.S.	
through March 31	\$15.00
thereafter	\$18.00
Foreign surface mail	\$21.00
Air mail:	
Europe	\$36.00
Mexico, Central America	\$39.00
Middle East, North Africa	\$42.00
South America, Central Africa	\$51.00
South Africa, Far East, Australasia	\$60.00

For back issues, subscriptions, change  
of address or other information, write to:  
MICRO  
P.O. Box 6502  
Chelmsford, MA 01824  
or call  
617/256-5515

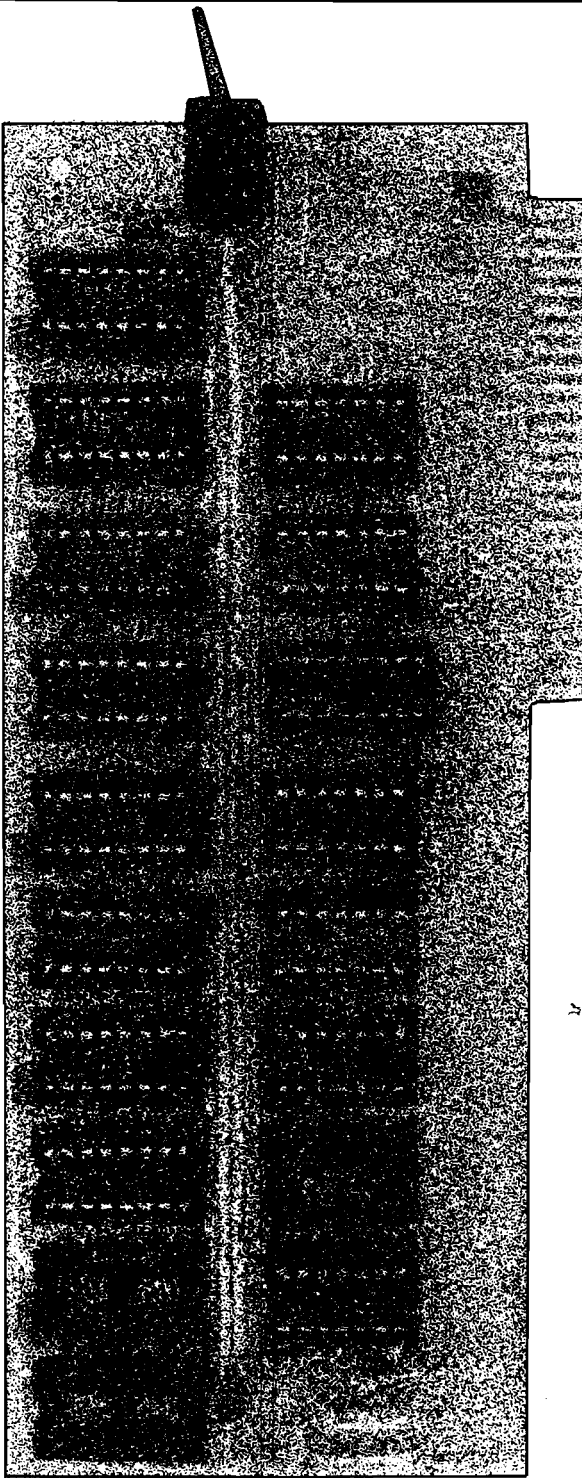
Copyright © 1981 by MICRO INK, Inc.  
All Rights Reserved

### CONTENTS

- 7** S-C ASSEMBLER MODIFICATIONS  
Enhance the usefulness of the S-C assembler for the Apple  
By Ned W. Rhodes
- 13** PRINT USING FOR THE PET  
Popular program adapted to run on any PET or CBM machine  
By David Malmberg
- 17** MEMSEARCH FOR THE AIM 65  
Scan through memory using this machine language utility program  
By Bob Kovacs
- 23** JOYSTICKS FOR THE OSI C4  
Make your own joysticks  
By Charles Platt
- 27** APPLE MEMORY MAPS, PART I  
Draw your own memory maps and display them  
By Peter A. Cook
- 37** SYM TIME- REMAINING TIMER  
Measure elapsed time and create an "alarm" for your SYM  
By Ralph Orton
- 43** OH NO — IT'S GARBAGE COLLECT!  
Find out what garbage collect is, and how to avoid it  
By Gordon A. Campbell
- 57** ADD A LIGHT PEN TO YOUR MICRO  
Hardware details to install a light pen on any 6502  
By Peter Alan Koski
- 65** INTEGER BASIC INTERNALS  
A sorted list of Apple Integer BASIC memory locations  
By Glenn R. Sogge
- 69** ATARI ERROR MESSAGES  
English language versions of Atari's number-coded error messages  
By David P. Allen
- 79** BASIC PROGRAM CONVERTER BETWEEN SYM AND KIM  
Transfer BASIC programs from SYM to KIM, and vice versa  
By Lee Chapel

### DEPARTMENTS

- 5** Editorial — Robert M. Tripp
- 6** Letterbox
- 15** MICRO Club Circuit
- 47** New Publications
- 51** MICRO Dealers
- 55** PET Vet — Loren Wright
- 77** Challenges — Paul Geffen
- 81** Microbes and Updates
- 83** The MICRO Software Catalog: XXXI
- 89** 6502 Bibliography: Part XXXI — William R. Dial
- 95** Advertisers' Index



# 16K RAM Expansion Board for the Apple II\*

## \$195.00

- expands your 48K Apple to 64K of programmable memory
- works with Microsoft Z-80 card, Visicalc, LISA ver 2.0 and other software
- eliminates the need for an Applesoft\* or Integer Basic ROM Card
- switch selection of RAM or mother board ROM language
- includes installation and use manual
- fully assembled and tested



Visa and MasterCard accepted



Shipping and handling will be added unless the order is accompanied by a check or money order  
N.C. residents add 4% sales tax

\*Apple II and Applesoft are trademarks of Apple Computer, Inc.

# ANDROMEDA



INCORPORATED\*\*

P.O. Box 19144  
Greensboro, NC 27410  
(919) 852-1482

\*\*Formerly Andromeda Computer Systems

# MICRO

## Editorial

### Staff and Stuff

Most readers probably never read the staff listing on the Table of Contents page, but those who do will note that since the beginning of this volume, (June 1980) we have added an associate publisher, special projects editor, art director, advertising manager, three micro specialists and a typesetter. This improved staffing permits MICRO to deliver a better product each month and to undertake a number of other projects as well.

One major undertaking is book publishing. A series of Apple books is under way, with the first, *MICRO/Apple, Volume 1*, to be released April 1. This collection of Apple articles from past issues of MICRO is intended for the beginner-to-intermediate Apple user. All of the material has been re-edited, re-typeset and many articles have been updated by the original authors and/or the MICRO staff. All programs have been re-entered, listed and tested. They are provided on a diskette which is an integral part of the book. The 224-page book is wire-bound

and lies flat when open to make it easy to use.

Other books in the *MICRO/Apple* series will include reprints, original articles, new reference works, and more. This will permit us to present various types of material which do not work well in a magazine format: long articles or listings, good articles of limited scope, and so forth.

We are looking for additional material for other major microcomputers to support similar books for the PET, OSI, AIM, SYM, KIM and Atari. If you have material which you may not have submitted because you felt that it was not suited to a magazine presentation, please consider it for one of the books. If you have a complete manuscript for a 6502-based book, or even just the idea for one, please contact us. We may be interested in publishing it and distributing it to the 6502 world through our dealer network.

### An Apple Solution

The February editorial addressed the problem of "Too Many Apples"—more Apple articles on a regular basis than we can incorporate in MICRO without overwhelming the other 6502-based microcomputers. The reader response may be summarized as:

no one favored "no change" or "print the extra Apple material in book form";

only a few wanted to "print the best material without regard to micro-computer";

more wanted to "publish an Apple supplement or quarterly" or "publish a monthly Apple magazine";

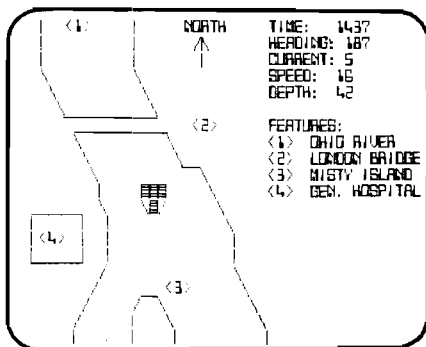
most chose to "increase the size of MICRO to accommodate additional Apple material without reducing the coverage of the other micros."

This reader feedback and our in-house staff discussions agree, and the decision has been made to expand MICRO. Starting with the June 1981 issue, there will be "extra" pages devoted to Apple articles and advertisements. The number of pages will be determined partially by the extra advertising required to cover the additional production, printing and postage costs—without requiring an increase in either the single copy or subscription price. There will be at least 16 extra pages, and possibly 32 pages. This expansion will permit us to provide timely Apple coverage while maintaining our policy of serving the entire 6502 community.

*Robert M. Tripp*

Robert M. Tripp  
Editor/Publisher

### About the Cover—



Screen display on this month's cover — from the human point of view.

(Cover photo by Michael Rakip)

### Cruising Down the River...

Imagine yourself cruising down the river on the Delta Queen. To navigate rivers you need maps and charts. Currently these are available as printed material, very detailed and very accurate. Accurate? Well, the chart was accurate when it was made, but how long ago was that? And what changes have occurred since then?

How about a computer displayable map—one that could be updated continuously by whatever authority has the charting responsibility, the U.S. Coast Guard or the U.S. Geodetic Survey? A diskette could be generated which contains the latest information along a particular route. It could provide whatever level of detail is required; from an overview as pictured on the cover, to the detail normally provided in navigational charts. As the position of the vessel is

entered into the computer, manually in a simple system or automatically in a more advanced one, the display could change to provide the current map information.

In addition to the pure mapping function, the computer could provide a wealth of other information. Time of day, current speed, vessel speed, direction, rate of fuel consumption, estimated time to destination or check point, and other operating parameters could be displayed. Automatic radio tracking equipment could provide accurate positioning information. Depth information in coastal waters could be continuously updated and modified as a function of tide tables. The possibilities for this type of microcomputer application are almost limitless.

But for now, I guess I'll just keep drifting.

# MICRO

## Letterbox

Dear Editor:

First, I don't know of any available printed material that has been as interesting and informative as "MICRO Magazine".

Many little problems related to programming have been removed due to the care and testing that is done, by writers, proofreaders, editors and by the production people. The quality is outstanding as witnessed by the brevity of your "Microbes" pages.

Now, the second part—I feel that I have received more value from this source than it has cost. Therefore, I offer this little tip for Apple II owners fortunate enough to have Disk II. Perhaps I am lazy, but my fingers get tired of constantly typing "catalog" following the end of a program. I know that many programs exist to change the disk command to cat or just plain 'C'. They are good, but why not insert these lines in place of "END" statement in the programs used frequently?

```
XX0 INPUT"WANT DISK
    CATALOG (Y/N) ?";A$
XX1 TEXT:HOME
XX2 IF A$ = "Y" THEN PRINT
    D$;"CATALOG"
```

Your program is still in memory should you choose to re-run it. Or with the catalog menu in front of you, a change to a different program is quite simple.

Another simple little tip is to type "VTAB <1 THROUGH 20 >" to move the cursor up to the program desired, enter your command, and use the right arrow key to trace over the program listing, hit return, and your command is executed. Be sure that you don't leave any part of the program type or sector information before tracing over the program title. Those little left-overs produce nice error statements.

Thanks again for an excellent publication. I look forward to seeing it each month for it makes the Apple II more enjoyable for this retired telephone man who is pretty much housebound.

John A. Backman  
302 North 76th  
Seattle, WA 98103

Dear Editor:

I appreciated the letter by Robert V. Davis, MICRO, January 1981, but his letter didn't take full advantage of OSI's BASIC-in-ROM accuracy and he doesn't solve the absence of the PRINT USING command for anything but whole dollars.

That would be trouble if you're working in any accounting program where you need to keep track of pennies. The subroutine I am enclosing will print out amounts in dollars and cents from \$0.00 to \$167,772.15 with full accuracy and amounts close to one billion with 7+ decimal accuracy before going into scientific notation errors. Since Michigan income tax asks that you don't round off at one place, this program would keep you out of trouble with the taxman. Also by simply changing the value of H in line 20000 by a power of ten, and making the opposite change of T, you can set up for printing in the thousandth place or any other decimal place you wish with 7+ decimal accuracy. This routine will also increase the amount of decimals printed with any other BASIC computer.

```
50 INPUT"AMOUNT OF
    CASH";B:A=B
60 PRINT"BALANCE";:GOSUB
    20000
70 REM REST OF PROGRAM
19999 PRINTING SUBROUTINE
20000 H=100:T=1000:
    G=0:C=A:IF A>T*9
    THEN G=T*INT(A/T):C=
    A-G+T
20010 PLACE=INT(LOG
    (H)/LOG(10)+.5):IF A<1
    THEN 20070
20020 A$=STR$(INT(H*C+.5)):
    AC$=RIGHT$(A$,PL):
    B=LEN(A$)
20030 A$=LEFT$(A$,B-PL)+
    "."+AC$:IF G>0 THEN
    A$=STR$(G/T)+MID$
    (A$,3)
20040 PRINT TAB(20-LEN(A$))"
    ";A$:RETURN
20060 REM AMOUNTS LESS
    THAN 1
20070 A$=STR$(INT(A*H
    +.5)/H):IF
    LEN(A$)<PL+2 THEN
    A$=A$+"0":
    GOTO20070
20080 GOTO20050
```

Dale Mayers  
2301 S. Washington  
Lansing, MI 48910

Dear Editor:

I'd like to share the following information in response to your Editorial in the January 1981 issue (MICRO Goes to School).

Our math department was given the job of learning how to operate the computers, then teach our students, then teach any interested non-math teachers. Granted, year #1 was trial and error. We spent many hours on our own time getting our act together.

Several members of the department formed a core group which learned how to program and joined area users groups, and then brought this information back to the rest of the department for general use. We subscribe to the leading magazines for help and greatly appreciate MICRO's help with the Club Circuit.

By using small ads, we have contacted and exchanged ideas, programs, and student booklets with teachers in several states. There is a vast network out there of independent math teachers which the computer will bring together.

This year, in our lab, we are more organized. Lab slots are assigned on a week-to-week basis and we have lab assignments sheets for the students, that they receive before they enter the lab. The sheets contain information as to what programs they should work on, what section of particular programs, what disks to use, which computers to be worked on, if the printer is to be used, etc. Thus, any computer center means preparation by the teachers involved if the center is to achieve its goals in the educational environment. And with the availability of data base programs, the department has its grades, orders, inventory, small supplies, etc., on disk.

Our computer center has taken a lot of effort, but it is well worth it. If any teacher or department requires more information, they may write to Apple Bit'N Pieces Educators Group c/o our school.

Patrick J. Calebrese  
Math Dept. Chairman  
Millcreek Township School District  
Millcreek Middle School—J.S. Wilson  
900 West 54th Street  
Erie, PA 16509



# S-C Assembler Modifications

The usefulness of the S-C assembler for the Apple can be enhanced with the addition of a command to automatically generate line numbers for the programmer while he is entering the source code.

Ned W. Rhodes  
2001 No. Kenilworth St.  
Arlington, Virginia 22205

The S-C assembler is one of the many assemblers available for the Apple computer system. The original version of the S-C assembler was cassette-based and performed well for the user with a minimal system. Subsequent versions of the assembler have been disk-based. With the announcement of version 3.2, previous owners were invited to upgrade their assemblers for \$12.50. This I did, and along with my upgrade kit came information on how the S-C assembler could be modified to incorporate more features. In this article I will describe modifications to the S-C assembler that allow the S-C assembler to work with the auto-start ROM, automatically generate line numbers for source code entry, and allow the user to change the starting line number and increment for the auto-line numbering mode.

## Adding Back the Multiply Routine

In the auto-start ROM, Apple has incorporated some features that make line editing easier and allow the Apple to automatically boot itself when power is applied. In order to give us all of these features, they had to replace some old (and very useful) code in the F8 ROM with their new routines. One of the deleted routines happened to be the Integer multiply routine which is used by the S-C assembler. So, if you have the auto-start ROM, you must patch the assembler and add the multiply code in order to make the

## Listing 1

```

1000 *
1010 *
1020 *
1030 *
1040 *
1050 *
1060 *
1070 *
1080 * ROUTINE TO DO AUTO NUMBERING
1090 *
1100 *
1110 *
1120 *
1130 *
1140 *
1150 *
1160 *
1D21- 2C 7D 1D 1170 ANUM BIT FLAG TEST AUTO-FLAG
1D24- 10 27 1180 BPL EXIT NOT TURNED ON
1D26- 4E 7D 1D 1190 LSR FLAG CLEAR THE FLAG
1D29- E0 00 1200 CPX #0 IF NOT IN COLUMN 1
1D2B- D0 20 1210 BNE EXIT THEN DON'T DO IT
1220 *
1230 *
1240 * PRINT IT OUT, AND STORE IN
1250 * INPUT BUFFER
1260 *
1270 *
1D2D- 20 5C 1D 1280 JSR CONV4 CONVERT LINE NUMBER
1290 *
1300 *
1310 * INCREMENT THE LINE NUMBER
1320 *
1330 *
1D30- F8 1340 SED SET DECIMAL MODE
1D31- 18 1350 CLC CLEAR CARRY
1D32- AD 7A 1D 1360 LDA NUM+1 ADD LST'S
1D35- 6D 7C 1D 1370 ADC INC+1
1D38- 8D 7A 1D 1380 STA NUM+1
1D3B- AD 79 1D 1390 LDA NUM ADD MSR'S
1D3E- 6D 7B 1D 1400 ADC INC
1D41- 8D 79 1D 1410 STA NUM
1D44- D8 1420 CLD SET BINARY MODE
1D45- A9 A0 1430 LDA #SAO SEND A SPACE TOO
1D47- 20 72 1D 1440 JSR CHO
1D4A- 4C 0C FD 1450 JMP $FDOC INPUT NEXT CHARACTER
1460 *
1470 *
1480 *
1490 * CALL THE MONITOR TO READ KEY
1500 * CHECK IF CONTROL-N.
1510 * IF SO, SET AUTO-FLAG AND
1520 * CHANGE TO CARRIAGE RETURN
1530 *
1D4D- 20 18 FD 1540 EXIT JSR $FD18 MONITOR KEYIN
1D50- C9 8E 1550 CMP #SRE CONTROL-N??
1D52- D0 05 1560 BNE HTRN NO
1D54- A9 8D 1570 LDA #SBD CHANGE TO CONTROL-M
1D56- 8D 7D 1D 1580 STA FLAG SET FLAG
1D59- 4C 8B 13 1590 HTRN JMP $138B RE-JOIN SCALL
1600 *
1610 *
1620 * CONVERT AND STORE FOUR DIGITS
1630 *
1640 *
1650 CONV4
1D5C- AD 79 1D 1660 LDA NUM FIRST TWO DIGITS
1D5F- 20 65 1D 1670 JSR CONV2
1D62- AD 7A 1D 1680 LDA NUM+1 LAST TWO DIGITS
1690 *
1700 *
1710 * CONVERT AND STORE TWO DIGITS
1720 *

```

assembler run properly. Bob Sander-Cederlof (the S-C assembler creator) included the patch along with my upgrade kit and I will repeat it here.

Before we can patch the assembler, we have to create some room for the patch. Bob suggested that we move the starting address of the symbol table up a page or two, and make all patches and modifications in this new space. The assembler resides in memory from \$1000 through \$1BFF, and the symbol table follows, starting at \$1C00. The moving of the symbol table is accomplished by changing location \$1010 in the assembler. Now, I suggest that we start the symbol table at \$1E00 so that we have plenty of room for the enhancements that are to be described later on. The step-by-step instructions for moving the symbol table are:

1. Load the assembler
2. Change contents of \$1010 to \$1E
3. Re-save the assembler using BSAVE ASMB,A\$1000,L\$E00

Note that the older versions of the assembler may also be patched in this fashion, but that the address to be patched will not necessarily be the same. In that case, use the Monitor disassembler and examine memory on either side of address \$1010 until you find either a \$1C or \$1D, as that was the default-starting page number of the symbol table.

The multiple routine may now be added, starting at location \$1D00 using the monitor insert command.

```
*1D00: A0 10 A5 50 4A 90 0C 18
        A2 FE B5 54 75 56 95 54
*1D10: E8 D0 F7 A2 03 76 50 CA
        10 FB 88 D0 E5 60
```

And finally, we need to change the JSR instruction that points to the multiply routine to point to the relocated code for the multiply routine. You should find a JSR \$FB63 at location \$1122. The following will change the destination address to \$1D00.

```
*1123: 00 1D
```

Now, the assembler may be saved as instructed in step 3 above. This modified version of the assembler will now work properly with the auto-start ROM.

### Automatic Line Numbers

The other little goodie that Bob included in my upgrade kit was a routine that allowed the assembler to automatically generate line numbers so

```
1730 *
1740 CONV2
1D65- 48 1750 PHA SAVE BYTE ON STACK
1D66- 4A 1760 LSR GET LEFT DIGIT
1D67- 4A 1770 LSR
1D68- 4A 1780 LSR
1D69- 4A 1790 LSR
1D6A- 20 70 1D 1900 JSR CONV1 CONVERT AND STORE IT
1D6D- 68 1810 PLA GET BYTE FROM STACK
1D6E- 29 0F 1820 AND #SOF ISOLATE SECOND DIGIT
1830 CONV1
1D70- 09 B0 1840 ORA #SBO CONVERT TO ASCII
1D72- 9D 00 02 1850 CHO STA $200,X STORE IN INPUT BUFFER
1D75- E8 1860 INX INCREMENT BUFFER POINTER
1D76- 4C ED FD 1870 JMP $FDED PRINT THE CHARACTER
1880 *
1D79- 10 00 1890 NUM .HS 1000 INITIAL NUMBER
1D78- 00 10 1900 INC .HS 0010 INCREMENT
1D7D- 00 1910 FLAG .HS 00
1920 .END
```

### SYMBOL TABLE

```
ANUM 1D21 EXIT 1D4D RTRN 1D59
CONV4 1D5C CONV2 1D65 CONV1 1D70
CHO 1D72 NUM 1D79 INC 1D7B
FLAG 1D7D
```

### Listing 2

```
1000 *
1010 *
1020 *
1030 *
1040 *
1050 *
1060 *
1070 * THIS ADDS THE AUTO COMMAND TO THE
1080 * S-C ASSEMBLER. THE AUTO COMMAND
1090 * ALLOWS YOU TO SET THE STARTING LINE
1100 * NUMBER AND THE INCREMENT FOR AUTOMATIC
1110 * LINE ENTRY.
1120 *
1130 * THE FORMAT OF THE COMMAND WILL BE:
1140 *
1150 * AUTO START,INC
1160 *
1170 *
1180 SPACE .EQ $20 SPACE
1190 LRUF .EQ $200 LINE BUFFER
1200 COMMA .EQ $2C COMMA
1210 WARM .EQ $1003 WARM START
1220 NUM .EQ $1D79 STARTING LINE NUMBER
1230 INC .EQ $1D7B INCREMENT
1240 .OR $1D7E AFTER THE AUTO LINE NUMBER GENERATOR
1250 *
1260 *
1270 *
1D7E- A0 03 1280 AUTO LDY #3 START AT FOURTH CHARACTER
1D80- B9 00 02 1290 SLOP LDA LRUF,Y GET CHARACTER
1D83- F0 60 1300 BEQ DONE ALL DONE--DO NOTHING
1D85- C9 20 1310 CMP #SPACE IS IT A SPACE??
1D87- F0 03 1320 BEQ GSPAC YES
1D89- C8 1330 INY BUMP Y
1D8A- D0 F4 1340 BNE SLOP IDLE UNTIL A SPACE
1350 *
1360 *
1370 * GOT A SPACE. IDLE UNTIL NO MORE SPACES
1380 *
1390 *
1400 GSPAC
1D8C- C9 1410 INY BUMP Y
1D8D- B9 00 02 1420 LDA LRUF,Y GET CHARACTER
1D90- F0 53 1430 BEQ DONE WE ARE DONE
1D92- C9 20 1440 CMP #SPACE IS IT A SPACE
1D94- F0 F6 1450 BEQ GSPAC LOOP UNTIL NO SPACE
1460 *
1470 *
1480 * COUNT THE NUMBER OF CHARACTERS
1490 * UNTIL THE "," AND SAVE THE POSITION
1500 * NUMBER OF THE LAST CHARACTER.
1510 *
1520 *
1D96- A2 00 1530 LDX #00 GET A ZERO
1D98- C9 2C 1540 CLOP CMP #COMMA IS IT A COMMA??
1D9A- F0 09 1550 BEQ SAVIT YES
1D9C- E8 1560 INX BUMP COUNT
1D9D- C8 1570 INY BUMP CHARACTER SCAN
1D9E- B9 00 02 1580 LDA LRUF,Y GET NEXT CHARACTER
1DA1- F0 02 1590 BEQ SAVIT SAVE PARAMETERS
1DA3- D0 F3 1600 BNE CLOP TRY AGAIN
1610 *
1620 *
1630 * WE GET HERE AND SAVE X AND Y FOR LATER
```

```

1640 *
1650 *
1660 SAVIT
1DA5- 8E 2D 1E 1670 STX SCNT SAVE COUNT
1DA8- 8C 2E 1E 1680 STY EPOS END POSITION + 1
1DAB- B9 00 02 1690 LDA LBUF,Y GET CHARACTER AGAIN
1DAE- F0 1E 1700 BEQ DSTRT IF ZERO GO AWAY
1710 *
1720 *
1730 * SCAN THE INCREMENT
1740 *
1750 *
1DB0- C8 1760 INY NEXT CHARACTER
1DB1- A2 00 1770 LDX #00 ZERO COUNT
1DB3- B9 00 02 1780 ILOP LDA LBUF,Y GET CHARACTER
1DB6- F0 04 1790 BEQ DINC DONE WITH SCAN
1DB8- E8 1800 INX BUMP COUNT
1DB9- C8 1810 INY NEXT CHARACTER
1DBA- D0 F7 1820 BNE ILOP REPEAT TIL DONE
1830 *
1840 *
1850 * CONVERT THE INCREMENT AND SAVE
1860 *
1870 *
1DBC- 8A 1380 DINC TXA SET CONDITION CODE
1DBD- F0 0F 1890 BEQ DSTRT IF ZERO DO START
1DBF- 20 E8 1D 1900 JSR GETNUM CONVERT NUMBER
1DC2- AD 2F 1E 1910 LDA HOLD GET MSB
1DC5- 8D 7B 1D 1920 STA INC SAVE
1DC8- AD 30 1E 1930 LDA HOLD+1 GET LSB
1DCB- 8D 7C 1D 1940 STA INC+1 SAVE
1950 *
1960 *
1970 * DO THE START LINE NUMBER
1980 *
1990 *
2000 DSTRT
1DCE- AE 2D 1E 2010 LDX SCNT GET COUNT
1DD1- F0 12 2020 BEQ DONE IF ZERO -- IGNORE
1DD3- AC 2E 1E 2030 LDY EPOS GET POSITION
1DD6- 20 E8 1D 2040 JSR GETNUM CONVERT
1DD9- AD 2F 1E 2050 LDA HOLD GET MSB
1DDC- 8D 79 1D 2060 STA NUM SAVE
1DDF- AD 30 1E 2070 LDA HOLD+1 GET LSB
1DE2- 8D 7A 1D 2080 STA NUM+1 SAVE
2090 *
2100 *
2110 * DONE OR ABORT
2120 *
2130 *
1DE5- 4C 03 10 2140 DONE JMP WARM WARM START
2150 *
2160 *
2170 * GETNUM -- CONVERTS ASCII TO BCD
2180 *
2190 *
2200 GETNUM
1DER- A9 00 2210 LDA #00 GET A ZERO
1DEA- 8D 2F 1E 2220 STA HOLD ZERO OUT
1DED- 8D 30 1E 2230 STA HOLD+1 ZERO OUT
1DEU- 20 20 1E 2240 JSR READ8 GET 8 BITS
1DF3- 8D 30 1E 2250 STA HOLD+1 SAVE BITS
1DF6- CA 2260 DEX DECREMENT LOOP COUNT
1DF7- F0 24 2270 BEQ EXT DONE
1DF9- 20 20 1E 2280 JSR READ8 GET 8 BITS
1DFC- 20 27 1E 2290 JSR SHIFT SHIFT LEFT 4
2300
1DFF- 18 2310 CLC CLEAR CARRY
1E00- 6D 30 1E 2320 ADC HOLD+1 PUT IN BITS
1E03- 8D 30 1E 2330 STA HOLD+1 SAVE BACK
1E06- CA 2340 DEX DECREMENT LOOP COUNT
1E07- F0 16 2350 BEQ EXT DONE
1E09- 20 20 1E 2360 JSR READ8 GET 8 BITS
1E0C- 8D 2F 1E 2370 STA HOLD SAVE BITS
1E0F- CA 2380 DEX DECREMENT LOOP COUNT
1E10- F0 0D 2390 BEQ EXT DONE
1E12- 20 20 1E 2400 JSR READ8 GET BITS
1E15- 20 27 1E 2410 JSR SHIFT SHIFT LEFT 4
1E18- 18 2420 CLC CLEAR CARRY
1E19- 6D 2F 1E 2430 ADC HOLD AND IN BITS
1E1C- 8D 2F 1E 2440 STA HOLD SAVE BACK
1E1F- 60 2450 EXT RTS RETURN
2460 *
2470 *
2480 * READ8 -- READ 8 BITS FROM LINE BUFFER
2490 *
2500 *
2510 READ8
1E20- 88 2520 DEY DECREASE POINTER
1E21- B9 00 02 2530 LDA LBUF,Y GET CHARACTER
1E24- 29 0F 2540 AND #50F ONLY FOUR BITS

```

as to relieve the programmer of that task. I have often wanted that sort of a feature when I am doing a lot of coding with the S-C assembler. I have included the code that will automatically generate the line numbers in listing 1. It is placed immediately after the multiply routine that is listed in the previous section. The steps that are required to incorporate the routine into the assembler are:

1. BRUN the assembler
2. Enter the source code from listing 1
3. Assemble the code using the assembler
4. Patch an assembler address that will allow access to the auto-line routine. Location \$1388 should contain a JSR \$FD1B. Change the address to \$1D21 using the monitor command:

\*1389:21 1D.

The automatic line number routine is started by typing a control-N instead of a RETURN. So, whenever you type control-N, the assembler will generate a carriage return, a line feed, and then display the next line number on the screen. I incorporated this routine in my assembler and was very happy with it with one exception. In order to change either the starting line number or the increment, you had to change the values stored in memory. This soon got to be very tedious, especially when I had to refer to the source listing in order to find the address that I had to change if I needed a different starting line number or increment. I longed for a command to change one or both of the numbers.

### The 'AUTO' Command for the S-C Assembler

Listing 2 is the code to include the 'AUTO' command to the S-C assembler. The format of the AUTO command is the same as for Integer BASIC, which is:

AUTO starting line number,  
increment.

The design of the routine is quite simple. First the routine goes to the input line buffer and begins to scan the command, beginning with character four. It throws away all characters until it finds a space. This is done so that the user may type any character string that starts with the first three letters 'AUT'. After we have encountered a space, we count the number of characters from there until the comma. This is the number of digits in the starting line number and this value is saved for later use. Note that this value can be zero,

which implies that you can change only the increment, but don't have to change the starting line number also (for example AUTO ,10).

Next we scan the character string, starting with the first character after the comma, and ending with the null byte that terminates the input buffer string. Again the number of characters is saved and, as mentioned above, it also may be zero if you only want to change the starting line number and keep the same increment (for example AUTO.1000). The increment character string is converted from ASCII to BCD by the GETNUM routine. The resulting BCD number for the increment is saved as the new increment. Finally, the starting line number string is converted to BCD and saved as the new starting line number. Then we jump back to the assembler command mode.

Only a small problem now exists—there is no 'AUTO' command in the basic S-C assembler. We have two options: we can find the command dispatch table in the assembler and add another command to it (this may be complicated), or we can replace one of the existing commands with our new command. I chose to do the latter. The code at the end of listing 2 changes the 'JOIN' command to 'AUTO' by changing the ASCII command string and the address of the routine that actually does the command in the command dispatch table. As before, the code needs to be assembled as part of the assembler and saved as indicated above.

I have recommended that you create a source file and assemble that in order to incorporate these new features. This is not necessary, since I have included the object code as part of the listings. Instead, you could just enter the object code directly into memory and make the patches listed above. The only problem that I see with that method, is that it can be very tedious, if you were to make a small mistake. Also, it is a good idea to make yourself a back-up copy of the assembler until you have tested out your new and improved version.

Ned W. Rhodes received his BSEE from the University of Minnesota and his MS in Computer Science from the George Washington University in Washington D.C. He is currently employed by the David W. Taylor Naval Ship Research and Development Center, where he develops high-speed minicomputer-based data acquisition systems for use during full-scale trials aboard naval vessels.

**MICRO**

```

1E26- 60      2550      RTS          DONE
              2560 *
              2570 *
              2580
              2590 *      SHIFT -- SHIFT LEFT 4 BITS
              2600 *
              2610 *
              2620 SHIFT
1E27- 18      2630      CLC          CLEAR CARRY
1E28- 2A      2640      ROL          LEFT 1
1E29- 2A      2650      ROL          LEFT 1
1E2A- 2A      2660      ROL          LEFT 1
1E2B- 2A      2670      ROL          LEFT 1
1E2C- 60      2680      RTS          RETURN
              2690 *
              2700 *
              2710 *      STORAGE
              2720 *
              2730 *
1E2D- 00      2740 SCNT .HS 00      COUNT
1E2E- 00      2750 EPOS .HS 00      POSITION
1E2F- 00 00   2760 HOLD .DA 0          TEMP STORAGE
              2770 *
              2780 *
              2790 *      CHANGE JOIN TO AUTO
              2800 *
              2810 *
              2820
1289- 41 55 54 2830 .OR $1289      IN DISPATCH TABLE
128C- 7E 1D   2840 .AS /AUT/      AUTO COMMAND
              2850 .DA AUTO      ADDRESS
              .EN

```

**NEW!** FROM **Brøderbund Software**

**STRATEGY GAMES!** **FAST ACTION GAMES!**





**THE SAGA CONTINUES . . .**  
**IV. TAWALA'S LAST REDOUBT**

The cruel Emperor Tawala has been forced from his throne on the world of Galactica and has fled for his life to the planet of Farside, where he and a small bank of adherents prepare to make their last stand. Extreme solar conditions have isolated Farside from the rest of the galaxy, and so it remains to Benth, leader of the local-insurrectionists, to press the final assault on Tawala and his minions.

**TAWALA'S LAST REDOUBT** puts you in the position of rebel leader. You must intercept and decipher Tawala's secret messages to his supporters, form alliances with local chiefs, detect Tawala's spies in your midst, separate hard intelligence from enemy disinformation, avoid Tawala's military forays against you and, finally, lead the assault against the Prince's stronghold.

Minimum Configuration:  
 TRS-80 Cassette, 16K, Level II, \$19.95  
 TRS-80 Disk, 32K, \$24.95  
 APPLE Disk, 48K with APPLESOFT, \$29.95

**APPLE GALAXIAN**

Apple Galaxian — In brilliantly colored array, the Galaxians swoop down from all sides in dazzlingly swift attacks to do battle upon the lone defender. This faithful rendition of that most popular of all bar games may drive you around the bend, but think of all the quarters you'll be saving! Apple II Integer or Plus, 48K disk, \$24.95.

How to order: Ask your dealer or send check or money order for the exact retail price to:



**Brøderbund Software**  
 Box 3266, Eugene, Oregon 97403

Call (503) 343-9024 to order. NO CHARGE FOR SHIPPING AND HANDLING!  
 Visa and Mastercard accepted.

**We've got more! Send for our free catalog!**

"Apple, Apple II Plus and Applesoft are trademarks of Apple Computer Co. TRS-80 is a trademark of Radio Shack."

Now your  really can be used as a word processor

with the  
**KEYBOARD +PLUS™**

Act now 99.95 ... May 1st \$119.95

By: **Lazer**  
MICRO-SYSTEMS INC.  
P.O.Box 55518  
Riverside, Calif. 92517

### A real shift key

Now you can easily enter upper/lower case data using the shift key on your Apple keyboard. Existing word processors use the ESCAPE or right arrow keys as a "software" shift key. This works, but it takes a few weeks to get used to. And, if you are using a typewriter in your day to day activities, you may never get used to the "software" shift key.

The Keyboard +Plus can be teamed up with most of your existing software to allow lower case entry into programs which previously did not. When paired with the Lazer MicroSystems' Lower Case +Plus, your existing software takes on new dimensions.

The Lazer MicroSystems Keyboard +Plus lets you easily enter the entire 128 ASCII character set directly from the Apple keyboard. The extra characters are [ , ] , { , } , \_ , ~ , \ , ` , and □. This is especially handy for Pascal and CP/M users.

The keyboard +Plus features a capslock mode in which the Apple keyboard behaves as if the Keyboard +Plus was not present. This allows programs which cannot properly handle lower case to function normally.

The Keyboard +Plus is directly compatible with Basic, Pascal, CP/M, LISA, and most major word processor programs including ApplePIE and SuperTEXT.

### A true type-ahead buffer

Pascal and Visicalc users have already experienced the convenience of a type-ahead buffer. Now all software systems running on the Apple II can take advantage of a hardware type-ahead buffer.

A type-ahead buffer lets you enter commands and data even though the computer is busy doing something else. For example, if you type "SAVE PGMNAME" you do not have to wait for the BASIC prompt before typing "CATALOG". Since you can type "CATALOG" while the disk is still spinning, the catalog will be displayed immediately after DOS has saved your program. The savings is two fold. First, the few seconds required to type "CATALOG" after the prompt reappears is saved. Second, and even more important, the operator's attention is not required while the program is being saved. Typically, up to 10% of a programmer's time is saved when a type ahead buffer is used. Programmers and Apple users will greatly appreciate the fact that keys will not be lost because you can type faster than the current operating system or program can accept data. This problem is especially evident when entering new lines into a large Applesoft program.

The need for a type-ahead buffer is sort of like the need for a telephone. If you've never used one, you probably won't see the need for one. But once you've used one, it's indispensable. After all, if a type-ahead buffer wasn't useful, you wouldn't find it on most expensive minicomputers or on the Apple ///.

and the  
**LOWER CASE +PLUS™**

Act now \$59.95 ...  
May 1st \$69.95

### Software Compatibility

The Lower Case +Plus is compatible with all major software systems running on the Apple II. All word processors and any other software that is compatible with the Paymar LCA will work even better with the Lazer Micro Systems' Lower Case +Plus. When paired with the Keyboard +Plus, you get a dynamite word processor combination.

CP/M applications utilizing lower case can also take advantage of the Lower Case +Plus' display capabilities.

Pascal users (version 1.0 and 1.1) can use the patch provided with each Lower Case +Plus to display lower case from Pascal programs.

Why buy an Apple /// to simulate an Apple II when you can buy Lazer MicroSystems products for your Apple II to simulate Apple ///'s features (and save a bundle).

#### Major Dealers

Consumer Computer  
8314 Parkway Dr.  
La Mesa, Calif. 92041  
(714) 465-8888

Have your name listed here as a dealer or distributor. Contact Lazer MicroSystems Inc. for details.

#### Distributors

Computer Data Services  
64 Pinedale  
Hauppauge, NY 11787  
(516) 360-0988

Micron Distributing  
409 Queen St. West  
Toronto Ontario  
M5V 2A5 Canada  
(416) 363-6058

Lower Case +Plus, Keyboard +Plus, and +Plus are all trademarks belonging to Lazer MicroSystems Inc. Apple is a registered trademark of Apple Computer Inc. Paymar LCA is a trademark of Dan Paymar. CP/M is a registered trademark of Digital Research.

- \* Up to 128 displayable characters.
- \* Inverse and normal upper and lower case.
- \* Two on-board character sets.
  1. Standard Word processor set. 2. Graphics set.
- \* 7x8 font size (maximum).
- \* Character set can be redefined with a 2716 EPROM, EPROM programmer and a HIRES character generator such as the "Keyboard filter" from Mountain Computer.
- \* Optional fonts provided on diskette
- \* BASIC software provided on diskette.
- \* Pascal patch provided for 1.0 and 1.1
- \* Expansion socket compatible with other Lazer MicroSystems' products.
- \* High quality double sided PC board with solder mask and silk screen.
- \* One board works with all Apple II computers.
- \* Extensive documentation booklet.
- \* Compatible with most word processors.

Order from:

**Lazer**  
MICRO-SYSTEMS INC.  
P.O.Box 55518  
Riverside, Calif. 92517  
(714) 682-5268

Give approximate date your Apple was purchased new. Visa and MC accepted. Give card number, expiration date, and signature.

Personal & business checks require 2 weeks to clear & will increase delivery time by that much. Calif. residents must add 6% sales tax.

U.S.A. orders add \$2.00 shipping & handling. All other countries add \$15.00.

C.O.D. orders available only with non-refundable \$4.00 shipping & handling fee paid in advance.

Dealer and Distributor inquiries invited.

Last year we tested or reviewed 141 PET programs, evaluated 54 peripherals ranging from light pens to printers, and ran 27 major articles on PET programming. Our gossip columnist blew the gaffe on dozens of inside stories, receiving two death threats, five poison pen letters and a dead rat for his pains. We also published 53 letters from PET users, 88

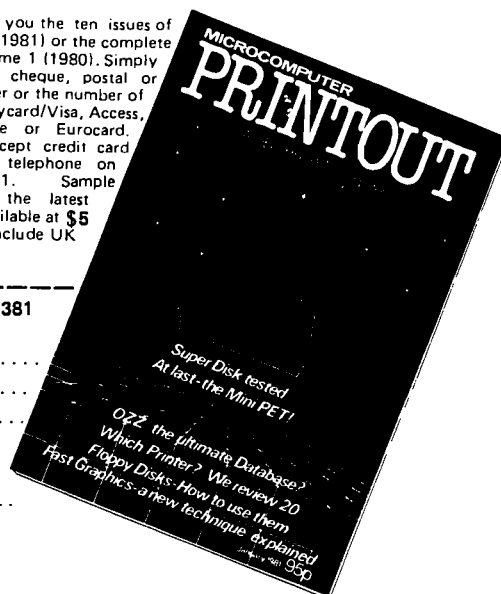
listings, 105 programming hints, and 116 news stories about the CBM/PET.

All this added up to more than 150,000 words of essential PET information. We are PRINTOUT, the independent

magazine about the CBM/PET. Shouldn't you subscribe?

# THE TRUTH ABOUT THE PET

**\$36** buys you the ten issues of Volume 2 (1981) or the complete set of Volume 1 (1980). Simply send us a cheque, postal or money order or the number of your Barclaycard/Visa, Access, Mastercharge or Eurocard. We also accept credit card orders by telephone on 0635-201131. Sample copies of the latest issue are available at **\$5**. All prices include UK postage.



To PRINTOUT PO Box 48, Newbury, Berkshire RG16 0UJ, England. M381

My Name is .....

Address .....

.....Postcode .....

Please Enter my Subscription to :  Volume 2 (1981)  Send me the set of Vol 1 (1980)

I enclose my cheque or Postal Order OR

Debit my Access/Mastercharge/Eurocard/Barclaycard/Visa account No. ....

UK £9.50  Eire £12.50 Punts  Europe (surface) £14.50

Europe Airmail £18  USA Airmail \$45  USA (surface) \$36

Rest of World Air £25  Rest of World (surface) £14.50

Send me a sample copy  UK £1  Europe Air £1.50  USA Air \$5

Send me .... binders @  UK £3.50  Eire £4.50 Punts  Europe £5  Rest of World £7.50  USA \$19

# PRINT USING for the PET

This is an excellent PET version of Gary Morris' Apple program. It runs on any PET or CBM machine.

David Malmberg  
43064 Via Moraga  
Fremont, California 94538

Gary Morris recently published a PRINT USING program for the Apple in the October 1980 issue of *MICRO* (29:14). His program made use of some of the ROM routines in Applesoft. Since Microsoft developed both Applesoft and the various versions of PET BASIC, I felt that Gary's routine could be easily adapted for the PET. After consulting Jim Butterfield's many memory maps of the PET ROMs, and a fair amount of experimentation, I succeeded in modifying Gary's basic routine to work on the PET.

Listing 1 is a BASIC program that POKEs the machine code for the routine into the second cassette buffer (from 826 to 984). This program also detects which of the three versions of BASIC is operable in the specific PET and modifies the machine code accordingly. This is done by PEEKing into location 50003 which contains a "0" for BASIC 2.0, a "1" for BASIC 3.0, and a "160" for BASIC 4.0. The program in listing 1 will also set the USR vector (locations 1 and 2) to point to the beginning of the code in the second cassette buffer. Once this program has been run, the machine language routine is available to any BASIC program via the USR function.

As an example of how this would be used, consider the following BASIC instructions:

```
10 ED$ = "$, 0.00"  
20 X = 123456  
30 PRINT "TOTAL IS ";Y =  
   USR(X)
```

This sequence will cause the following to be printed:

TOTAL IS \$ 1,234.56

The edit pattern to be used in formatting the output must be specified by the string variable ED\$. The edit pattern may contain almost any valid character (such as, \$ #, %, ' = / K . etc.). These characters will be "skipped over" and the various digits of the number will be inserted into the blanks of the edit pattern, or overlaid on any 0's in the pattern. The value to be printed will be edited from right to left. If the value is too large for the edit field, the left-most characters will be truncated. A comma in the pattern will be

printed only if there is at least one digit to the left of it. If the value is negative, the minus sign will be placed to the left of the highest digit.

The value to be edited is passed to the PRINT USING routine as the parameter of the USR function, e.g., X in the previous example. This parameter may be a complex expression, rather than just a variable or a numeric value. The value returned by the USR function to BASIC (Y in the previous example) will be garbage and have no meaning. Be careful not to use a variable name that is significant to the rest of the program as the left hand side of the USR equation.

## Listing 1

```
10 PRINT "[CLR] 2 DOWN]PRINT USING FOR THE PET"  
20 PRINT "[DOWN]BY DAVID MALMBERG"  
30 REM ADAPTED FROM A ROUTINE FOR THE APPLE  
40 REM BY GARY MORRIS IN OCT-1980 MICRO  
50 PRINT "[HOME]      LOADING 2ND CASSETTE BUFFER"  
60 FOR I= 826 TO 984 :READ DC:POKE I,DC:PRINT "[HOME]";I,DC:NEXT I  
70 REM BASIC 3.0 VERSION  
80 DATA 32,233,220,169,69,162,196,133  
90 DATA 66,134,67,32,201,207,160,2,177  
100 DATA 68,133,93,136,177,68,133,92,136  
110 DATA 177,68,201,16,144,2,169,16,141  
120 DATA 32,3,168,136,177,92,153,33,3  
130 DATA 136,16,248,160,0,185,0,1,240  
140 DATA 3,200,208,248,174,32,3,136,185  
150 DATA 0,1,72,104,72,201,45,208,14,189  
160 DATA 32,3,201,45,144,22,202,208,240  
170 DATA 104,24,144,54,189,32,3,201,32  
180 DATA 240,8,201,44,240,238,201,48,144  
190 DATA 234,104,157,32,3,202,240,32,192  
200 DATA 1,208,205,232,24,144,16,189,32  
210 DATA 3,201,36,240,17,201,46,176,5  
220 DATA 169,32,157,32,3,202,240,5,236  
230 DATA 32,3,144,232,174,32,3,169,0,157  
240 DATA 33,3,160,3,169,33,32,28,202,169  
250 DATA 0,133,7,96  
260 POKE 1,58:POKE 2,3:REM SET USR VECTOR  
270 IF PEEK(50003)<>160 THEN 310  
280 REM BASIC 4.0 MODIFICATIONS  
290 POKE 827,147:POKE 828,207:POKE 838,135:POKE 839,193  
300 POKE 978,39:POKE 979,187  
310 IF PEEK(50003)<>0 THEN 370  
320 REM BASIC 2.0 MODIFICATIONS  
330 POKE 827,175:POKE 828,220:POKE 838,215:POKE 839,207  
340 POKE 978,39:POKE 979,202:POKE 983,94  
350 POKE 834,148:POKE 836,149:POKE 843,150:POKE 845,175  
360 POKE 848,150:POKE 850,174:POKE 853,150:POKE 866,174  
370 PRINT "[I 6 DOWN]LOADING COMPLETED"
```

The routine works by editing the ASCII representation of the number passed as the USR parameter. The routine assumes that this value has been "integerized" and that the ASCII representation does not contain a decimal point. The position of the decimal point (if any) will be implied by the edit pattern, i.e., the variable ED\$.

If the actual value you wish to format has a decimal point, or if you wish to scale the number to be printed differently from the way it is represented internally in the PET, you can use a BASIC user-defined function to handle the conversion before going to the USR routine. For example:

```

10 DEF FNS2(X) = INT (X*100
+ 0.5)
20 DEF FNP(X) = INT(X/2.21
+ 0.5)
30 ED$ = "$ , 0.00"
40 Y = USR(FNS2(12.3456))
50 ED$ = "KILOS = "
60 PRINT
70 Z = 1000.0 : REM POUNDS
80 Y = USR(FNP(X))

```

will cause the following output:

```

$ 12.35
KILOS = 452

```

Listing 2 gives the assembler source code for the PET PRINT USING routine. The appropriate ROM routine locations are given for all three versions of PET BASIC, with conditional assembly determined by the value of ROMs in line 100. The assembled code shown along side of the source code is for BASIC 3.0—the "new" ROMs. The assembler source is almost identical to that shown in Gary Morris' original Applesoft article, with the exception of the use of the STROUT ROM routine to print the formatted representation of the number (line 1450). The assembler source also has several slight differences to accommodate the differences between how Applesoft and PET BASICs handle the ASCII representation of numbers, and the value the USR function returns. The assembler source is well-commented and is very straightforward.

## Listing 2

```

0010 ;PRINT USING FOR THE PET
0020 ;BY DAVID MALMBERG
0030 ;43064 VIA MORAGA
0040 ;FREMONT, CALIFORNIA 94538
0050 ;
0060 ;ADAPTED FROM A ROUTINE FOR THE APPLE
0070 ;BY GARY MORRIS IN OCT-1980 MICRO
0080 ;
0090 ;BA #033A
0100 ROMS .DE 3
0110 .OS
0120 STRING .DE #100
0130 LENGTH .DE 800
0140 EDITBUF .DE 801
0150 ;
0160 ;IFE ROMS-3
0170 FLPASC .DE #DCE9
0180 STROUT .DE #CA1C
0190 NAME .DE #42
0200 VARIABLE .DE #44
0210 FIND .DE #CF09
0220 PNTR .DE #5C
0230 VARTYP .DE #07
0240 ***
0250 ;
0260 ;IFE ROMS-4
0270 FLPASC .DE #CF93
0280 STROUT .DE #BB1D
0290 NAME .DE #42
0300 VARIABLE .DE #44
0310 FIND .DE #C187
0320 PNTR .DE #5C
0330 VARTYP .DE #07
0340 ***
0350 ;
0360 ;IFE ROMS-2
0370 FLPASC .DE #DCAF
0380 STROUT .DE #CA27
0390 NAME .DE #94
0400 VARIABLE .DE #96
0410 FIND .DE #CFD7
0420 PNTR .DE #AE
0430 VARTYP .DE #5E
0440 ***
0450 ;
0460 ;FIRST CONVERT NUMBER PASSED BY USR
0470 ;FUNCTION TO FLOATING ACCUM TO
0480 ;ASCII STRING STARTING AT "STRING"
0490 ;
033A- 20 E9 DC 0500 ;JSR FLPASC
0510 ;NOW FIND THE VARIABLE (ED#) TO USE
0520 ;IN THE EDIT PATTERN
0530 ;
033D- A9 45 0540 SEARCH LDA #E ;BASIC VARIABLE
033F- A2 C4 0550 LDX #C4 ;NAME IS ED#
0341- 85 42 0560 STA #NAME
0343- 86 43 0570 STX #NAME+1
0345- 20 C9 CF 0580 JSR FIND
0348- A0 02 0590 LDY #2
034A- B1 44 0600 LDA (VARIABLE),Y ;GET ADDR HI
034C- 85 5D 0610 STA #PNTR+1
034E- 88 0620 DEY
034F- B1 44 0630 LDA (VARIABLE),Y ;GET ADDR LO
0351- 85 5C 0640 STA #PNTR
0353- 88 0650 DEY
0354- B1 44 0660 LDA (VARIABLE),Y ;GET LENGTH
0356- C9 10 0670 CMP #16
0358- 90 02 0680 BCC LENOK ;MAXIMUM LENGTH
035A- A9 10 0690 LDA #16 ;ALLOWED IS 16!!!
035C- 8D 20 03 0700 LENOK STA LENGTH
0710 ;
0720 ;MOVE THE ED# PATTERN TO EDITBUF
035F- A8 0730 TAY
0360- 88 0740 DEY
0361- B1 5C 0750 LOOP2 LDA (PNTR),Y
0363- 99 21 03 0760 STA EDITBUF,Y
0366- 88 0770 DEY
0367- 10 F8 0780 BPL LOOP2
0790 ;
0369- A0 00 0800 ;FIND THE ASCII STRING END
0310 0810 LDY #0
036B- B9 00 01 0820 LOOP LDA STRING,Y ;GET CHAR

```



# MICRO

## Club Circuit

Mike Rowe  
Club Circuit  
P.O. Box 6502  
Chelmsford, MA 01824

*The following club announcements are presented in zip code order.*

### Richmond Computer Club

Gary F. Cowardin is Treasurer for this group which meets on the last Monday of each month at 7:30 pm at the Science Museum of VA. This club has a membership of over 50 active members who meet to encourage organized computer use involving Ohio Scientific, Heath, TRS-80, Apple, and many other microcomputers. For further information, write:

Secretary  
1004 Lorraine Avenue  
Richmond, VA 23227

### Jacksonville Atari & PET Society (JAPS)

This group meets at various member's homes and businesses to assist members, exchange ideas, information and experiences. Russell A. Grockett, Jr is president for this newly-formed group. For monthly information on club meeting locations contact the president at (904) 725-0435 evenings and weekends. Or write to:

401 Monument Road #171  
Jacksonville, FL 32211

### 6502 User's Group

Chairman Gerald Key heads this group of 28+ members which meets every 3rd Thursday of the month at 7:30 pm. Meetings are held at the State Savings Bank Community Room, 444 Havens Corner Road, Gahanna, OH. This club states its purpose as a means to exchange ideas, provide assistance to members, and promote the use of microcomputers. This club provides a forum for all 6502-based users and is the only Columbus area alternative to many Apple user's groups. For further information, write:

Chairman  
141 Flintridge Drive  
Gahanna, OH 43230

(Continued on page 20)

```

036E- F0 03      0330      BEQ EDIT
0370- C8         0340      INY
0371- D0 F8      0350      BNE LOOP
                0360      ;MOVE STRING TO THE EDITBUF, FROM RIGHT
                0370      ;TO LEFT, FILLING OVER NUMBERS BUT
                0380      ;SKIPPING COMMA'S AND PERIODS.
                0390      ; IF WE COME TO A MINUS SIGN THEN
                0300      ;KEEP GOING LEFT UNTIL THE PATTERN
                0310      ;HAS A BLANK OR A COMMA, THEN KEEP
                0320      ;GOING LEFT STORING BLANKS IN THE
                0330      ;EDITBUF UNTIL IT ENDS OR WE COME
                0340      ;TO A DOLLAR SIGN
                0350      ;
0373- AE 20 03   0360      EDIT      LD# LENGTH      ;FIELD WIDTH
                0370      ;
0376- 88         0390      EDLOOP     DEY
0377- B9 00 01   0390      LDA STRING,Y      ;GET CHARACTER
037A- 48         1000      PHA      ;SAVE IT
037B- 68         1010      CHECK     PLA
037C- 48         1020      PHA
037D- C9 2D      1030      CMP #'-      ;IF A MINUS SIGN
037F- D0 0E      1040      BNE DIGIT     ;SKIP TO A BLANK
0381- BD 20 03   1050      MINUS.    LDA EDITBUF-1,X
0384- C9 2D      1060      CMP #'-
0386- 90 16      1070      BCC DROPIIT
0388- CA         1080      SKIPIT   DEX
0389- D0 F0      1090      BNE CHECK
038B- 68         1100      PLA
038C- 18         1110      CLC
038D- 90 36      1120      BCC DONE
038F- BD 20 03   1130      DIGIT    LDA EDITBUF-1,X
0392- C9 20      1140      CMP #'
0394- F0 08      1150      BEQ DROPIIT
0396- C9 2C      1160      CMP #'
0398- F0 EE      1170      BEQ SKIPIT
039A- C9 30      1180      CMP #0
039C- 90 EA      1190      BCC SKIPIT
039E- 68         1200      DROPIIT  PLA      ;GET IT BACK
039F- 9D 20 03   1210      STA EDITBUF-1,X
03A2- CA         1220      DEX
03A3- F0 20      1230      BEQ DONE
03A5- C0 01      1240      CPY #1      ;END OF STRING?
03A7- D0 CD      1250      BNE EDLOOP
03A9- E8         1260      INX
03AA- 18         1270      CLC
03AB- 90 10      1280      BCC NEXT1
03AD- BD 20 03   1290      BLANK    LDA EDITBUF-1,X      ;BLANK FROM
03B0- C9 24      1300      CMP #'$      ;HERE TO $
03B2- F0 11      1310      BEQ DONE
03B4- C9 2E      1320      CMP #'
03B6- B0 05      1330      BCS NEXT1
03B8- A9 20      1340      LDA #'
03BA- 9D 20 03   1350      STA EDITBUF-1,X
03BD- CA         1360      NEXT1   DEX
03BE- F0 05      1370      BEQ DONE
03C0- EC 20 03   1380      CPX LENGTH
03C3- 90 E8      1390      BCC BLANK
03C5- AE 20 03   1400      DONE     LD# LENGTH
03C8- A9 00      1410      LDA #0
03CA- 9D 21 03   1420      STA EDITBUF,X      ;PUT 0 AT END
03CD- A0 03      1430      LDY #H, EDITBUF
03CF- A9 21      1440      LDA #L, EDITBUF
03D1- 20 1C CA   1450      JSR STROUT
03D4- A9 00      1460      LDA #0      ;SET TYPE TO NUMERIC
03D6- 85 07      1470      STA *VARTYP     ;TO AVOID BASIC ERROR
03D8- 60         1480      RTS
                1490      XEND     .EN

```

LABEL FILE: [ / = EXTERNAL ]

```

/ROMS=0003          /STRING=0100          /LENGTH=0320
/EDITBUF=0321      /FLPASC=DCE9          /STROUT=CA1C
/NAME=0042         /VARIABLE=0044       /FIND=CFC9
/PNTR=005C        /VARTYP=0007         SEARCH=033D
LENOK=035C        LOOP2=0361          LOOP=036B
EDIT=0373         EDLOOP=0376          CHECK=037B
MINUS=0381        SKIPIT=0388          DIGIT=038F
DROPIIT=039E      BLANK=03AD           NEXT1=03BD
DONE=03C5         XEND=03D9

```

MICRO

# 80 COLUMN GRAPHICS



The Integrated Visible Memory for the PET has now been redesigned for the new 12" screen 80 column and forthcoming 40 column PET computers from Commodore. Like earlier MTU units, the new K-1008-43 package mounts inside the PET case for total protection. To make the power and flexibility of the 320 by 200

The image on the screen was created by the program below.

```

10 VISMEM: CLEAR
20 P=160: Q=100
30 XP=144: YR=1.5*PI.1415927
40 YP=56: YR=1: ZP=64
50 XF=XR/XP: YF=YR/YR: ZF=XR/ZP
60 FOR ZI=Q TO Q-1
70 IF ZI<-ZP OR ZI>ZP GOTO 150
80 ZT=ZI*XP/ZP: ZZ=ZI
90 XL=INT(.5+SQR(XP*XP-ZT*ZT))
100 FOR XI=XL TO XL
110 XT=SQR(XI*XI+ZT*ZT)*XF: XX=XI
120 YY=(SIN(XF)+.4*SIN(3*XT))*YF
130 GOSUB 170
140 NEXT XI
150 NEXT ZI
160 STOP
170 X1=XX+ZZ+P
180 Y1=YY-ZZ+Q
190 GMODE 1: MOVE X1,Y1: WRPIX
200 IF Y1=0 GOTO 220
210 GMODE 2: LINE X1,Y1-1,X1,0
220 RETURN
    
```

bit mapped pixel graphics display easily accessible, we have designed the Keyword Graphic Program. This adds 45 graphics commands to Commodore BASIC. If you have been waiting for easy to use, high resolution graphics for your PET, isn't it time you called MTU?

**K-1008-43M** Manual only \$10 (credited toward purchase)  
**k-1008-43** Complete ready to install package \$495

Mastercharge and Visa accepted

Write or call today for our full line catalog describing all MTU 6502 products, including our high speed 8" Floppy Disk Controller for up to 4 megabytes of PET storage.



**NOW 80 COLUMN PETS CAN HAVE MTU HIGH RESOLUTION GRAPHICS**

# MEMSEARCH for the AIM 65

**"MEMSEARCH"** is a machine language utility program which quickly scans through memory searching for a user-specified sequence. It can assist in locating an ASCII string or an instruction code group. A wild card feature allows for partial matching of sequences up to 16 bytes long.

Bob Kovacs  
41 Ralph Road  
West Orange, New Jersey 07052

Have you ever had to manually search through memory to look for a certain sequence? Whether you're searching for a particular series of op-codes or ASCII text, doing it with the help of a dump utility or even a disassembler can be painfully slow and prone to error. Clearly this is another job for the computer! The machine language routine described here will accept up to a 16-byte sequence (easily increased if that isn't enough) and identify the starting locations of any matching sequences within the memory range specified by the user.

Although this program was specifically written for use on the AIM 65, using existing monitor routines whenever possible, it shouldn't be too difficult to adapt it to any other 65XX system.

## The Program

The flow diagram in figure 1 defines the major events and decision points in memory search routine. Entry point labels are also included to relate these functions to the implementation (see program listing in figure 2).

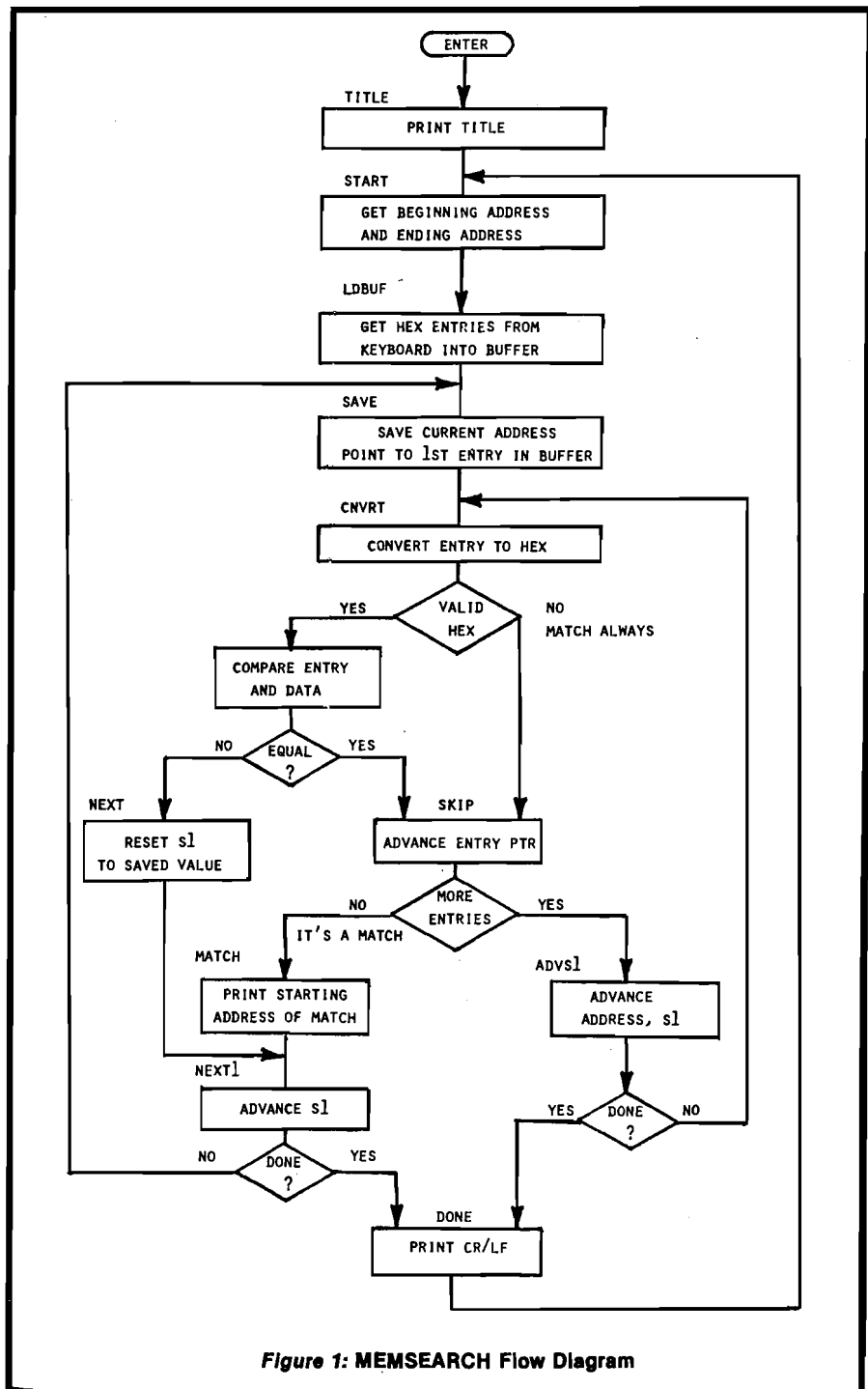


Figure 1: MEMSEARCH Flow Diagram

The program begins by establishing a memory search range and the data sequence to be found. This sequence is stored in a buffer using keyboard entry format [2 ASCII bytes per hex byte entry] and is converted to its numerical equivalent each time it is compared to memory. Although this approach is not terribly efficient, it was necessary in order to allow for wild card or don't-care entries, and still permit all 256 possible byte values for valid comparisons. I'm sure that other approaches could have been used to speed up execution time somewhat, but this method is still fairly fast. The worst case of a search through 4K of memory (when all but the 16th entry always match) takes about 6 seconds to complete.

The main body of the program operates by comparing the entry sequence to the data within the memory bounds specified by the user. This is performed one byte at a time, starting with the first entry and then searching for a corresponding value in memory. If a match is found, then the second entry is compared to the contents of the next memory location only. This operation is repeated, always comparing the next entry with the data in the next memory location. If successive successful comparisons exhaust the total number of entries in the buffer, then the entire entry sequence has been matched. At this point the memory address corresponding to the first entry is output, and the search continues at the memory location following the matched sequence.

If at any point an entry fails to match the contents of memory, then the starting address corresponding to the first entry is incremented by one, and the entire operation begins again.

A number of monitor routines were used in MEMSEARCH to minimize its length (192 bytes program and 36 bytes variable space). A summary of the monitor routines used here is shown in figure 3. Along with the name and entry point is a brief description of what the routine does. Those registers affected by that call to the monitor are also listed.

Figure 2

```

0800      1  ;
0800      2  ;
0800      3  ;
0800      4  ;
0800      5  ;MEMSEARCH FOR AIM 65
0800      6  ; BY BOB KOVACS
0800      7  ; 41 RALPH ROAD
0800      8  ; WEST ORANGE, NJ 07052
0800      9  ;
0800     10  ;ALL KEYBOARD ENTRIES
0800     11  ; IN HEXADECIMAL
0800     12  ;NONHEX ENTRIES--"DON'T CARE"
0800     13  ;
0800     14  ;ALL MATCHES RETURN BEGINNING
0800     15  ; ADDRESS OF SEQUENCE
0800     16  ;
0400     17          ORG $400
0400     18          OBJ $800
0400     19  FROM    EQU $E7A3
0400     20  TO      EQU $E7A7
0400     21  MOVE    EQU $F910
0400     22  LDAY    EQU $EB58
0400     23  PACK    EQU $EA84
0400     24  NUMA    EQU $EA46
0400     25  OUTPUT  EQU $E97A
0400     26  REDOUT  EQU $E973
0400     27  BLANK   EQU $E83E
0400     28  CRLF    EQU $E9F0
0400     29  QM      EQU $E7D4
0400     30  STIY    EQU $A427
0400     31  ADDR    EQU $A41C
0400     32  S1      EQU $A41A
0400     33  ;
0400     34  ;
0400     35  ;OUTPUT TITLE
0400  A000  36  TITLE  LDY  #$00
0402  B9BD04 37  TITLE1 LDA  MSG,Y
0405  F006  38          BEQ  TITLE2
0407  207AE9 39          JSR  OUTPUT
040A  C8     40          INY
040B  D0F5  41          BNE  TITLE1
040D  20F0E9 42  TITLE2 JSR  CRLF
0410     43  ;
0410     44  ;GET BEGINNING & ENDING ADDRESSES
0410  20A3E7 45  START  JSR  FROM
0413  B0FB  46          BCS  START
0415  203EE8 47          JSR  BLANK
0418  2010F9 48          JSR  MOVE
041B  20A7E7 49  START1  JSR  TO
041E  B0FB  50          BCS  START1
0420     51  ;
0420     52  ;PROMPT USER FOR HEX INPUT
0420  20D4E7 53  LDBUF  JSR  QM
0423  203EE8 54          JSR  BLANK
0426  A200  55          LDX  #$00
0428     56  ;
0428     57  ;GET ENTRY PAIRS & STORE IN BUF
0428     58  ;EXIT ENTRY MODE WITH CR
0428  2073E9 59  LDBUF1 JSR  REDOUT
042B  C90D  60          CMP  #$0D
042D  F011  61          BEQ  LDBUF2
042F  9DCA04 62          STA  BUFHI,X
0432  2073E9 63          JSR  REDOUT
0435  9DDA04 64          STA  BUFLO,X
0438  203EE8 65          JSR  BLANK
043B  E8     66          INX
043C  E010  67          CPX  #$10
043E  90E8  68          BCC  LDBUF1

```

```

0440 8EC904 69 LDBUF2 STX ENT CNT
0443 20F0E9 70 JSR CRLF
0446 71 ;
0446 72 ;SAVE CURRENT ADDRESS
0446 AD1AA4 73 SAVE LDA S1
0449 8DC704 74 STA TEMP1
044C AD1BA4 75 LDA S1+1
044F 8DC804 76 STA TEMP2
0452 77 ;
0452 78 ;READ BUF & CONVERT TO HEX
0452 79 ;NON-HEX ACTS AS DON'T CARE
0452 A200 80 LDX #$00
0454 BDCA04 81 CNVRT LDA BUFHI,X
0457 2084EA 82 JSR PACK
045A B014 83 BCS SKIP
045C BDDA04 84 LDA BUFLO,X
045F 2084EA 85 JSR PACK
0462 B00C 86 BCS SKIP
0464 87 ;
0464 88 ;COMPARE TO DATA AT ACTIVE ADDRESS
0464 A000 89 LDY #$00
0466 A91A 90 LDA #$1A
0468 2058EB 91 JSR LDAY
046B CD29A4 92 CMP STIY+2
046E D01E 93 BNE NEXT
0470 94 ;
0470 95 ;MATCH OR DON'T CARE
0470 E8 96 SKIP INX
0471 ECC904 97 CPX ENT CNT
0474 B007 98 BCS MATCH
0476 20A804 99 JSR ADVS1
0479 B027 100 BCS DONE
047B 90D7 101 BCC CNVRT
047D 102 ;
047D 103 ;GOT A MATCH!
047D 104 ;OUT SAVED ADDRESS
047D ADC804 105 MATCH LDA TEMP2
0480 2046EA 106 JSR NUMA
0483 ADC704 107 LDA TEMP1
0486 2046EA 108 JSR NUMA
0489 203EE8 109 JSR BLANK
048C D00C 110 BNE NEXT1
048E 111 ;
048E 112 ;NO OR PARTIAL MATCH
048E 113 ;BACK-UP ACTIVE ADDRESS
048E ADC704 114 NEXT LDA TEMP1
0491 8D1AA4 115 STA S1
0494 ADC804 116 LDA TEMP2
0497 8D1BA4 117 STA S1+1
049A 20A804 118 NEXT1 JSR ADVS1
049D B003 119 BCS DONE
049F 4C4604 120 JMP SAVE
04A2 121 ;
04A2 122 ;NO MORE DATA--START AGAIN
04A2 20F0E9 123 DONE JSR CRLF
04A5 4C1004 124 JMP START
04A8 125 ;
04A8 126 ;COMPARE & BUMP ADDRESS PTR
04A8 AD1AA4 127 ADVS1 LDA S1
04AB CD1CA4 128 CMP ADDR
04AE AD1BA4 129 LDA S1+1
04B1 ED1DA4 130 SBC ADDR+1
04B4 EE1AA4 131 INC S1
04B7 D003 132 BNE ADV
04B9 EE1BA4 133 INC S1+1
04BC 60 134 ADV RTS
04BD 135 ;
04BD 136 ;

```

(continued)

## Using the Program

Load MEMSEARCH through the assembler using the listing in figure 2. Save the program on tape using the 'DUMP TO TAPE' command from \$400 to \$4BF.

After loading MEMSEARCH, begin its execution using the '\*' and 'G' commands. The beginning address and ending address +1 are entered in response to the 'FROM' and 'TO' prompts. The sequence to be found is entered following the '?' prompt. Values are in hex notation without spaces between bytes (spaces are automatically inserted). Two characters must be entered per byte, and up to 16 bytes can be specified. Non-hex entries act as wild cards and match anything. Terminate the sequence (if less than 16 bytes) with a carriage return. The addresses of any matching data sequences in memory are output and the program loops back to search a new memory block.

## Applications

What can MEMSEARCH be used for? Well, everyone has his own needs. I was prompted to write MEMSEARCH in order to locate certain entry points and page zero usage in the AIM 65 BASIC interpreter. Unfortunately Rockwell hasn't provided much information in this area. Nevertheless, I suspected that this was a version of Microsoft BASIC similar to the one known as Applesoft (used in the Apple II). Although quite a bit is known about Applesoft, the memory locations used in the Apple and AIM weren't necessarily the same. Thus the code wouldn't be the same (hence the need for a wild card). With the help of MEMSEARCH I was able to identify the required entry points and page zero locations in a minimum of time.

---

Bob Kovacs is an electro-optics engineer at Bendix where he is currently responsible for the development of a charge-transfer imaging system used for celestial navigation. He is using an AIM 65 for imager sequencing, data collection and processing in the evaluation of a breadboard system. At home, Bob is involved with hardware/software projects on his Apple II. He also enjoys skiing, gardening and photography.

---

## MICRO Club Circuit

(Continued from page 15)

### Apple II Computer User's Group

Rod Nelson, President, William T. Davis Secretary preside over this club boasting a membership of 276. Meetings are held on the first Thursday of each month at 7:00 pm, at the Colorado School of Mines, Golden, CO. The group meets to help each other learn and enjoy computing with Apples. Contact:

Secretary  
P.O. Box 17467  
Denver, CO 80217

### Las Cruces Computer Club

This dual Apple/TRS-80 users group meets on the first Thursday of each month at 7:30 pm at the SW Computer Center [121 Wyatt Suite 7, Las Cruces, NM 88001]. Leonard Fetterhoff is club president for 25 members. For further information contact the club secretary:

John Martellaro  
2929 Los Amigos Ct. Apt. B  
Las Cruces, NM 88001

### Original Apple Corps

Kip J. Reiner is president for this club of 300 members. Meetings are held on the second Sunday of the month at noon at UCLA campus, Young Hall, Room 2224, Los Angeles, CA. This group publishes a club magazine, "Apple-sauce" for \$15.00 a year. They meet to expand the knowledge of Apple computers, hardware and software. For further information, write:

Secretary  
19041-2 Hamlin Street  
Reseda, CA 91335

### Apple-Can

This 200+ membership club meets at 7:30 on the first Wednesday of each month, currently at Forest Hill Public Library. Louis H. Milrad is the club president. This club features many guest speakers and promotes the better understanding of the Apple computer, its applications and limitations. They publish a bimonthly newsletter. Many active subgroups in Telecommunications, Medical, Pascal, Forth, Introduction to BASIC, Games, Business, etc, all with an extensive program library. For further information, contact:

Secretary  
Suite 204  
2 Gloucester Street  
Toronto, Ontario, CANADA  
M4Y 1L5

04BD	4D454D	137	MSG	ASC	'MEMSEARCH'
04C0	534541				
04C3	524348				
04C6	00	138		BYT	\$00
04C7	00	139	TEMP1	BYT	\$00
04C8	00	140	TEMP2	BYT	\$00
04C9	00	141	ENTCNT	BYT	\$00
04CA	313233	142	BUFHI	ASC	'12345678'
04CD	343536				
04D0	3738				
04D2	313233	143		ASC	'12345678'
04D5	343536				
04D8	3738				
04DA	313233	144	BUFLO	ASC	'12345678'
04DD	343536				
04E0	3738				
04E2	313233	145		ASC	'12345678'
04E5	343536				
04E8	3738				

Name	Address	Registers Changed	Description
FROM	E7A3	A,X,Y	Output 'FROM' prompt; user inputs 4 character hex address (ESC & DEL are active) which is stored @ADDR. Carry set if non-hex value entered.
TO	E7A7	A,X,Y	Same as FROM except for prompt.
REDOUT	E973	A	Return with a single character from keyboard in accumulator. Echo to output device unless CR input.
MOVE	F910	A,X	2-byte move from ADDR to S1.
LDAY	EB58	A	Performs a LDA (S1),Y without using page zero. Enter with accumulator pointing to S1 via offset from \$A400 base address.
PACK	EA84	—	Converts ASCII character in accumulator into hex and packs it with previous value (saved in STTY + 2). If not hex (i.e. 0-9,A-F) then original character is returned with carry set.
NUMA	EA46	—	Output contents of accumulator as 2 character hex.
OUTPUT	E97A	—	Output ASCII code in accumulator to active output device(s).
BLANK	E83E	A	Output a single space.
CRLF	E9F0	A	Output a carriage return and line feed.
QM	E7D4	A	Output a question mark.

Figure 3: AIM 65 Monitor Routine Summary

MICRO



## ASCII EXPRESS II

by BILL BLUE

Described in INFOWORLD as "The finest program for Apple data communications..." ASCII EXPRESS II allows your Apple to communicate with virtually any computer with dial-up access.

Written in Applesoft and Machine language, Ascii Express II includes everything you'd expect in a complete communications package. It features a variety of powerful features including full support of upper/lower case, autodial and answer capabilities (when used with the Hayes Micromodem), and file oriented upload/download facilities.

A built-in line editor gives full editing functions, and programmable keyboard MACROS reduce complicated log-in procedures to a few simple keystrokes.

Downloaded files may be printed while being received, saved to disk, or printed later when offline. The copy mode allows everything shown on the screen to be saved in the large (20K) buffer.

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.

Uses include:

- Send/receive letters/files from networks like the SOURCE, MICRONET, or other bulletin board type systems.
- Transferring program files between Apples, an Apple and a TRS-80, PET, etc.
- Use the Apple as a terminal to a mainframe at a remote location with the added advantage of being able to process data at the Apple before or after transfer.
- Minimize on-line costs by quickly transferring files and other data.

System requirements include a 48K Apple with Applesoft in ROM or the Language Card, a disk drive, and one of the above communications devices. A lower case display board is recommended, but not required.

## COMMUNICATIONS GAP ??? WE'VE GOT YOU COVERED!!



**S.D.S. offers a complete selection of communications software to meet almost every user's need. We think you'll find the three programs described here the best available anywhere — and we back that claim with our unconditional guarantee of satisfaction or your money back.**

**To find out more about these programs, send for more information, or see your local Apple dealer.**

## ONLINE

by BILL BLUE

ONLINE is a completely secure dial-up system that allows you to call your Apple computer while you're away from home. It also provides for up to 50 optional user accounts.

ONLINE includes a versatile mail system and built-in line editor with provisions for uploading and downloading programs and files.

Its many applications include use by businesses for 24 hour answering of field representatives inquiries, taking orders or advertising for your company. It can also be used by clubs or groups for posting announcements, or transferring files.

Requires 48K Apple with Hayes Micromodem and DOS 3.3.

**SOUTHWESTERN DATA SYSTEMS**  
P.O. BOX 582-M • SANTEE, CA 92071  
(714) 562-3670

## Z-TERM

by BILL BLUE

The Rolls-Royce of communications software. You may find cheaper programs but you'll never find one better. Not only does it provide everything Ascii Express II does, but then some. Designed for the CP/M environment using the Z-80 Softcard, Z-TERM permits a number of features not available elsewhere.

- Receives up to 41K of data at a time. Can send files of any size.
- Auto save mode send XOFF character when buffer is full, and resumes (with operator prompting) after save.
- Terminal emulation allows you to define what kind of terminal your Apple should appear as.
- Entirely in machine language for maximum speed and power.

Z-TERM fully supports the Hayes Micromodem, Apple Communications card, SSM-AIO board, CCS Asynchronous Serial Card, Lynx Communications system and others! Fully supports the local Apple 40 column screen, external terminals, and all 80 column boards interchangeably and with NO configuration necessary!

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!

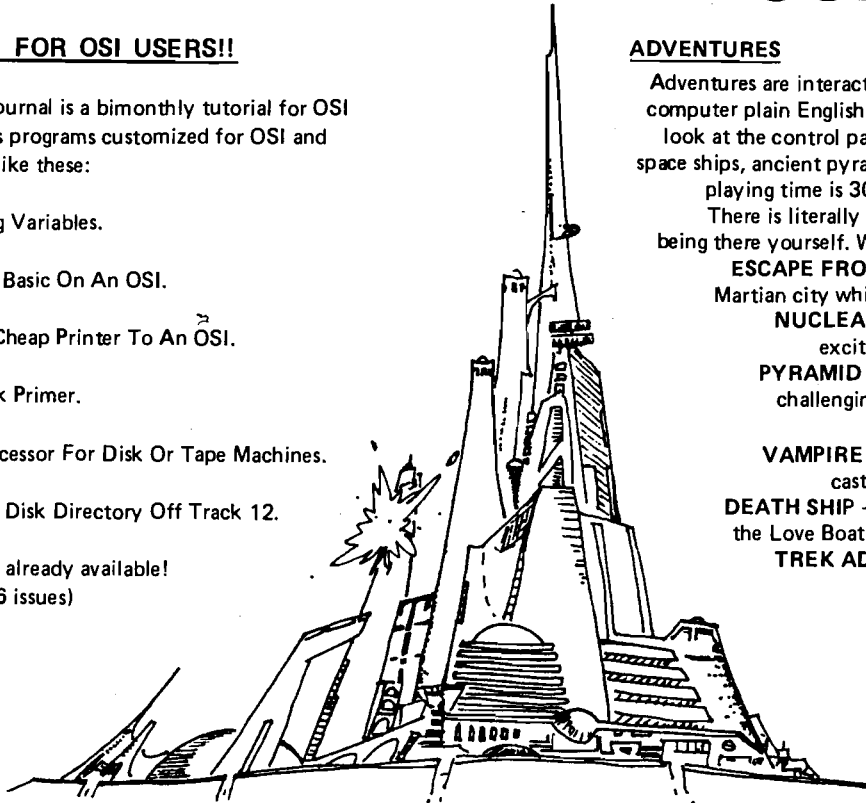
\*Note: CP/M and Apple DOS files are not directly compatible.

A JOURNAL FOR OSI USERS!!

The Aardvark Journal is a bimonthly tutorial for OSI users. It features programs customized for OSI and has run articles like these:

- 1) Using String Variables.
- 2) High Speed Basic On An OSI.
- 3) Hooking a Cheap Printer To An OSI.
- 4) An OSI Disk Primer.
- 5) A Word Processor For Disk Or Tape Machines.
- 6) Moving The Disk Directory Off Track 12.

Four back issues already available!  
\$9.00 per year (6 issues)

ADVENTURES

Adventures are interactive fantasies where you give the computer plain English commands (i.e. take the sword, look at the control panel.) as you explore alien cities, space ships, ancient pyramids and sunken subs. Average playing time is 30 to 40 hours in several sessions.

There is literally nothing else like them — except being there yourself. We have six adventures available.

**ESCAPE FROM MARS** — Explore an ancient Martian city while you prepare for your escape.

**NUCLEAR SUBMARINE** — Fast moving excitement at the bottom of the sea.

**PYRAMID** — Our most advanced and most challenging adventure. Takes place in our own special ancient pyramid.

**VAMPIRE CASTLE** — A day in old Drac's castle. But it's getting dark outside.

**DEATH SHIP** — It's a cruise ship — but it ain't the Love Boat and survival is far from certain.

**TREK ADVENTURE** — Takes place on a familiar starship. Almost as good as being there.

\$14.95 each

NEW SUPPORT ROMS FOR BASIC IN ROM MACHINES

**C1S** — for the C1P only, this ROM adds full screen edit functions (insert, delete, change characters in a basic line.), Software selectable scroll windows, two instant screen clears (scroll window only and full screen.), software choice of OSI or standard keyboard format, Bell support, 600 Baud cassette support, and a few other features. It plugs in in place of the OSI ROM. NOTE: this ROM also supports video conversions for 24, 32, 48, or 64 characters per line. All that and it sells for a measly \$39.95.

**C1E/C2E** for C1/C2/C4/C8 Basic in ROM machines.

This ROM adds full screen editing, software selectable scroll windows, keyboard correction (software selectable), and contains an extended machine code monitor. It has breakpoint utilities, machine code load and save, block memory move and hex dump utilities. A must for the machine code programmer replaces OSI support ROM. Specify system \$59.95

DISK UTILITIES

**SUPER COPY** — Single Disk Copier

This copy program makes multiple copies, copies track zero, and copies all the tracks that your memory can hold at one time — up to 12 tracks at a pass. It's almost as fast as dual disk copying. — \$15.95

**MAXIPROSS (WORD PROCESSOR)** — 65D polled keyboard only - has global and line edit, right and left margin justification, imbedded margin commands, choice of single, double or triple spacing, file access capabilities and all the features of a major word processor — and it's only \$39.95.



This is only a partial listing of what we have to offer. We now offer over 100 programs, data sheets, ROMS, and boards for OSI systems. Our \$1.00 catalog lists it all and contains free program listings and programming hints to boot.



OSI

Aardvark Technical Services • 1690 Bolton • Walled Lake, MI 48088  
(313) 669-3110

OSI

P.C. BOARDS

**MEMORY BOARDSII** — for the C1P. — and they contain parallel ports!

Aardvark's new memory board supports 8K of 2114's and has provision for a PIA to give a parallel ports! It sells as a bare board for \$29.95. When assembled, the board plugs into the expansion connector on the 600 board. Available now!

**PROM BURNER FOR THE C1P** — Burns single supply 2716's. Bare board — \$24.95.

**MOTHER BOARD** — Expand your expansion connector from one to five connectors or use it to adapt our C1P boards to your C4/8P. — \$14.95.

ARCADE AND VIDEO GAMES

**ALIEN INVADERS** with machine code moves — for fast action. This is our best invaders yet. The disk version is so fast that we had to add selectable speeds to make it playable.  
Tape — \$10.95 — Disk — \$12.95

**TIME TREK (8K)** — real time Startrek action. See your torpedoes move across the screen! Real graphics — no more scrolling displays. \$9.95

**STARFIGHTER** — a real time space war where you face cruisers, battleships and fighters using a variety of weapons. Your screen contains working instrumentation and a real time display of the alien ships. \$6.95 in black and white - \$7.95 in color and sound.

**MINOS** — A game with amazing 3D graphics. You see a maze from the top, the screen blanks, and then you are in the maze at ground level, finding your way through on foot. Realistic enough to cause claustrophobia. — \$12.95

SCREEN EDITORS

These programs all allow the editing of basic lines. All assume that you are using the standard OSI video display and polled keyboard.

**C1P CURSOR CONTROL** — A program that uses no RAM normally available to the system. (We hid it in unused space on page 2). It provides real backspace, insert, delete and replace functions and an optional instant screen clear. \$11.95

**C2/4 CURSOR**. This one uses 366 BYTES of RAM to provide a full screen editor. Edit and change lines on any part of the screen. (Basic in ROM systems only.)

**FOR DISK SYSTEMS** — (65D, polled keyboard and standard video only.)

**SUPERDISK**. Contains a basic text editor with functions similar to the above programs and also contains a renumberer, variable table maker, search and new BEXEC\* programs. The BEXEC\* provides a directory, create, delete, and change utilities on one track and is worth having by itself. — \$24.95 on 5" disk - \$26.95 on 8"

AARDVARK IS NOW AN OSI DEALER!

Now you can buy from people who can support your machine.

—THIS MONTH'S SPECIALS—

Superboard II	\$279
C1P Model II	429
C4P	749

... and we'll include a free Text Editor Tape with each machine!

Video Modification Plans and P.C. Boards for C1P as low as \$4.95



# Joysticks for the OSI C4

**You can do better than to buy OSI joysticks for the C4P. Here's how to make and test your own.**

Charles Platt  
P.O. Box 556  
New York, New York 10011

The Ohio Scientific Challenger C4 is designed for use with joysticks, which are available from the manufacturer as an optional extra. Anyone who really enjoys playing and/or programming video games will want to take advantage of this feature, since it is much easier to control a game with joysticks than by pressing keys on the keyboard. However, Ohio Scientific joysticks are expensive, not as strong as one would like, and often out of stock at one's local OSI dealer. Having learned these hard facts of life, I decided to take matters into my own hands. Either I would convert Atari joysticks (which are very widely available and not too highly priced), or I would make my own.

## Joystick Operation

During a game program the computer needs to know in which direction each joystick is being pushed by the player(s), and whether the "action key" on each joystick is being pressed.

Inside the joystick assembly are four switches which close, one at a time, when the stick is pushed up, down, left, or right. If the stick is pushed diagonally, two of the four switches close simultaneously. In addition there is a fifth switch which is closed when the player pushes the action key.

The computer detects these switch closures via a POKE command in the game program. For example, POKE 57088,128 directs the computer's attention to Joystick A. If the program next asks for a PEEK c memory location 57088, this will yield a number which corresponds to which switches are closed inside the joystick assembly.

This routine is similar to a keyboard PEEK routine, and the joysticks can be thought of as extensions to the keyboard.

There is a chart on page 90 of the old C4 user's manual, giving the possible PEEK numbers and the joystick positions which they represent. Unfortunately, the column headings in this chart are incorrect. The figures in the columns headed "Action Key Depressed" are in fact produced when the action key is *not* depressed, while the figures in the "Action Key Not Depressed" column are in fact produced when the action key *is* depressed. If you write your own game program it is important to bear this in mind. This has been corrected in the 1981 version of the C4P User's Manual.

## Connecting Non-C4 Joysticks

There are four trapezoidal sockets on the back panel of the C4, adjacent to the fan. The top socket is for Joystick A, the next one down is for Joystick B. (The other two sockets are for keypads A and B.)

Neither the C4 user's manual nor the maintenance manual gives precise information about which pin does what, in the joystick sockets. However, some trial-and-error tests revealed the functions that follow.

Looking at the outside of the socket, numbering the pins from left to right, the top row of pins in each socket can be labelled pins 1 through 5, and the bottom row, pins 6 through 9. In this case, pin 1 is the ground, pin 2 connects to the action key, pin 3 connects to the "Left" switch in the joystick, pin 4 goes to the "Down" switch, pin 5 to the "Right" switch, and pin 6 to the "Up" switch. Pins 7, 8, and 9 are unconnected.

My first experiment was with Atari joysticks. By a rare fluke of standardization in the computer industry, the

Atari joystick plug exactly fits the C4 joystick socket. Moreover, the switching inside the Atari joystick unit is similar to the switching of C4 joysticks, and there are precisely six wires in the Atari connecting cable—just right for the six active pins in the C4 socket.

There is one snag however. If you look in the holes in the Atari plug, you will find that not all of them contain metal connectors. Some holes are not used and do not connect to anything. Unfortunately, these holes correspond with pins in the C4 socket which *are* used and *must* be connected to something. So you have to slice open the molded plastic Atari plug to get at the metal connectors, which must be reshuffled into the right sequence, leaving holes 7, 8, and 9 empty to correspond with unused C4 pins 7, 8, and 9.

The Atari wires are color coded and should be matched to the C4's pin numbers as follows:

Black	Pin 1
Orange	Pin 2
Green	Pin 3
Blue	Pin 4
Brown	Pin 5
White	Pin 6

Once you have opened the plug and extracted the little metal connectors which slide onto the pins in the joystick socket (some connectors may be torn loose in the plug-opening operation and will need to be resoldered to their wires), you can slide these connectors individually onto their separate pins, and separate them with small pieces of electrical tape to prevent accidental shorts. You can then test the joystick, using the procedure described later in this article.

When you're sure the joystick is working properly, and all your connections have been made correctly, you can drip some quick-setting epoxy over the metal connectors to encapsulate

them. When the epoxy is dry, the connectors can be slipped off the pins in one unit. The epoxy has, in fact, created a new "plug" around the connectors, to replace the original plug which had to be sliced open.

### Making Your Own Joysticks

After using Atari joysticks for a while, I became dissatisfied with their response and decided to build my own. This turned out to be extremely simple.

Each joystick unit consists of a box with a wooden top and bottom and aluminum sides. [The thin aluminum is bent around the wood and nailed to it.] The stick is pivoted where it is screwed to the bottom of the box; some self-centering action is provided by a small compression spring. The stick protrudes through a 1" square hole in the top of the box. Arranged around this hole, screwed to the underside of the top of the box, are four microswitches, positioned so that their contact buttons are just touching the four sides of the stick (which has a square cross-section at this point). Lastly, a pushbutton is mounted on the outside of the top of the box to serve as the action key.

Using microswitches allows a much more positive "feel" than is available from the Atari joysticks. My home-made units provide much more precise control of video games.

### Checking Joystick Operation

To make sure you have wired your home-made or Atari joysticks correctly, you can run a simple "POKE and PEEK" test program.

#### Program for Joystick A

```

10 POKE 2073,96:REM —
  DISABLES CONTROL-C.
  THE ROUTINE WON'T
  FUNCTION TILL YOU DO
  THIS.
20 FOR K=1 TO 200:REM —
  SEE NOTE BELOW
30 POKE 57088,128:REM —
  ACTIVATES JOYSTICK A
40 P=PEEK(57088) AND
  31:REM — PEEK JOYSTICK A
50 PRINT P
60 FOR D=1 TO 200:NEXT
  D:REM — DELAY LOOP
70 NEXT K
80 END

```

Since "Control-C" has been disabled in the program, there is no way of stopping the program once it has started, short of hitting the Break key. So a loop is used, incrementing K by 1 in each of 200 cycles. The program ends at the end of the loop. A delay loop is also used, to stop the figures from racing uncontrollably across the screen.

*Note:* line 30, the POKE command, is inside the K loop. This is because you must POKE 57088 again after each time you have PEEKed it and it has yielded data. If you write a program which repeatedly PEEKs 57088 for data and does not re-POKE it each time, you will find that the joysticks won't work properly. For a demonstration of this fault, you can run the sample program listed on page 93 of the old C4 user's manual, or pages 45-47 in the new manual. This program erroneously fails to POKE 57088 after PEEKing it. Consequently, as listed, the program doesn't work.

When you test Joystick A, using the test program shown here, you should find that moving the stick generates, on the video screen, the various numbers listed on page 90 of the old manual, page 43 in the new manual. If the numbers are as listed, but they appear in the wrong sequence, you've probably made an incorrect connection in the joystick socket. If the numbers on the screen do not in any way match the numbers in the manual, you have probably made a programming error. Be sure that your PEEK command is PEEK[57088] AND 31. Without the "AND 31" it won't work.

If you are using Atari joysticks and you find that pushing the stick directly up and down, or from side to side, produces numbers which wrongly indicate diagonal motion, the problem is simply that you are pushing the stick too hard, thus turning on two switches instead of only one at a time. Only very light pressure is required.

Once you have tested Joystick A, you can test Joystick B by rewriting two lines of the test program:

```

30 POKE 57088,16
40 P=PEEK(57088) AND 248

```

These are the POKE and PEEK which give access to Joystick B.

Happy game playing!

MICRO™

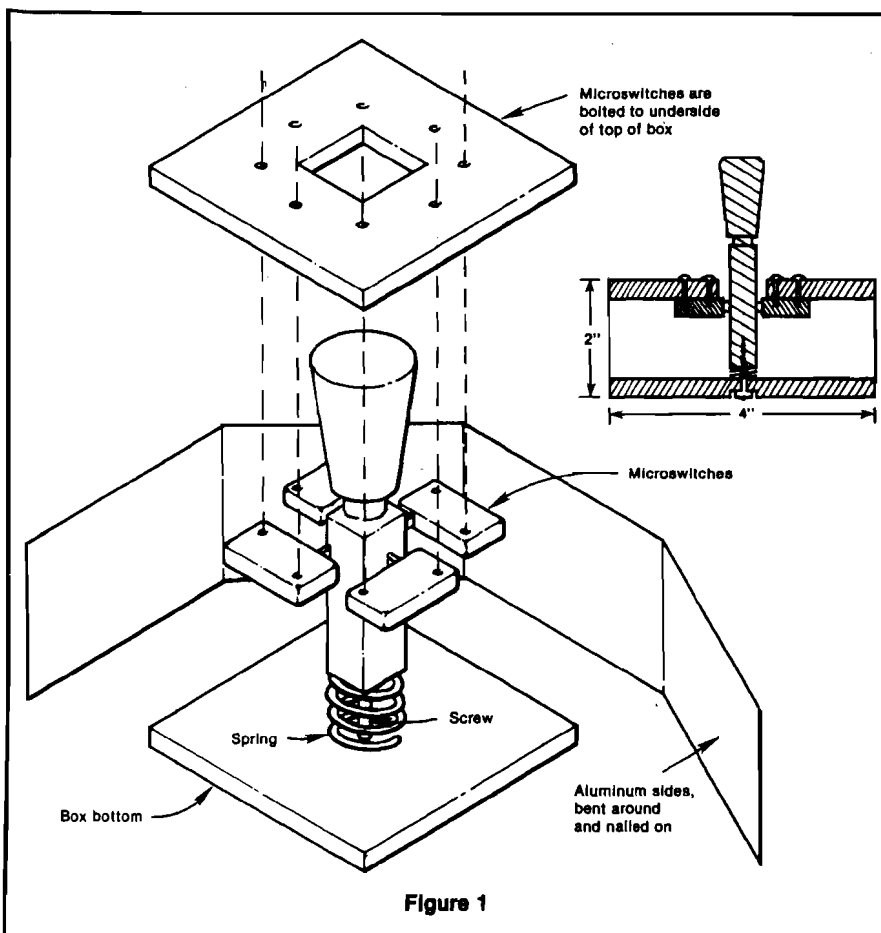


Figure 1

# AN ENTIRE STAR FLEET FOR \$39.95. YOU'LL LOVE IT!



Like some future starship admiral hurtling through the vast void of hyperspace at speeds beyond comprehension, you are challenged to a battle for cosmic supremacy.

**THE WARP FACTOR**, the latest computer strategy game from SSI, is what every space war fan has been waiting for - the ability to command a star fleet in realistic battle simulation against alien vessels.

It is light years ahead of all

other "space" games because it doesn't just fill your screen with pretty pictures and little substance. **THE WARP FACTOR** is a high-powered tactical simulation that places you squarely in the Captain's role, dealing with the critical parameters of interstellar battle such as sensor and scanner readings; energy allocation for weapons (phasers, disruptor bolts, photon and plasma torpedoes), shields, and warp engines; and battle damage.

**THE STARSHIPS.** With twelve different starship designs - ranging from dreadnoughts and fighters to star bases and base stations - representing five Galactic Empires, you can set up an astronomical variety of confrontations against another player or the computer.

Each class of vessels is awarded a point value to reflect its relative strength so you can assemble fleets of comparable power for a balanced game. Of course, you're free to play the intrepid hero against seemingly hopeless odds - perhaps mere fighters against a star base!

Employing up to ten ships, both sides can give individual or fleet orders, the latter allowing all your ships to execute your commands in unison.

**THE COMPUTER**, aside from being the game's perfect administrator and referee, also serves as your ever-ready, ever-capable nemesis in the multiple solitaire scenarios provided: The Reman Chase (replete with the Cloaking Device, Plasma Torpedoes, and Neutral Zone); Attack on Star Base; Attack on Base Station; and Dogfight.

**THE TWO-PLAYER VERSION** is essentially free-form. With each player choosing starships from a different Empire, you can create scenarios ranging from space skirmishes to a full-scale, all-out star war!

**FOR \$39.95**, **THE WARP FACTOR** is undeniably the most complete and detailed simulation of tactical starship combat yet designed. It comes with the 5 1/4" program disc; a Starship Operating Manual; 3 Starship Data Cards; and a Game Selection Card - all of which will convert your computer into the gateway to galactic adventure.

## THE WARP FACTOR™. The Universe Awaits Your Command.

Credit card holders, if you own an Apple® II 48K (Applesoft ROM) and a mini-floppy disc drive, call **800-227-1617 ext. 335 (toll free)** and charge your order to your VISA or MASTER-CARD. In California, call 800-772-3545, ext. 335.

To order by mail, send your check to: Strategic Simulations Inc, Dept. M, 465 Fairchild Drive, Suite 108, Mountain View, CA 94043.

*All our games carry a 14-day money-back guarantee.*

While you're at it, you can also get our other games:

FOR YOUR APPLE®:

- Computer Bismarck:** \$59.95.
- Computer Ambush** (a tactical simulation of man-to-man combat in WWII): \$59.95.
- Computer Napoleonic**, the Battle of Waterloo: \$59.95.

- Computer Quarterback** (a real-time strategy football game): \$39.95.
- Computer Conflict** (two modern-day tactical warfare simulations featuring *REBEL FORCE* and *RED ATTACK*): \$39.95
- Computer Air Combat** (a simulation of air combat in WWII): \$59.95.

FOR YOUR TRS-80®:

- Computer Bismarck**, 48K Disc: \$59.95. 32K Cassette: \$49.95.

# DATA CAPTURE 4.0<sup>©</sup>

The most advanced and easiest to use telecommunications program for use with the MICROMODEM II<sup>™</sup> or the Apple COMMUNICATIONS CARD<sup>™</sup>

- Q. Will DATA CAPTURE 4.0 work with my Communications Card<sup>™</sup> and a modem?**  
A. It makes using the Comm. Card almost as easy as using the Micromodem II.
- Q. Do I need an extra editor to prepare text for transmission to another computer?**  
A. No. DATA CAPTURE 4.0 gives you control of the text buffer. You can use DATA CAPTURE 4.0 to create text.
- Q. Can I edit the text I have prepared?**  
A. Yes. You can insert lines or delete any lines from the text.
- Q. How about text I have captured. Can I edit that?**  
A. As easily as the text you have prepared yourself. You can delete any lines you don't want to print or save to a disk file. You can also insert lines into the text.
- Q. Just how much text can I capture with DATA CAPTURE 4.0?**  
A. If the system with which you are communicating accepts a stop character, most use a Control S, you can capture an unlimited amount of text.
- Q. How does that work? And do I have to keep an eye on how much I have already captured?**  
A. When the text buffer is full the stop character is output to the other system. Then DATA CAPTURE 4.0 writes what has been captured up to that point to a disk file. This is done automatically.
- Q. Then what happens?**  
A. Control is returned to you and you can send the start character to the other system. This generally requires pressing any key, the RETURN key or a Control Q.
- Q. Are upper and lower case supported if I have a Lower Case Adapter?**  
A. Yes. If you don't have the adapter an upper case only version is also provided on the diskette.
- Q. Do I need to have my printer card or Micromodem II<sup>™</sup> or Communications Card<sup>™</sup> in any special slot?**  
A. No. All this is taken care of when you first run a short program to configure DATA CAPTURE 4.0 to your system. Then you don't have to be concerned with it again. If you move your cards around later you can reconfigure DATA CAPTURE 4.0.
- Q. Do I have to build a file on the other system to get it sent to my Apple?**  
A. No. If the other system can list it you can capture it.
- Q. How easy is it to transmit text or data to another system?**  
A. You can load the text or data into DATA CAPTURE 4.0 from the disk and transmit it. Or you can transmit what you have typed into DATA CAPTURE 4.0.
- Q. How can I be sure the other system receives what I send it?**  
A. If the other system works in Full Duplex, it 'echoes' what you send it, then DATA CAPTURE 4.0 adjusts its sending speed to the other system and won't send the next character until it is sure the present one has been received. We call that 'Dynamic Sending Speed Adjustment'.
- Q. What if the other system works only in Half Duplex.**  
A. A different sending routine is provided for use with Half Duplex systems.
- Q. What if I want to transmit a program to the other system?**  
A. No problem. You make the program into a text file with a program that is provided with DATA CAPTURE 4.0, load it into DATA CAPTURE 4.0 and transmit it.

- Q. What type files can I read and save with DATA CAPTURE 4.0?**  
A. Any Apple DOS sequential text file. You can create and edit EXEC files, send or receive VISICALC<sup>®</sup> data files, send or receive text files created with any editor that uses text files.
- Q. Can I leave DATA CAPTURE 4.0 running on my Apple at home and use it from another system?**  
A. Yes. If you are using the Micromodem II<sup>™</sup> you can call DATA CAPTURE 4.0 from another system. This is handy if you are at work and want to transmit something to your unattended Apple at home.
- Q. Where can I buy DATA CAPTURE 4.0?**  
A. Your local Apple dealer. If he doesn't have it ask him to order it. Or if you can't wait order it directly from Southeastern Software. The price is \$65.00. To order the Dan Paymar Lower Case Adapter add \$64.95 and include the serial number of your Apple.
- Q. If I order it directly how can I pay for it?**  
A. We accept Master Charge, Visa or your personal check. You will get your order shipped within 3 working days of when we receive it no matter how you pay for it. Send your order to us at the address shown or call either of the numbers in this advertisement. You can call anytime of day, evening or Saturdays.
- Q. I bought DATA CAPTURE 3.0 and DATA CAPTURE 4.0 sounds so good I want this version. What do I do to upgrade?**  
A. Send us your original DATA CAPTURE 3.0 diskette and documentation, the \$35.00 price difference and \$2.50 for postage and handling. We will send you DATA CAPTURE 4.0 within 3 working days of receiving your order.
- Q. What kind of support can I expect after I buy it?**  
A. If you have bought from Southeastern Software in the past you know we are always ready to answer any questions about our products or how to use them.

**Requires DISK II<sup>™</sup>, Applesoft II<sup>™</sup> and 48K of Memory**

## DATA CAPTURE 4.0<sup>©</sup>

Copyright © 1980 Southeastern Software

\* Apple<sup>®</sup>, Apple II Plus<sup>®</sup>, Disk II<sup>™</sup> and APPLESOFT II<sup>™</sup> are trademarks of Apple Computer Company.

\* Micromodem II<sup>™</sup> is a trademark of D.C. Hayes Associates, Inc.

\* Visicalc<sup>®</sup> Copyright by Software Arts, Inc.



We welcome your personal check. We also accept Visa and Master Charge.

# Southeastern Software

Dept. MK  
6414 Derbyshire Drive • New Orleans, LA 70126  
504/246-8438 504/246-7937

# Apple Memory Maps, Part 1

Your Apple can draw accurate memory maps of Integer BASIC and Applesoft programs, together with their associated variables, arrays, and strings, by using the information contained in various pointers. DOS, MAXFILES, and RAM Applesoft can also be displayed.

Peter A. Cook  
1443 N. 24th Street  
Mesa, Arizona 85203

*This article will be presented in two parts. Part 1 contains examples of memory maps produced by the Apple, which show where the computer stores programs in its memory. Part 2 will contain the "Memory Map" program listing and a description of how it works.*

Memory maps show where computers store data in their memories. A 48K Apple actually has 65,536, or 64K, memory locations in which data can be stored. Locations 0 to 49151, the first 48K, are available for storing changeable information [Random Access Memory], while locations 49152 to 65535, the last 16K, are for permanently-installed data which can't be changed by the user [Read Only Memory]. The computer places data into specific locations in the RAM memory area, depending on what type data it is, and which language is being used.

Various charts in the Apple reference manuals show where programs are stored in RAM, along with their associated variables, arrays and strings. The disk and cassette versions of Applesoft are also stored in this area, and so is the Disk Operating System and its file buffers. The charts are adequate for simple programs, but for more complex ones you need to know exactly how much space is used by the different program components. This is especially important if the Hi-Res graphics pages are used, or if machine language subroutines are included.

APPLE II	Applesoft Card		NO CARD
	Switch up	Switch down	
DOS 'INT'	Integer BASIC	Integer BASIC	Integer BASIC
DOS 'FP'	ROM Applesoft	ROM Applesoft	RAM Applesoft (disk)
no DOS	ROM Applesoft	Integer BASIC	Integer BASIC
		RAM Applesoft (cassette)	RAM Applesoft (cassette)

Figure 1: Language availability for various configurations of the Apple II.

## Description

The following maps cover the Apple's RAM memory area from 2048 to the highest available RAM location in your machine. The area from 0 to 2047 is not included because it is used by the computer for various internal functions and is not generally available for BASIC programs.

The MEMORY MAP program will provide the following information:

1. Maximum amount of RAM available.
2. Whether or not DOS has been booted.
3. Number of DOS file buffers reserved (MAXFILES).
4. Current language in use.
5. Whether or not a program has been loaded, or run.
6. Location and length of program, variables, arrays, and strings.
7. Amount of free space remaining.
8. Setting of LOMEM and HIMEM.
9. Location of Hi-Res graphics pages.
10. Extent of the "garbage collection" of old strings.

The program will work with all versions of the Apple II or Apple II Plus, ranging in size from 16K to 48K, with either the old monitor ROM or the new autostart ROM installed. It will accept programs from cassette as well as disk, but it will only work with DOS version 3.2.

The program was designed for use with Integer BASIC, RAM Applesoft, or ROM Applesoft. However, I do not know what the results will be if you use these languages with the Pascal language system installed. Language availability for various configurations of the Apple II is shown in figure 1.

### Integer BASIC Memory Maps

The following examples show how the MEMORY MAP program can be used with Integer BASIC programs. We will use a 48K Apple II with Applesoft card in slot 0, printer in slot 2, and disk drive in slot 6. For the first example, turn on the computer without loading DOS. Enter the monitor and load the

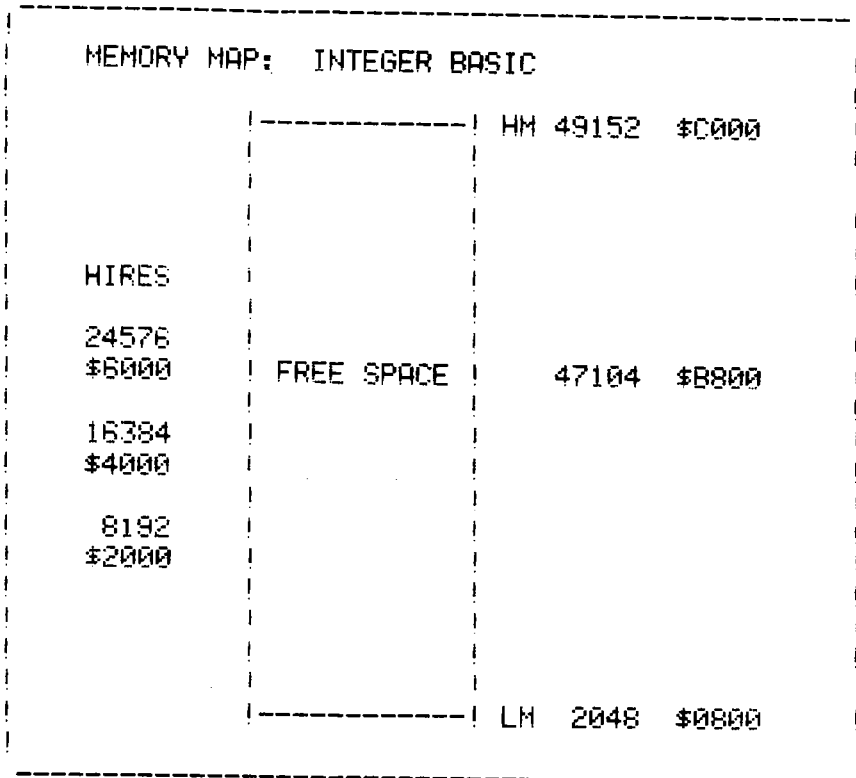


Figure 2: Integer BASIC map with nothing in memory.

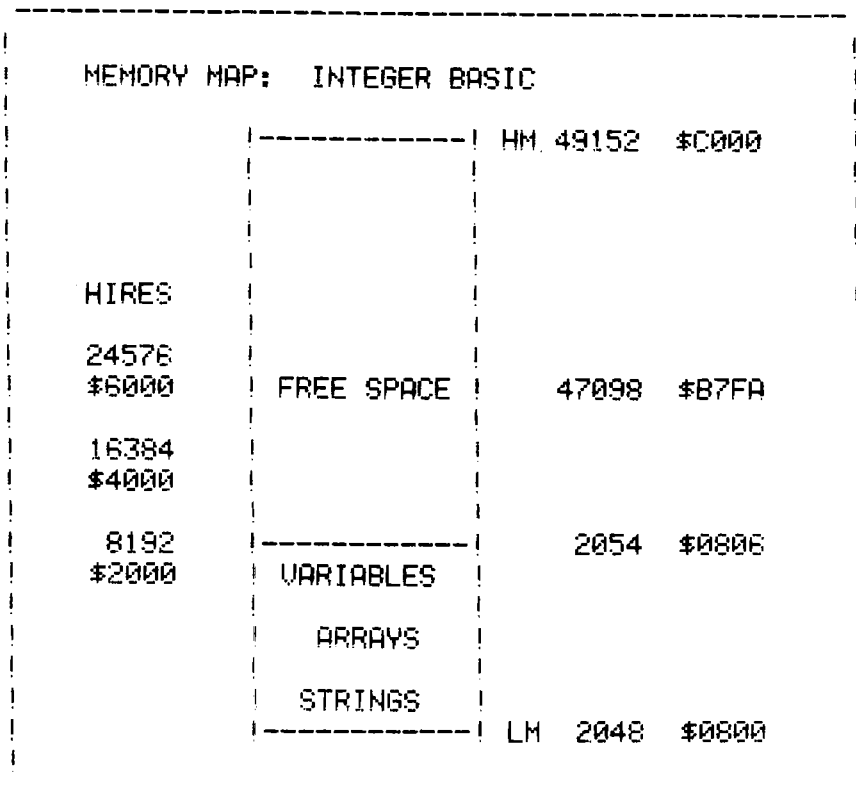


Figure 3: Integer BASIC map showing area for variables.

MEMORY MAP: INTEGER BASIC		HM	49152	\$C000
	PROGRAM		49138	\$BFF2
HIRES				
24576				
\$6000	FREE SPACE		47090	\$B7F2
16384				
\$4000				
8192				
\$2000				
		LM	2048	\$0800

Figure 4: Integer BASIC map showing program area.

MEMORY MAP: INTEGER BASIC		HM	49152	\$C000
	PROGRAM		49138	\$BFF2
HIRES				
24576				
\$6000	FREE SPACE		47084	\$B7EC
16384				
\$4000				
8192	VARIABLES		2054	\$0806
\$2000				
	ARRAYS			
	STRINGS			
		LM	2048	\$0800

Figure 5: Integer BASIC map after running program.

MEMORY MAP machine language program from cassette. Enter BASIC and use CALL 13000 to run it. More detailed loading instructions will be provided in Part 2, along with the actual program itself.

```
3200.38DFR
Control B
CALL 13000
```

Figure 2 shows that LOMEM is set at 2048, HIMEM is set at 49152, and 47,104 bytes of free space are waiting to be used.

Now define a simple variable and call MEMORY MAP again.

```
A = 1
CALL 13000
```

Figure 3 shows that the variable is stored just above LOMEM and contains 6 bytes, as do all simple variables in Integer BASIC.

Clear the variable and enter the same statement in the form of a program.

```
Reset, Control B
10 A = 1
20 END
CALL 13000
```

Notice that the program has been stored just below HIMEM, as shown in figure 4.

Load the program again, and this time run it to see what happens.

```
Reset, Control B
10 A = 1
20 END
RUN
CALL 13000
```

The program creates the same variable in figure 5 that was entered in figure 3.

Now load the DOS. Type INT to remove the greeting program, then re-enter the above program and run it. The DOS boot will clobber MEMORY MAP, so it too will have to be reloaded. Now that we have DOS, we can use BRUN MEMORY MAP instead of the separate commands for loading and calling 13000.

```
Reset, Control B
PR#6
INT
10 A = 1
20 END
RUN
BRUN MEMORY MAP
```

Figure 6 shows the large amount of space used by the DOS and its file buffers. The default number of buffers, three, has been reserved and HIMEM has been reset to 38400.

For a more complex case, let's reserve the maximum number of file buffers, 16, drastically change the values of LOMEM and HIMEM, and run our same program again. Be aware that LOMEM: and HIMEM: are not legal Integer BASIC commands, but can be used with DOS.

```
INT
MAXFILES 16
LOMEM: 14000
HIMEM: 15000
10 A = 1
20 END
RUN
BRUN MEMORY MAP
```

The memory map in figure 7 shows that everything has been set as specified. Note the small amount of free space remaining.

### Applesoft Memory Maps

Applesoft stores everything quite differently than does Integer BASIC. To demonstrate, type FP to change languages and clear the preceding program, then call MEMORY MAP.

```
FP
CALL 13000
```

Figure 8 shows that the program storage area is now at the bottom of memory instead of at the top. With no program loaded, the program pointer starts at 2049 and the end of program pointer starts one or two bytes higher. LOMEM is set above the program. Location 2048 contains a "0" because each program line must be preceded by a zero.

In Applesoft, the variables, arrays, and strings are all stored in separate areas instead of in the one combined area used by Integer BASIC. We can see this by creating some simple examples and looking at the result with MEMORY MAP.

```
A = 1
DIM B(10)
C$ = "STRING"
CALL 13000
```

MEMORY MAP: INTEGER BASIC			
	DOS, FILES (3)	49152	\$C000
	PROGRAM	HM 38400	\$9600
HIRES		38386	\$95F2
24576 \$6000	FREE SPACE	36332	\$8DEC
16384 \$4000			
8192 \$2000	VARIABLES	2054	\$0806
	ARRAYS		
	STRINGS	LM 2048	\$0800

Figure 6: Integer BASIC map showing DOS and program.

MEMORY MAP: INTEGER BASIC			
	DOS, FILES (16)	49152	\$C000
	PROGRAM	HM 15000	\$3A98
HIRES		14986	\$3A8A
24576 \$6000	FREE SPACE	980	\$03D4
16384 \$4000			
8192 \$2000	VARIABLES	14006	\$36B6
	ARRAYS		
	STRINGS	LM 14000	\$36B0
		2048	\$0800

Figure 7: Integer BASIC map with changed LOMEM and HIMEM.



MEMORY MAP: APPLESOFT				
	DOS, FILES (3)	49152	\$C000	
		HM 38400	\$9600	
HIRES				
24576				
\$6000	FREE SPACE	36349	\$80FD	
16384				
\$4000				
8192				
\$2000				
		LM 2051	\$0803	
	PROGRAM			
		2049	\$0801	
		2048	\$0800	

Figure 8: Applesoft map with only the DOS in memory.

MEMORY MAP: APPLESOFT				
	DOS, FILES (3)	49152	\$C000	
		HM 38400	\$9600	
	STRINGS			
HIRES		38394	\$95FA	
24576				
\$6000	FREE SPACE	36267	\$80AB	
16384				
\$4000				
8192		2127	\$084F	
\$2000	ARRAYS			
		2065	\$0811	
	VARIABLES	LM 2051	\$0803	
	PROGRAM			
		2049	\$0801	
		2048	\$0800	

Figure 9: Applesoft map showing variable, array, and string areas.

Notice in figure 9 that the variables start at LOMEM. Applesoft variables are seven bytes long. The variable area contains 14 bytes, for A and C\$. Arrays in Applesoft can be multidimensional, so they are placed in a separate location above the variables. The array space is determined by rules given in the Applesoft reference manual, pages 119 and 137. The string variable C\$ is stored in the variable area with a pointer to the word "STRING" in the string area. Note that the string area contains exactly six characters.

Something interesting happens when you put the above statements into the form of an executable program. Clear the memory, type in the program, and look at its memory map to see that the program has indeed been stored. See figure 10.

```
FP
10 A = 1
20 DIM B(10)
30 C$ = "STRING"
CALL 13000
```

Now run the program and look at it again.

```
RUN
CALL 13000
```

Figure 11 shows that the variable area still contains 14 bytes, and that array B is still the same, but there is no string in the string area. This is because the letters of the string are contained in the program area, and the pointer in C\$ obtains the string from the program.

Whenever new characters are assigned to the same string variable, they are added to the string area even if they are the same as those already assigned to that variable. A clutter of old strings thus begins to form, known as the "garbage collection." Its formation can be demonstrated by entering the same statement several times.

```
FP
A$ = "STRING"
A$ = "STRING"
A$ = "STRING"
CALL 13000
```

Notice in figure 12 that there are now 18 bytes stored in the string area, even though only six of them are being used.

The variable area contains seven bytes for A\$, the one variable in use.

The Applesoft reference manual makes the following statement on page 53:

"Applesoft stores duplicate strings only once. That is, if A\$ = "PIPPIN" and B\$ = "PIPPIN" then the string "PIPPIN" will be stored only once."

Let's try it and see.

```
FP
A$ = "PIPPIN"
B$ = "PIPPIN"
CALL 13000
```

Figure 13 shows that there are 12 bytes in the string area instead of only six. If you enter the monitor mode and examine the variable area you will see that the two string variables point to different locations in the string area. This obviously indicates that Applesoft does *not* store duplicate strings only once.

The actual length of a program doesn't always correspond with the amount of memory required. Just because your program is short doesn't mean you have lots of memory left over. In Applesoft it is easy to create a multidimensional array which uses up all memory space in a 48K machine.

```
FP
DIM A(97,73)
BRUN MEMORY MAP
```

Figure 14 shows that there are only 80 free bytes remaining after dimensioning the array. To verify that MEMORY MAP is indeed providing accurate information, you can check the free space remaining by using the FRE(0) command.

```
PRINT FRE(0)
80
```

If you don't need to use floating point numbers, a good way to save array space is to define the array as an integer array.

```
FP
DIM A%(97,73)
BRUN MEMORY MAP
```

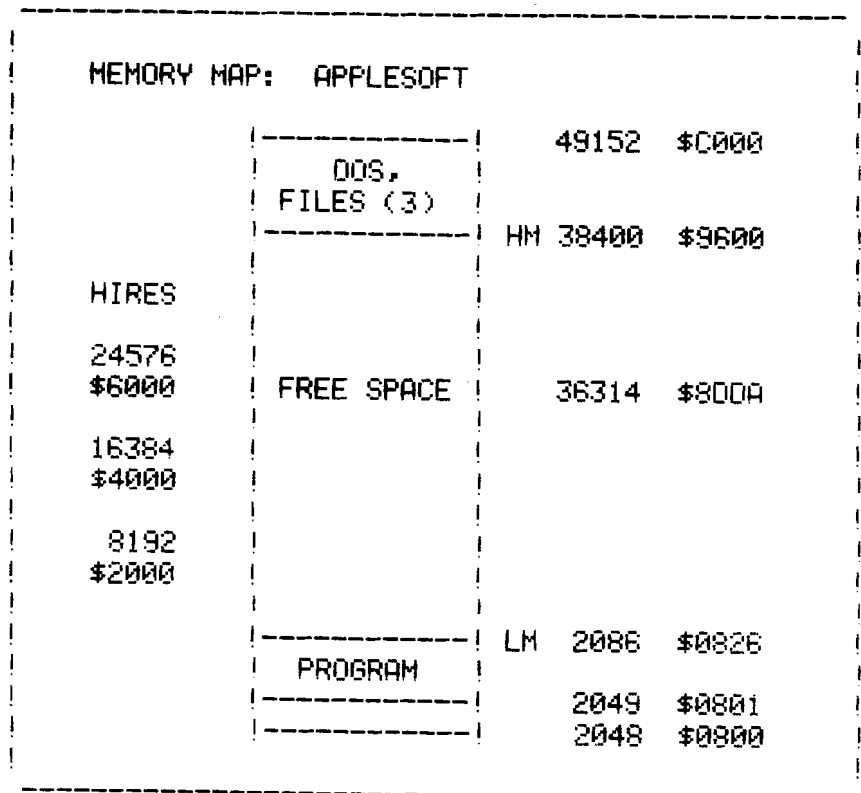


Figure 10: Applesoft map showing program area.

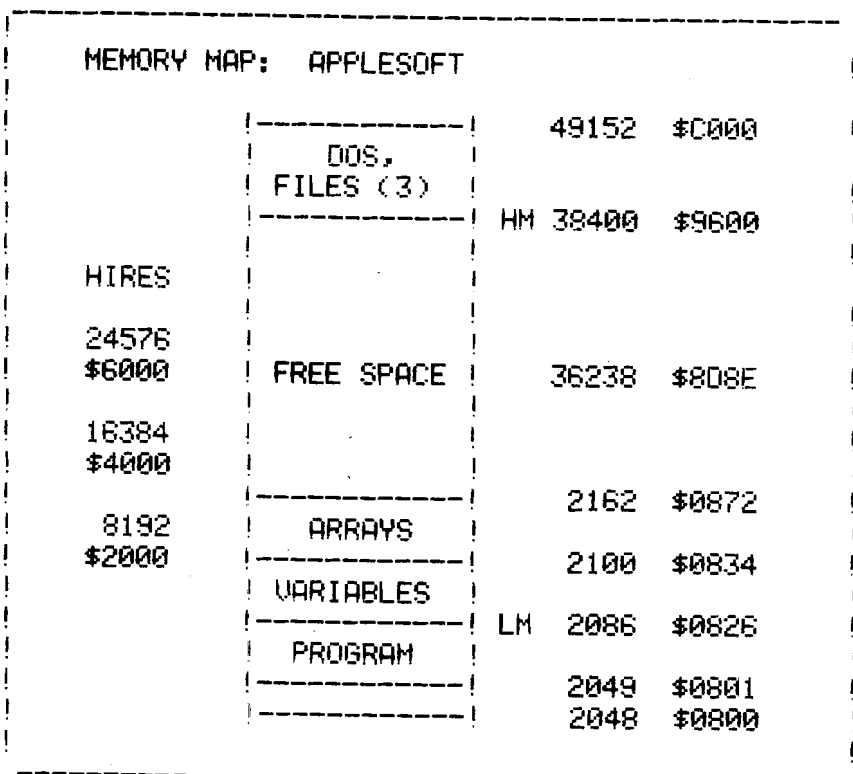


Figure 11: Applesoft map after running program.

MEMORY MAP: APPLESOFT			
	DOS, FILES (3)	49152	\$C000
	STRINGS	HM 38400	\$9600
HIRES		38382	\$95EE
24576 \$6000	FREE SPACE	36324	\$8DE4
16384 \$4000			
8192 \$2000	VARIABLES	2058	\$080A
	PROGRAM	LM 2051	\$0803
		2049	\$0801
		2048	\$0800

Figure 12: Applesoft map showing formation of "garbage collection" for one string variable.

MEMORY MAP: APPLESOFT			
	DOS, FILES (3)	49152	\$C000
	STRINGS	HM 38400	\$9600
HIRES		38388	\$95F4
24576 \$6000	FREE SPACE	36323	\$8DE3
16384 \$4000			
8192 \$2000	VARIABLES	2065	\$0811
	PROGRAM	LM 2051	\$0803
		2049	\$0801
		2048	\$0800

Figure 13: Applesoft map of two string variables with duplicate strings.

(continued)

Note the large difference in space required for the array in figure 15 as compared to the preceding one. The addition of a % sign saved 21,756 bytes!

If you don't have ROM Applesoft installed, you must load Applesoft into RAM from either cassette or disk. To demonstrate, turn off the computer and remove the Applesoft card. Turn the computer back on and load Applesoft from disk by typing FP. Then run MEMORY MAP to see where RAM Applesoft is stored.

```
Control B
PR#6
FP
BRUN MEMORY MAP
```

Figure 16 shows that RAM Applesoft is stored below the program area, and that it uses a large amount of space. By referring to the Hi-Res locations on the left, you can see that Hi-Res graphics' page one is not available when using RAM Applesoft.

For our final example, let's create the most complicated map possible by using RAM Applesoft, a different LOMEM and HIMEM, and all types of variables. I also tried to change MAXFILES, but it doesn't seem to work with RAM Applesoft. See figure 17.

```
LOMEM: 15000
HIMEM: 20000
A = 1
DIM B(10)
CS$ = "STRING"
CALL 13000
```

That concludes the examples. Next month's article will contain the Memory Map program listing and will describe how it works.

Lieutenant Colonel Pete Cook is a jet pilot instructor at Williams Air Force Base. He is assigned to the Air Force's Human Resources Laboratory, Operations Training Division, a large research facility for designing advanced aircraft simulations, and one of the largest computer complexes in Arizona.

This is his third article for MICRO.

**APPLE II  
SOFTWARE FROM  
POWERSOFT**

P. O. BOX 157  
PITMAN, NEW JERSEY 08071  
(609) 589-5500

**SUPER CHECKBOOK 3.0**—A vastly improved version of our popular selling program. With new features such as: simplified but powerful transaction entry and modification routines, new reconciliation routines, additional features such as 30 percent increase in the total number of checks handled, posting of interest from interest bearing checking accounts, automatic teller transactions, bullet proof error handling, and smart disk routines. Plus the program still contains the options of bar graphs, sorting, activities, and account status. . . . .  
Disk Only/Applesoft \$34.95

Of special interest to owners of older versions of the program is a limited trade-in period ending May 31, 1981. Trade-in value \$19.95 cassette \$24.95 diskette. Original tape or diskette must be returned to receive new version plus \$1.50 freight and the difference between \$34.95 and the trade-in value. A conversion program is included to convert data files to the new format.

**ADDRESS FILE GENERATOR**—Allows the user to create any number of four types of address files: Holiday, Birthday, Home and Commercial. The program contains a menu of seven major commands used to: Create, Add, Edit, Display, Search, Sort, and Reorganize Files. Up to three fields may be used for the sort criteria. Major commands have subordinate commands which adds to the flexibility of this powerful software system. We doubt you could buy a better program for maintaining and printing address files. . . . . Disk Only/Apple Printer Card/Applesoft \$24.95

**SPANISH VOCABULARY DRILL  
FRENCH VOCABULARY DRILL  
ITALIAN VOCABULARY DRILL  
GERMAN VOCABULARY DRILL**

These programs provide practice in foreign language vocabulary by means of three types of drills: *Matching, Foreign Language to English and English to Foreign Language*. Although the diskette comes with some lessons on it, these are intended to be samples. The most effective way to use these programs is to enter your own lessons from the course you are studying. To facilitate the entry of new lessons, each program contains a complete Lesson Editor which has various entry and revision options. The manual also contains instructions for converting the programs to other languages. . . . . Disk Only/ Applesoft each \$24.95

**SPACE TREK J**—Your mission is to patrol the galaxy, and to seek out and destroy the ships of the Klarian fleet. At your command is the starship Lexington. The Lexington has a wide variety of weapons, sensors and other devices useful in your mission. There are two kinds of Klarian ships Regular and Super. Regular Klarians have an average energy supply of 5000 to 12000 quarks while Super Klarians have 12500 to 15000 quarks and are protected from some of the Lexingtons' weapons and attack strategies. . . . .  
Disk Only/Applesoft \$19.95

**WORLD OF ODYSSEY**—An adventure game utilizing the full power of Disk II, which enables the player to explore 353 rooms on 6 different levels full of dragons, dwarfs, orcs, goblins, gold and jewels. The program allows the player to stop the game and to resume at a later time. . . . .  
Disk Only/Applesoft \$24.95

**GALACTIC EMPIRES**—Pits 1 to 20 players against each other and the computer in a struggle for control of up to 40 star systems. The players compete by sending out fleets of ships to capture neutral planets and to attack the colonies of other players. The victor is the player who controls the most stars by game's end. . . . .  
Applesoft \$14.95

Dealer Inquiries Invited  
Visa and MasterCard

**POWERSOFT**  
P. O. BOX 157  
PITMAN, NEW JERSEY 08071  
(609) 589-5500

MEMORY MAP: APPLESOFT

		49152	\$C0000
	DOS, FILES (3)		
		HM 38400	\$9600
HIRES			
24576			
\$6000	FREE SPACE	80	\$0050
16384			
\$4000			
8192		38320	\$95B0
\$2000	ARRAYS		
		LM 2051	\$0803
	PROGRAM		
		2049	\$0801
		2048	\$0800

Figure 14: Applesoft map of large floating point array.

MEMORY MAP: APPLESOFT

		49152	\$C0000
	DOS, FILES (3)		
		HM 38400	\$9600
HIRES			
24576			
\$6000	FREE SPACE	21836	\$554C
16384			
\$4000			
8192		16564	\$40B4
\$2000	ARRAYS		
		LM 2051	\$0803
	PROGRAM		
		2049	\$0801
		2048	\$0800

Figure 15: Applesoft map of large integer array.

MEMORY MAP: APPLESOFT

	DOS, FILES (3)	49152	\$C000
		HM 38400	\$9600
HIRES			
24576 \$6000	FREE SPACE	26109	\$65FD
16384 \$4000			
8192 \$2000			
	PROGRAM	LM 12291	\$3003
		12289	\$3001
	APPLESOFT	2048	\$0800

Figure 16: Applesoft map with RAM Applesoft loaded.

MEMORY MAP: APPLESOFT

	DOS, FILES (3)	49152	\$C000
		HM 38400	\$9600
		HM 20000	\$4E20
HIRES	STRINGS	19994	\$4E1A
24576 \$6000	FREE SPACE	4918	\$1336
16384 \$4000		15076	\$3AE4
	ARRAYS	15014	\$3AA6
8192 \$2000	VARIABLES	LM 15000	\$3A98
		12291	\$3003
	PROGRAM	12289	\$3001
	APPLESOFT	2048	\$0800

Figure 17: Applesoft map showing most complex case.



Fast, inherently structured, programming system ready for your APPLE II or II+ (24K).

Extensive, professional, 100 page bound documentation. Cleanly interfaced to DOS 3.2 or 3.3. Files are completely compatible with DOS or BASIC.

- Control C break and continue for reasonable debugging.
- Built-in, convenient editor.
- FORTH structured assembler.
- The best blend of FORTH and the APPLE's capabilities.
- Supports games, music, I/O, graphics, disk, tape.
- Supplied on APPLE diskette.
- Excellent for applications or systems programming.
- After two years, still \$49.95. Calif. residents add \$3.00 sales tax.

From your dealer or direct from:  
SOFTAPE, Dept. f,  
10432 Burbank Blvd.  
North Hollywood, CA 91601  
or Call: 1-213-985-5763

FOG-279 \$49.95

Master Charge/Visa Accepted.

Apple is a registered trademark of APPLE COMPUTER, INC.

MICRO™



# SYM Time-Remaining Timer

This program measures elapsed time and sounds an alarm when the preset limit is reached.

Ralph Orton  
16015 San Fernando Mission Blvd.  
Granada Hills, California 91344

Here's a neat little timer for a "barebones" 1K SYM that can satisfy a host of timing chores for you. Time phone calls, eggs, exercise sessions and contests. Don't miss TV shows, dates or appointments. My own most frequent use is to keep from "timing out" on the local amateur radio repeaters and thus I avoid the embarrassment associated with such a happening. Operating features include:

1. No peripherals required
2. Two modes of operation
3. Long timing internals (more than 4 days) with one second resolution
4. Positive status indications
5. Settable pre-time out warning
6. Ease of operation

Before entering into an explanation of timer operation, I would like to thank John Gieryc for his helpful article in the April, 1979 issue of *MICRO*; "SYM-1 6522-Based Timer." It was John's article that provided the heart of this timer.

Operation is straightforward. After entering the program, enter desired pre-time out warning (hours, minutes, seconds) and desired operating mode. These are entered sequentially in the order indicated above, starting at address "0000". For example, you have decided, as an exercise in self improvement, to restrict yourself to 10½ hours of TV per week. However, you're not crazy about the timekeeping involved

```

0800      1  ;*****
0800      2  ;*
0800      3  ;* TIME REMAINING TIMER
0800      4  ;*
0800      5  ;*   RALPH R. ORTON
0800      6  ;*
0800      7  ;*****
0800      8  ;
0800      9  ;FOR THE SYM-1
0800     10  ;SHOWS TIME REMAINING ON READOUT
0800     11  ;AND SOUNDS A SETTABLE WARNING.
0800     12  ;DISPLAYS READY WHENEVER TIMER
0800     13  ;IS STOPPED.
0800     14  ;
0800     15  ;TWO MODES OF OPERATION:
0800     16  ;"RESET" & "ACCUMULTE"
0800     17  ;
0800     18  ;LOAD TIMER INTERVAL AND WARNING
0800     19  ;TIME STARTING AT ADDRESS $0006. PRO-
0800     20  ;SHOWN. LOAD MODE AT $0006. PRO-
0800     21  ;GRAM STARTS AT $0200.....
0800     22  ;
0800     23  HRSSET EPZ $00           ;SET HOURS HERE
0800     24  MINSET EPZ $01         ;SET MINUTES HERE
0800     25  SECSET EPZ $02         ;SET SECONDS HERE
0800     26  HRSWAR EPZ $03        ;WARNING HOURS HERE
0800     27  MINWAR EPZ $04        ;WARNING MINUTES HERE
0800     28  SECWAR EPZ $05        ;WARNING SECONDS HERE
0800     29  MODE EPZ $06          ;"AC" = ACCUMULATE
0800     30  HRSREM EPZ $07        ;CURRENT HOURS HERE
0800     31  MINREM EPZ $08        ;CURRENT MINUTES HERE
0800     32  SECREM EPZ $09        ;CURRENT SECONDS HERE
0800     33  FRACNT EPZ $0A        ;20THS OF A SECOND ARE HERE
0800     34  DISPIN EPZ $0B       ;INPUT FOR "LODISP" SUBROUTINE
0800     35  DISPOP EPZ $0C        ;STORAGE FOR "LODISP" SUBROUTINE

0800     36  ;
0800     37  ; MONITOR SUBROUTINES:
0800     38  ;
0800     39  NIBASC EQU $8309
0800     40  INSTAT EQU $8386
0800     41  DELAY EQU $835A
0800     42  SCAND EQU $8906
0800     43  BEEP EQU $8972
0800     44  OUTDSP EQU $89C1
0800     45  ACCESS EQU $8B86
0800     46  ;
0800     47  DISBUF EQU $A640
0800     48  TV EQU $A656
0800     49  ;
0010     50  DATA ORG $0010
0010     51  ;
0010     52  BYT $50           ;R THESE ARE SEGMENT
0011     53  BYT $79           ;E CODES FOR "READY"
0012     54  BYT $77           ;A
0013     55  BYT $5E           ;D
0014     56  BYT $6E           ;Y
0015     57  BYT $00           ;SPACE
0016     58  ;
0200     59  TIME1 ORG $0200
0200 20868B START JSR ACCESS
0203 F8 SED
0204 A900 RESET LDA #$00           ;INITIALIZE FRACTION
0206 850A STA FRACNT             ;COUNTER
0208 A500 LDA HRSSET
020A 8507 STA HRSREM           ;TRANSFER TIME SET
020C A501 LDA MINSET         ;VALUES TO TIME
020E 8508 STA MINREM        ;COUNT LOCATIONS
0210 A502 LDA SECSET
0212 8509 STA SECREM
0214 A904 LDA #$04           ;INITIALIZE MODE OF OPER-
0216 8D7902 STA STOMOD+1     ;ATION TO RESETABLE..
0219 78 CONTIN SEI           ;INHIBIT INTERRUPTS
021A A205 LDX #$05
021C B510 LODI LDA $10,X
021E 9D40A6 STA DISBUF,X    ;LOAD DISPLAY:BUFFER
0221 CA DEX                 ;WITH "READY"...
0222 10F8 BPL LODI

```

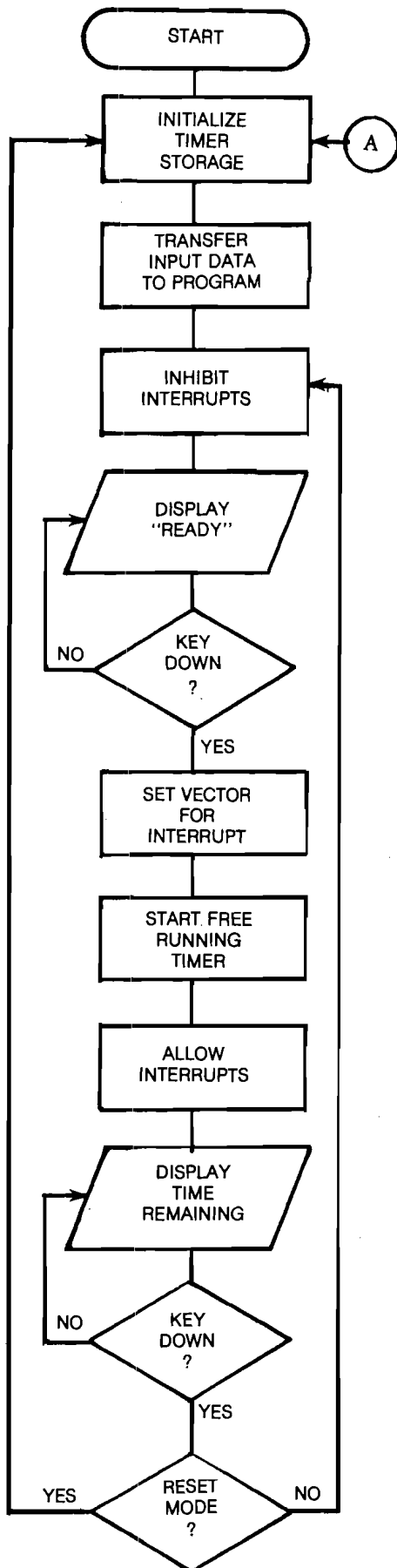


Figure 1: Main Routine

```

0224 200689 78 SHORDY JSR SCAND ;SHOW "READY"
0227 208683 79 JSR INSTAT ;CHECK FOR KEY DOWN
022A 90F8 80 BCC SHORDY ;IF KEY NOT DOWN, SHOW "READY"..
022C A900 81 LDA #000
022E 8D7EA6 82 STA SA67E ;LOAD IRQ VECTOR
0231 A903 83 LDA #030 ;WITH ADDRESS 0300
0233 8D7FA6 84 STA SA67F
0236 A9C0 85 LDA #0C0 ;LOAD IER VECTOR
0238 8D0EA0 86 STA SA00E ;LOAD IFR REGISTER
023B ADD0DA 87 LDA SA00D
023E 29BF 88 AND #0BF
0240 8D0DA0 89 STA SA00D ;SET TIMER FOR
0243 A9C0 90 LDA #0C0 ;FREE RUN MODE,
0245 8D0BA0 91 STA SA00B ;THEN..
0248 A950 92 LDA #050 ;LOAD HIGH & LOW ORDER
024A 8D06A0 93 STA SA006 ;COUNTER LATCHES TO
024D A9C3 94 LDA #0C3 ;GIVE 50MS INTERRUPT
024F 8D05A0 95 STA SA005
0252 58 96 CLI
0253 A507 97 LOAD LDA HRSREM ;GET
0255 850B 98 STA DISPIN ;AND
0257 206E03 99 JSR LODISP ;LOAD
025A A508 100 LDA MINREM ;TIME
025C 850B 101 STA DISPIN ;REMAINING
025E 206E03 102 JSR LODISP ;INTO DISPLAY BUFFER
0261 A509 103 LDA SECREM ;HRS.
0263 850B 104 STA DISPIN ;MIN.
0265 206E03 105 JSR LODISP ;SEC.
0268 A9AC 106 LDA #0AC ;DETERMINE MODE SELECTED
026A C506 107 CMP MODE ;AND
026C F00D 108 BEQ SETMOD ;CHANGE IF REQUIRED.
026E A904 109 SHOW LDA #004 ;DISPLAY TIME REMAINING
0270 8D56A6 110 STA TV ;UNTIL INTERRUPTED
0273 205A83 111 JSR DELAY ;OR KEY IS DOWN
0276 90DB 112 BCC LOAD
0278 4C0402 113 STOMOD JMP RESET ;04 MAY BE CHANGED TO 19
027B A919 114 SETMOD LDA #019 ;UNDER PROGRAM CONTROL,
027D 8D7902 115 STA STOMOD+1 ;DEPENDS ON MODE.
0280 4C6E02 116 JMP SHOW
0283 207289 117 WARN JSR BEEP ;BEEPER ROUTINE
0286 207289 118 JSR BEEP ;FOR WARNING
0289 207289 119 JSR BEEP
028C 207289 120 JSR BEEP
028F 207289 121 JSR BEEP
0292 60 122 RTS
0293 207289 123 TIMEOUT JSR BEEP ;BEEP!
0296 124 ;
0296 208683 125 JSR INSTAT ;CHECK FOR KEY DOWN
0299 90F8 126 BCC TIMEOUT ;IF NO KEY DOWN, BEEP AGAIN
029B 4C0002 127 JMP START ;IF KEY DOWN, JUMP TO START
029E 128 ;
029E 129 ;
0300 130 TIMER ORG $0300
0300 08 131 PHP ;INTERRUPT ROUTINE
0301 48 132 PHA ;STARTS HERE SO
0302 8A 133 TXA ;SAVE IMPORTANT
0303 48 134 PHA ;REGISTERS
0304 98 135 TYA
0305 48 136 PHA
0306 E60A 137 INC FRACNT ;INCREMENT FRACTIONS
0308 A50A 138 LDA FRACNT ;OF A SECOND COUNTER
030A C914 139 CMP #014 ;IF FULL SECOND IS
030C F003 140 BEQ REFRAC ;NOT UP YET JUMP TO
030E 4C6403 141 JMP ENDINT ;END INTERRUPT ROUTINE
0311 A900 142 REFRAC LDA #000
0313 850A 143 STA FRACNT ;AFTER RESETTING FRACTION
0315 38 144 SEC ;COUNTER SUBTRACT
0316 A509 145 LDA SECREM ;ONE SECOND FROM TIME
0318 E901 146 SBC #001 ;REMAINING. IF NOT TIME
031A 8509 147 STA SECREM ;TO SUBTRACT 1 MINUTE
031C C999 148 CMP #099 ;GOTO "CHKEND"
031E D01A 149 BNE CHKEND ;ROUTINE
0320 A959 150 LDA #059 ;ONE MINUTE HAS ELAPSED
0322 8509 151 STA SECREM ;SO RESET SECONDS TO 59
0324 38 152 SEC
0325 A508 153 LDA MINREM ;SUBTRACT 1 MINUTE
0327 E901 154 SBC #001 ;TIME REMAINING
0329 8508 155 STA MINREM ;IF NO TIME TO SUBTRACT
032B C999 156 CMP #099 ;ONE HOUR....
032D D00B 157 BNE CHKEND ;GOTO "CHKEND" ROUTINE
032F A959 158 LDA #059 ;ONE HOUR HAS ELAPSED
0331 8508 159 STA MINREM ;SO RESET MINUTES TO 59
0333 38 160 SEC
0334 A507 161 LDA HRSREM
0336 E901 162 SBC #001 ;SUBTRACT 1 HOUR FROM
0338 8507 163 STA HRSREM ;TIME REMAINING
033A A507 164 CHKEND LDA HRSREM ;IF HRS., MIN. AND
033C C900 165 CMP #000 ;SEC. ARE ALL ZERO
033E D00F 166 BNE CHECK ;THEN TIMER HAS TIMED OUT
0340 A508 167 LDA MINREM
0342 C900 168 CMP #000
0344 D009 169 BNE CHECK ;IF NO TIME OUT
0346 A509 170 LDA SECREM ;HAS OCCURRED GO TO
0348 C900 171 CMP #000 ;CHECK AND DETERMINE
034A D003 172 BNE CHECK ;IF TIME FOR WARNING
034C 4C9302 173 JMP TIMEOUT ;IS TO BE SOUNDED
034F A505 174 CHECK LDA SECWAR ;COMPARE WARNING HR/MIN/SEC

```



```

0351 C509 175      CMP SECREM      ;TO TIME REMAINING HR/MIN/SEC
0353 D00F 176      BNE ENDINT     ;IF NOT A MATCH, GOTO
0355 A504 177      LDA MINWAR     ;END INTERRUPT ROUTINE
0357 C508 178      CMP MINREM
0359 D009 179      BNE ENDINT
035B A503 180      LDA HRSWAR
035D C507 181      CMP HRSREM
035F D003 182      BNE ENDINT
0361 2083C2 183    JSR WARN
0364 AD04A0 184    ENDINT LDA SA004      ;SOUND A WARNING
0367 68 185        PLA              ;RESET TIMER INTERRUPT FLAG
0368 A8 186        TAY              ;RESTORE
0369 68 187        PLA              ;ALL
036A AA 188        TAX              ;PREVIOUSLY
036B 68 189        PLA              ;SAVED
036C 28 190        PLP              ;REGISTERS
036D 40 191        RTI              ;AND
036E A50B 192    LODISP LDA DISPIN    ;RETURN FROM INTERRUPT...
0370 850C 193    STA DISPOP          ;GET DIGITS TO BE
0372 6A 194        ROR              ;DISPLAYED AND SAVE
0373 6A 195        ROR              ;FOR LATER RECALL.
0374 6A 196        ROR              ;POSITION MSD FOR CONVERSION
0375 6A 197        ROR              ;TO ASCII
0376 200983 198    JSR NIBASC
0379 20C189 199    JSR OUTDSP        ;LOAD DIGIT
037C A50C 200    LDA DISPOP          ;GET OTHER DIGIT AND CONVERT
037E 200983 201    JSR NIBASC        ;TO ASCII....
0381 20C189 202    JSR OUTDSP        ;THEN LOAD DIGIT
0384 60 203        RTS              ;RETURN FROM SUBROUTINE....

```

in such an effort. So, you guessed it, here comes the SYM Timer. Starting at address "0000" you punch in "10" "30" "00". Then to provide a one-hour warning you continue with "01" "00" "00". At this point you are ready to select mode of operation.

By entering "AC" you will select the "Accumulative" mode of operation. In this mode you can "start" and "stop" the timer as often as required. The timer will continue timing at each "start" from where it was last stopped. If you had entered anything other than "AC" you would have selected the "Resettable" mode of operation. In this mode each "start" causes the timer to begin again from the original timer interval you set.

With a simple "Go" "200" "CR" SYM displays "ready". To start the timer press any key and time remaining is displayed. To stop the timer once more press any key and "ready" is displayed again.

When the timer reaches the pre-time out warning the beeper will sound momentarily, and when time out occurs, the beeper will sound continuously until it is reset by pressing any key.

Well that's it—maybe! I keep fighting off the urge to toss in more and more. For instance, how about a 1 year timer that reads out "Hrs x 100" "Hrs." "Min."? Or if that's a little ridiculous, then maybe one that displays "days" "hrs." "min." for in excess of 3 months of timing. Then of course we could have an option to display elapsed time as well as time remaining. I don't suppose it would be too difficult to toss in a 24 hour clock while we're at it. Of course it would have to operate simultaneously with all the other options.

So on and on it goes. For now, however, I will leave it to others to perfect the *ultimate* time machine.

MICRO™

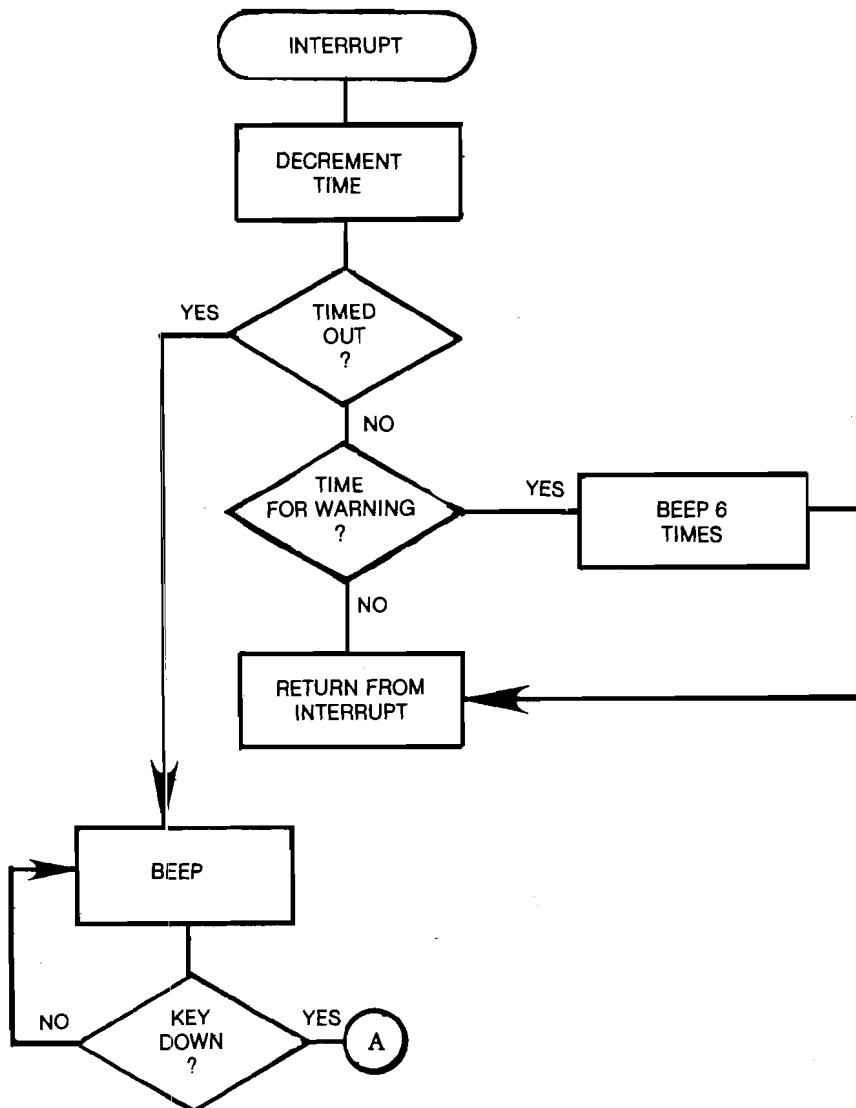


Figure 2: Interrupt Routine

**GET FREE ADS ON TV!**

How? Use our ADVERTISING SOFTWARE! You put it in the APPLE and produce colorful, dynamic ads on the screens of TV sets in your shop window. Even if you are not a shop owner, you can use this software to broadcast messages on TV screens in schools, hospitals, factories, etc. The following message-making programs are available.

**SUPER MESSAGE:** Creates messages in full-page "chunks". Each name allows statements of mixed typstyles, typesizes and colors, in mixed upper & lower case. Five typstyles are available. They range from regular APPLE characters, up to double-size, double-width characters with a heavy, bold font. Six colors may be used for each different typstyle. Vertical & horizontal centering are available, and word-wrap is automatic. Users can chain pages together to make multi-page messages. Pages can be advanced manually or automatically. Multi-page messages can be stored to disc or recalled instantly.

REQUIRES 48K & ROM APPLESOFT ..... \$ 50.

**MULTI-MESSAGE with INTERLEAVED COLOR PATTERNS:** Up to 10 messages can be run in sequence. Colorful, dynamic patterns (kaleidoscope or abstract art) can be interleaved between messages, at user option. Consists of 28 crisp, readable characters/line X 4 lines/page X 3 pages of text per message. Characters are 1/8 screen-height and "puff" onto the screen at comfortable reading speed.

REQUIRES 32K & INTEGER BASIC ..... \$ 35.

**HI-RES ALPHANUMERIC MESSAGE:** Same as Multi-Message above, but has only one message/set and no interleaved color-patterns. Still very good general message-maker!

**THE SCROLLING WONDER:** 4 brief messages appear in APPLE uppercase characters by "floating" onto the screen from below. Messages enter in random sequence, with random 50% of messages "flash". A multiple-rainbow grand finale ends the program. Very good program to run at point of purchase.

**GIANT LETTER:** Brilliantly-colored letters, of full screen height, appear one-at-a-time, in sequence, to spell out messages. Successive words have different colors. A running summary of letters, in APPLE characters, appears in the bottom 4 lines of the screen, as the giant letters are presented. Very good program for shop windows.

ALL 3 ABOVE TOGETHER, ON DISK, FOR 32K, INTEGER BASIC ..... \$ 30.

LET APPLE PLOT YOUR DATA AND KEEP YOUR RECORDS TOO!

**APPLE DATA GRAPH 2.1:** Plots up to 3 superimposed curves on the HI-res Screen both the X & Y axes dimensioned. Each curve consists of up to 120 pieces of data. Graphs can be stored to disc and recalled immediately for updating. Up to 100 graphs can be stored on the same disc. Great for Stock-market Charting, Business Management, and Classroom Instruction!

REQUIRES 48K & ROM APPLESOFT ..... \$ 40.

**APPLE RECORD MANAGER:** Allows complete files to be brought into memory so that record searches and manipulations are instantaneous. Records within any file can contain up to 20 fields, with user-defined headings. Information can be string or numeric. Users can browse thru files using page-forward, page-backward or random-search commands. Records can easily be searched, altered or sorted at will. Files can be stored on the same drive as the master program, or on another, if a second drive is available. Records or files can be printed, if desired. Additional modules coming are a STATISTICS INTERFACE, CHECKBOOK, MAILING LIST & DATA-ENTRY.

REQUIRES 48K & ROM APPLESOFT ..... \$ 35.

\* All Software above on Disk for APPLE DOS 3.2

**GET FREE SOFTWARE TOO!**

How? Order any of the items below, and for each \$100 worth of merchandise ordered, we will give you one of the items at left for FREE!

**APPLE ADD-ONS**

HAYES MICROMODEM for APPLE .....	\$ 300.
Z80 SOFTCARD by MICROSOFT .....	\$ 275.
16K RAMCARD by MICROSOFT .....	\$ 159.
FORTRAN for APPLE by MICROSOFT .....	\$ 159.
COBOL for APPLE by MICROSOFT .....	\$ 599.
BASIC Compiler for APPLE by MICROSOFT .....	\$ 315.

**PRINTERS**

CENTRONICS 737 (3 mo. warranty) .....	\$ 795.
CENTRONICS 737 (15 mo. warranty) .....	\$ 915.
EPSON TX-80 with TRACTORS & GRAPHICS .....	\$ 645.
EPSON MX-80 with TRACTORS & 132 Columns .....	\$ 515.
PAPER TIGER 480G with GRAPHICS & 2K Buffer .....	\$ 1135.
PAPER TIGER 445G with GRAPHICS & 2K Buffer .....	\$ 749.

**WORD PROCESSING**

EZ WRITER PROFESSIONAL SYSTEM for APPLE .....	\$ 239.
EZ MAILER (Interfaces to EZ WRITER above) .....	\$ 65.
VIDEX VIDEOTERM (80-Column Card for APPLE) .....	\$ 295.
VIDEX VIDEOTERM (Same as above with GRAPHICS) .....	\$ 320.
SUPR'TERM (80-Column Card for APPLE) .....	\$ 320.

**BUSINESS PROGRAMS for APPLE & TR-80 by SPECTRUM SOFTWARE**

**MICROACCOUNTANT:** An ideal package for the very small business, based upon classic T-accounts & Double-Entry Bookkeeping. This efficient program records and produces reports on account balances, general ledger journals, revenues & expenses, 40-column or screen reports. Handles up to 1000 journal entries/month, for up to 300 accounts. Includes a short primer in Financial Accounting.

REQUIRES 48K & ROM APPLESOFT ..... \$ 49.

**BUSINESS CHECK-REGISTER with BUDGET:** Unique system allows setting up pre-defined purpose & recipient accounts (50 each). Supports unique names too. Rapid-access to check-files with scrolling display & 40-col. printout, if desired. Up to 100 checks/mo. + reconciliation + AUTOMATIC BUDGET VARIANCES!

REQUIRES 48K & APPLESOFT ROM ..... \$ 49.

**STOCK MARKET**

STOCK MARKET ANALYSIS for APPLE by GALAXY ..... \$ 49.

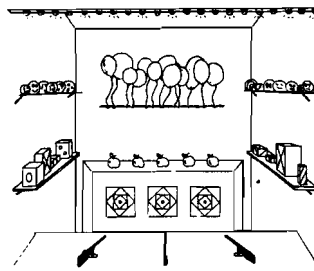
COD'S & Personal Checks are Welcome!

**CONNECTICUT INFORMATION SYSTEMS CO.**  
218 Huntington Road, Bridgeport, CT 06608 (203) 579-0472

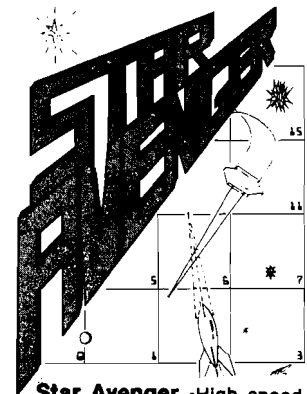


**Asteron** - The definitive hi-res implementation of the Asteroids arcade game. Features: Ship movement, hyper-space, alien saucers, sound effects, graphic routines allowing up to 25 objects to be displayed with real time response. Played from paddles or keyboard. **\$27.50**

**APPLE ARCADE**



**Shooting Gallery** - A real time simulation of a midway arcade. Features: row targets, pop targets, different skill levels, and bonus time. May be played using either game paddles or joy sticks. **\$22.50**



**Star Avenger** - High speed guerrilla warfare in space pitting you against your Apple. Featuring a new universe each game and varying skill levels. Universe consists of 16 hi-res screens with instantaneous crossover. **\$27.50**

**Available Now!**  
**MultiBoot™ Upgrade**

Have you not wished that your Basic software would work in both DOS 3.2 and DOS 3.3? Tired of spending hours "Muffin"ing your old programmes? Now your problems are solved with MultiBoot™ Upgrade. Upgrade a whole disc in just seconds and use your disc on any of DOS 3.3, DOS 3.2 and the Language Card.

**\$50.00**

*All Western MicroData game software is written in assembly language for maximum speed. All programmes require 48K and DISK DRIVE and will work on standard Apple II, Apple II plus, and Pascal systems, with either DOS 3.2 or DOS 3.3.*

**Western MicroData Enterprises Ltd.**

P.O. Box G33, Postal Station G  
Calgary, Alberta  
Canada T3A 2W1  
1-403-247-1621

For U.S. and foreign orders, prices are in U.S. dollars. For Canadian orders, prices are in Canadian dollars. Send cheque or Postal Money Order only. Allow 3-4 weeks for cheque to clear if not certified and allow up to 4 weeks for delivery.

Dealer and Computer Club enquiries invited.

Apple is a registered trademark of Apple Computer Inc.  
Disk II is a registered trademark of Apple Computer Inc.



# REAL TIME SAVER

Minutes are money. So, when it's possible to easily handle many times your workload, with better results, you're on to something.

And, that something is Programma's versatile and powerful Word Processing System. Because it's designed from the user's viewpoint, it's easy to work with. You can start right out doing basic word processing. And, since each step logically leads to the next, you'll be handling even complex work problems in a very short time.

Our WPS consists of two superior programs, Apple PIE (Programma Improved Editor) and FORMAT. PIE is a free-form, live-screen-oriented editor, for creating and editing text for processing. The commands let you enter or alter anything, anywhere on your screen. You can search and replace, add, delete, move, or insert, by character, word, line or paragraph. And you know what's happening, as you see it right on the screen. PIE also allows use of a lower case adapter, and can even be used as a software development tool.

The other half of our real time saver is FORMAT. It uses simple, embedded codes to set formats for letters, manuals, scripts, documents or catalogs to your specifications.

You want this centered?... that underlined?... those areas indented?... something paragraphed? You make the decisions, FORMAT does the work immediately, accurately. Then, if before printing, you want to revise copy, or change a document's final appearance, you can do it with ease. FORMAT is very forgiving!

To make the most of your time, order today. Our WPS for the 32K Apple II, on mini-floppies, with thorough documentation, is now just \$129.95. At your local computer store. Or direct from Programma, 2908 No. Naomi Street, Burbank, CA 91504. (213) 954-0240.

**PROGRAMMA'S  
WORD PROCESSING SOFTWARE  
FOR THE  
APPLE II\***

**PROGRAMMA  
INTERNATIONAL, INC**

\* Apple II is a trademark of Apple Computer, Inc.

# consumer computers

formerly Computers 'R' Us

# mail order



OPEN EVERY DAY 9 to 6 PST

California, Alaska & Foreign orders (714) 698-8088  
 Shipping Information or Backorders call (714) 698-0260  
 Service Center and for Technical Information (714) 460-6302

ORDER TOLL FREE

## 800-854-6654



ALL EQUIPMENT IS  
FCC APPROVED.



APPLE II PLUS 16K ..... 1049  
 APPLE II PLUS 48K  
 (APPLE Memory) ..... 1189  
 APPLE II Standard Models... CALL  
 DISK II DRIVE & CONTROLLER. 529  
 This model includes DOS 3.3 16 sector

**TOP FIVE SELLERS**

Language System w/Pascal ..... 425  
 Silentye Printer w/Interface ..... 549  
 Hayes Micromodem II ..... 319  
 Videx Videoterm 80 w/graphics ..... 335  
 Z-80 Microsoft Card ..... 299

**APPLE COMPUTER INC.**

Disk II Drive Only ..... 445  
 Integer or Applesoft II Firmware Card ..... 155  
 Graphics Tablet ..... 649  
 Parallel Printer Interface Card ..... 155  
 Hi-Speed Serial Interface Card ..... 155  
 Smarterm 80 Column Video Card ..... 335

**MOUNTAIN COMPUTER INC.**

Music System (16 Voices) ..... 479  
 A/D + D/A Interface ..... 319  
 Expansion Chassis ..... 555  
 Intral/X-10 System ..... 249  
 Clock/Calendar Card ..... 239  
 SuperTalker SD-200 ..... 249  
 Romplus+ Card ..... 135  
 Romwriter Card ..... 155

**CALIFORNIA COMPUTER SYSTEMS**

Clock/Calendar Module ..... 109  
 GPIB IEEE-488 Card ..... 259  
 Asynchronous Serial Interface Card ..... 129  
 Centronics Parallel Interface Card ..... 99  
 We carry all CCS hardware. Please call

**MISC. APPLE HARDWARE**

16K Ram Card Microsoft ..... 189  
 ADT Numeric Keypad (old or new hybrid) ..... 115  
 ALF 3 Voice Music Card ..... 229  
 Alpha Syntauri Keyboard System ..... 1399  
 Corvus 10MB Hard Disk ..... CALL  
 Lazer Lower Case Plus ..... 50  
 Micro-Sci Disk Drives ..... CALL  
 SSM AIO Serial/Parallel Card AGT ..... 189  
 Sup-R-Terminal 80 Cal. Card ..... 339  
 SVA 8 inch Floppy Disk Controller ..... 345  
 Versawriter Digitizer Pad ..... 229

WE HAVE MANY MORE ACCESSORIES  
FOR THE APPLE II IN STOCK—  
PLEASE CALL OR WRITE FOR A PRICE LIST.



ATARI

MODEL  
800 16K  
\$799



Atari 400 16K ..... 499  
 810 Disk Drive ..... 499  
 410 Program Recorder ..... 69  
 850 Interface Module ..... 175  
 822 Thermal Printer (40 col) ..... 369  
 825 Printer (80 col) ..... 795  
 Atari 16K Ram Module ..... 155  
 Atari Light Pen ..... 65

We stock all Atari accessories & software, please call for more info.

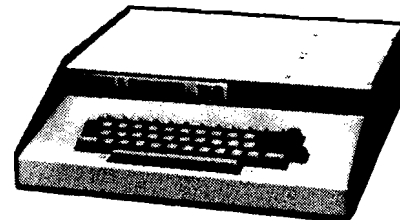
## PRINTERS

Anadex DP-9500 W/2k Buffer ..... 1375  
 Anadex DP-9501 W/2K Buffer ..... 1450  
 C. Itoh Starwriter 25 CPS ..... 1750  
 C. Itoh Starwriter 45 CPS ..... 2450  
 Centronics 737 ..... 825  
 Epson MX-70 W/Graphics ..... 449  
 Epson MX-80 132 Cal. ..... 620  
 Paper Tiger IDS-445 W/Dot Plot ..... 749  
 Paper Tiger IDS-460 W/Dot Plot ..... 1195  
 Paper Tiger IDS-560 W/Dot Plot ..... 1495  
 Gume Sprint 5/45 Daisywheel ..... 2550  
 Silentye w/Interface for Apple II ..... 549  
 Waranabe Digiplot ..... 1295

## VIDEO MONITORS

Amdex/Leedex Video-100 12" BGW ..... 139  
 Hitachi 13" Color ..... 389  
 NEC 12" P31 Green Phosphor ..... CALL  
 Panacolor 10" Color ..... 375  
 Sanya 9" BGW ..... 179  
 Sanya 12" BGW ..... 255  
 Sanya 12" P31 Green Phosphor ..... 295  
 Sanya 13" Color ..... 445

## DINO SCIENTIFIC



Challenger 4P ..... 699  
 C4PMF (Mini Floppy System) ..... 1599  
 CIP Model II ..... 449  
 Sargon II (Disk or Cassette) ..... 35  
 Fig Forth (Disk Only) ..... 69

## APPLE SOFTWARE

DOS Toolkit ..... 65  
 Appleplot ..... 60  
 Tax Planner ..... 99  
 Apple Writer ..... 65  
 Apple Post ..... 45  
 D.J. Portfolio Evaluator ..... 45  
 D.J. News & Quotes Reporter ..... 85  
 Apple Fartran ..... 165  
 Apple Pilot ..... 129  
 DOS 3.3 Upgrade ..... 49  
 Music Theory ..... 45  
 The Controller Bus. Sys ..... 519

**MISC. APPLICATIONS PACKAGES**

Visicalc ..... 125  
 Desktop Plan II ..... 169  
 CCA Data Management DMS ..... 85  
 Easywriter Word Processor ..... 225  
 ASCII Express ..... 65  
 Super Text II ..... 139  
 Programmo Apple Pie ..... 119  
 The Lordlord Apt. Mgmt. Pkg ..... 649  
 Peachtree Business Software ..... CALL  
 Tax Preparer by HowardSoft ..... 89  
 Applebug Assem/Disasm/Editor ..... 75  
 J-D Graphics By Bill Dudge ..... 53

**GAMES**

Flight Simulator ..... 34  
 The Wizard and The Princess ..... 32  
 Cosmos Mission (Space Invaders) ..... 24  
 Sargon II Chess ..... 32  
 Hi-Res Football ..... 39  
 Adventure by Microsoft ..... 27  
 Phantoms Five ..... 39  
 Reversal (Othello) ..... 34

PLEASE CALL OR WRITE  
FOR A COMPLETE  
SOFTWARE LIST.

ORDERING INFORMATION: Phone Orders invited using VISA, MASTERCARD, AMERICAN EXPRESS, DINERS CLUB, CARTE BLANCHE, or bank wire transfer. Credit cards subject to service charge: 2% for VISA & MC, 5% for AE, DC & CB. Mail Orders may send credit card account number (include expiration date), cashiers or certified check, money order, or personal check (allow 10 days to clear). Please include a telephone number with all orders. Foreign orders (excluding Military PC's) add 10% for shipping all funds must be in U.S. dollars. Shipping, handling and insurance in U.S. add 3% (minimum \$4.00). California residents add 6% sales tax. We accept COD's under \$500. OEM's, Institutions & Corporations please send for written quotation. All equipment is subject to price change and availability without notice. All equipment is new and complete with manufacturer warranty (usually 90 days). We cannot guarantee merchantability of any products. We ship most orders within 2 days.

WE ARE A MEMBER OF THE BETTER BUSINESS BUREAU AND THE CHAMBER OF COMMERCE  
SHOWROOM PRICES MAY DIFFER FROM MAIL ORDER PRICES.

PLEASE SEND ORDERS TO:

CONSUMER COMPUTERS MAIL ORDER 8314 PARKWAY DRIVE, GROSSMONT SHOPPING CENTER NORTH LA MESA CALIF. 92041

# Oh No — It's Garbage Collect!

**This article describes Garbage Collect in Microsoft's 6502 BASIC. The worst case is described, and a few suggestions made on how to avoid it.**

Gordon A. Campbell  
36 Doubletree Road  
Willowdale, Ontario  
M2J 3Z4

I was really pleased! The simple text editor worked well. It even had a fancy quasi-INPUT routine, just like CURSOR. And it only took a couple of days to develop, since it was written entirely in BASIC. Now to get on with some articles.

The first opus went well. After several input sessions, I ran a full draft. All the changes were going well, when suddenly, right in the middle of entering a command, the PET went dead. Pushing the STOP key did nothing, so I sat back to consider my sins. After a minute, the cursor returned, and the editor was again working.

The light came on. I was the victim of the dreaded garbage collect.

Garbage collect is the compression of string space. In Microsoft's 6502 BASIC, string contents are placed at the top of memory, working down. When a string is assigned a new value, it is placed below all previous strings. At some point, memory is filled, so garbage collect squishes all the strings back up to the top. It may also be forced, by using FRE(0).

The following one-liner provides the basis for some experiments:

```
5 N = 1000:  
B$ = CHR$(1):  
DIM A$(N):
```

```
FOR J = 0 TO N:  
A$(J) = B$:  
NEXT:  
A$(0) = "B":  
T = TI:  
PRINT FRE(0) TI-T
```

The program sets up bunches of strings, changes the first one, and forces garbage collect while printing the time required. (The CHR\$ is required since assigning a string a literal value results in the string pointer pointing at the literal in the program, rather than use of string space.)

Changing N showed that the number of strings has a roughly exponential effect on the time required. Changing the size of B\$ showed that the number of characters in the strings has no apparent effect on the time.

To find the worst case, some swift calculation shows that N can be set to 7908, and garbage collect takes 84 minutes and 13 seconds. But we can go higher. Drop the start-of-BASIC down to the first cassette buffer, and raise the top-of-memory to the end of the screen. Now N can be set to 8261, for a time of 91 minutes and 56 seconds!

How about other machines? A call to a friend showed that Applesoft is compatible with the PET. The only difference is the 10% that the PET spends looking at the keyboard and cassettes, and updating the clock. Down at our neighborhood Radio Shack we found that string space must be reserved with a 'CLEAR n' command. There is no apparent time spent in garbage collect, but there is a value for the CLEAR command which seems to crash the system, so that may be it. Presumably the Atari with its fixed-length strings doesn't create garbage in the first place.

Published information indicates that the latest PET ROM-set does garbage collect much more quickly. In a classic trade-off of speed versus memory, it also takes two bytes more

per string. The ways to reduce garbage collect are fairly obvious: don't have more strings than are absolutely required. For example:

1. Re-use work variables.
2. Use numbers rather than strings for switches.
3. Put literals right into PRINT statements rather than use constant strings.
4. Try to create the most stable strings first.
5. Avoid loops which create a string by concatenating a character at a time onto the string.
6. Apply the usual techniques to keeping your program small.
7. Avoid sorting techniques which involve changing the actual contents of the array. Instead, use QUICKSORT, or an Assembler sort which changes the string pointers.

Garbage collect will happen in any case. In interactive programs without a large number of strings, it can be made invisible to the operator by forcing it (X = FRE(0)) during times when the operator doesn't expect to use the keyboard. For 'batch' programs, the least amount of time will be consumed by just letting it happen when it must.

In summary, the next time your PET [Apple, SYM] seems to crash, don't reset it right away. It may just be collecting its garbage.

After 15 years in main-frame data processing, Gordon Campbell purchased a cassette-based PET in the spring of 1979. Since then, the PET has grown a disk, printer, and modem. The latest expansion provides CB2 sound in stereo.

MICRO™

# Enter our world of microcomputing...

Discover our exciting world of microcomputing by reading SoftSide Magazine, the monthly that helps you learn to use your 6502-based system more effectively and enjoyably. In SoftSide, you'll read helpful programming hints, follow regular columns by such well-known authors as Scott Adams, and explore the wide range of 6502-compatible software and hardware.

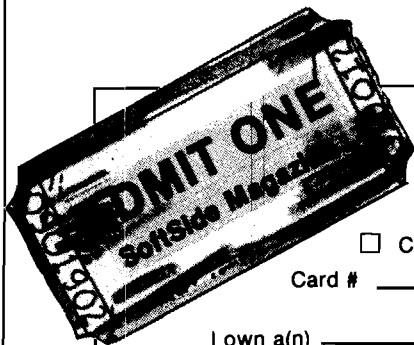
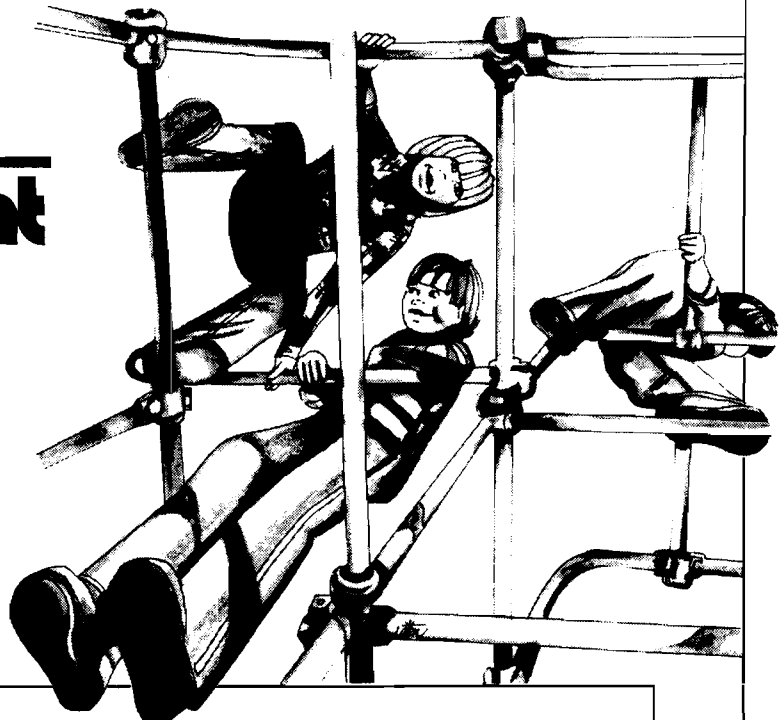
The focus of SoftSide is lots of entertaining software — great games, simulations and educational programs all ready to type right into your computer, each one fully documented and carefully explained. Every month you'll find at least three programs for the Apple, and three for Atari. The value of these programs is impressive — one reader told us that he estimates the value of the software in SoftSide at \$18 per issue!

SoftSide isn't for everyone. We're looking for the kind of reader who feels challenged by tackling all kinds of programs, long or short, and is rewarded with consistently fine graphics, great adventures, and simulations, and arcade games that don't lose their appeal after one play.

If you're the kind of person who ought to be reading SoftSide, take advantage of our special offer while it lasts — 13 issues for the price of 12 (you must order with the coupon in this ad or a photocopy). For a small admission price, you can become a part of SoftSide's world of microcomputing!

"As a recent purchaser of an Atari 800 and a recent subscriber to SoftSide, I am more than a little thrilled to find a magazine like yours available. Here I am looking for clever programs and clever programming ideas. Your magazine fits the bill! I have enjoyed nearly every hour of typing in the programs (at least I do after I see the program run with the fantastic graphics)." R.K.

**SoftSide**  
our viewpoint  
is strictly  
**BASIC.**



Here's my ticket to SoftSide's world of microcomputing. Please send me 13 issues for only \$18 (at a savings of 40% over cover price).

Check enclosed     Bill Me     Bill my Visa     MasterCard

Card # \_\_\_\_\_ Expiration date \_\_\_\_\_

I own a(n) \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

SoftSide Publications 6 South Street, Milford, New Hampshire

N181



## TSE-HARDSIDE HAS IT ALL IN ONE!

How many times have you wished that there was a single source for your personal computer needs? Well look no further, TSE-HARDSIDE, located in pleasant New Hampshire, has virtually every conceivable item for your micro. Whether you're shopping for your Apple, Pet, TRS-80 or Atari, TSE-HARDSIDE has it all. We stock hardware, software, books, magazines and specialty items for all of the popular machines. So the next time you're out shopping for your system don't be surprised, be satisfied. Remember the name TSE-HARDSIDE as your choice for quality, service and reliability.



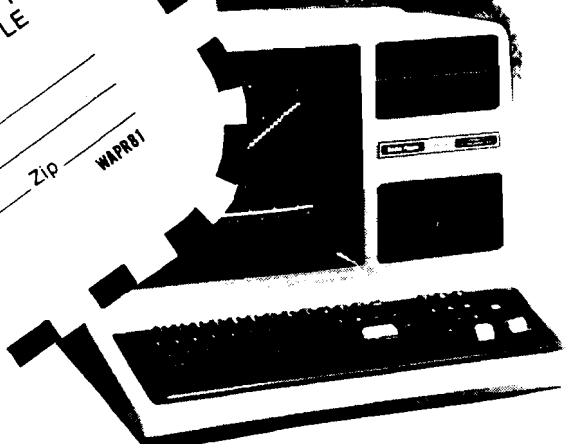
**TSE-HARDSIDE**  
 6 South St., Milford, NH 03055 (603) 673-5144  
 TOLL FREE OUT-OF-STATE 1-800-258-1790



**Save \$4.00**

If you or a friend would like to subscribe to our TSE/HARDSIDE Complete Computer Catalog, simply send \$2.00 and receive a \$4.00 certificate good toward your first purchase of software, hardware, books or specialty items from TSE/HARDSIDE. I have a (check one)  TRS-80,  APPLE,  ATARI,  PET. A photo-copy of this coupon will be accepted.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ WAPR81  
 MAIL TO: TSE/HARDSIDE  
 6 South Street  
 Milford, NH 03055



# An AIM 65 Intelligence Test

Please answer each question:

- 1 Who has been offering complete 6502-based products since 1976?  
 Rockwell International     The Computerist
- 2 Who makes a video expansion board for the AIM 65 that fully supports the AIM Monitor, Editor, Assembler and BASIC?  
 Rockwell International     The Computerist
- 3 Who offers a memory expansion board for the AIM with 32K RAM, provision for up to 16K EPROM, and an EPROM programmer using VIA chips?  
 Rockwell International     The Computerist
- 4 Who offers an enclosure for the AIM 65?  
 Rockwell International     The Computerist
- 5 Which company has seen fit to offer a one-year warranty on all of its AIM 65 products?  
 Rockwell International     The Computerist
- 6 Who will be offering a controller board with floppy disk controller, RS232 asynchronous communication interface, and timer in the second quarter of 1981?  
 Rockwell International     The Computerist
- 7 Who consistently uses a cost-effective integrated approach in the development of AIM-oriented products?  
 Rockwell International     The Computerist

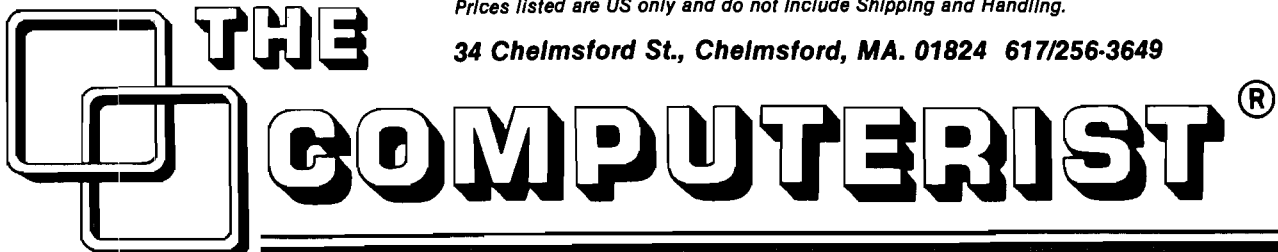
**Answers:**

1. The Computerist started offering complete AIM 65 products in 1976.
2. The Computerist Video Expansion Board offers the most desirable screen formats, EPROM programmer, and timer. Rockwell currently offers no video expansion board. Rockwell currently offers no video expansion board.
3. The Computerist offers the AIM Plus memory expansion board for 2516, 2716, 2532, and 2732 EPROMs. Rockwell offers a similar board for 2516, 2716, 2532, and 2732 EPROMs. To provide similar capabilities with Rockwell's board, you would need the 16K PROM/ROM Module (\$175.), PROM Programmer (\$175.), Module Stack to hold the PROMs (\$100.), and the Adapter/Buffer Module (\$1440.00).
4. The Computerist offers AIM Plus — an enclosure with built-in power supply and video expansion board. The power supply is rated at 5V at 0.5A. and +12V at 0.5 A. Rockwell offers a power supply alone, no enclosure, with a +5V at 0.5A. for \$150.00.
5. The Computerist offers a one-year warranty. Rockwell offers a 90-day warranty.
6. The Computerist offers a new multi-purpose controller board in the second quarter of 1981, which will include floppy disk, RS232, and other controllers on one board. Rockwell has not announced such a product.
7. The Computerist uses the integrated approach of efficiently combining a number of functions on a single board in a very price-effective manner. Rockwell followed that approach very well in the AIM 65, but has totally abandoned the integrated approach in favor of expansion modules.
8. Now, where are you going to look for support for your AIM 65?  
 Rockwell International     The Computerist

**Answer:** If you answered "The Computerist" to question 8, then you pass the AIM Intelligence Test. So send for our 1981 Product Guide. If you answered "Rockwell International", then maybe you didn't understand the question.

Prices listed are US only and do not include Shipping and Handling.

34 Chelmsford St., Chelmsford, MA. 01824 617/256-3649





# MICRO

## New Publications

Mike Rowe  
New Publications  
P.O. Box 6502  
Chelmsford, MA 01824

This column lists new publications received for review and also reports on pertinent publication announcements received from book and periodical publishers.

### General 6502

**The 6502 Instruction Handbook** by Scelbi Publications [20 Hurlbut Street, Elmwood, Connecticut 06110], 1981, 44 pages, 3¾ × 8½ inches, paperbound. \$4.95

Designed as a shirt-pocket guide for programmers, technicians, and engineers. Portions of the publication appeared originally in *SCELBI's 6502 Software Gourmet Guide & Cookbook* (by Robert Findley, 1979). This slim reference work, available from computer stores or for an extra 50¢ from the publisher, contains a synopsis of each instruction set for the 6502 CPU. Mnemonics and machine codes in hexadecimal format are provided for each addressing mode. Appendices list the instruction set alphabetically by assembler mnemonics as well as numerically by machine code. Other information provided includes a hexadecimal-to-decimal conversion chart, a chip pinout diagram, timing data, and diagrams of chip architecture.

**6502 Games** by Rodney Zaks. 6502 Series, Volume IV, Sybex Inc. [2344 Sixth Street, Berkeley, California 94710], 1980, x, 292 pages, 50 figures, 5½ × 8½ inches, paperbound. ISBN: 0-89588-023-9 \$12.95

This book is designed as an educational text for the programmer who wants to learn advanced programming techniques by using the 6502. Although it can be used merely to play games with a 6502-based board, for educational purposes, the reader should be familiar both with the 6502 instruction set and with basic programming techniques. The programs listed are for the SYM but can be adapted to other 6502-based microcomputers.

**CONTENTS:** *Introduction*—The Games Board. *Music Player*—Play a sequence of up to 255 notes [13 different notes] and record it automatically. *Translate*—The computer displays a binary number. Each player in turn must press the hexadecimal equivalent as quickly as possible. The first to score 10 wins. Designed for two players. *Hexguess*—Guess a 2-digit hex number generated by the computer. The computer will tell you how far off your guess is. You are allowed up to 10 guesses. *Magic Square*—Light up a perfect square on the board. Each key inverts some LED pattern. Skill and logic are required. *Spinner*—A light is spinning around a square. You must catch it by hitting the corresponding key. Every time you succeed, it will spin faster. A game of skill. *Slot Machine*—A Las Vegas type slot machine is simulated, with three spinning wheels. Try your luck. *Echo*—Recognize and duplicate a sound/light sequence [also known as SIMON—A manufacturer trademark]. *Mindbender*—Play against the dealer (the computer) with a deck of 10 cards. You may hit or stay. Don't bust! *Blackjack*—Guess a sequence of numbers generated by the computer. It will tell you how many digits are correct and in the right position [also known as MASTERMIND—a manufacturer trademark]. *Tic-Tac-Toe*—Try to achieve three in a row before the computer does in this favorite game of strategy. The computer's ability improves with yours. Can you outsmart it? *Appendices:* A. 6502 Instructions—Alphabetic; B. 6502—Instruction Set: Hex and Timing. *Index.*

### AIM 65

**AIM 65 Laboratory Manual and Study Guide** by Leo J. Scanlon. John Wiley & Sons [605 Third Avenue, New York, New York 10158] 1981, 180 pages, diagrams and charts, 8½ × 11 inches, paperbound. ISBN: 0-471-06488-2 \$7.95

A study and exercise book designed to introduce students to microcomputers by working with the AIM 65. Pages are perforated so that the student's answers, written in the book, can be handed in, lesson by lesson, for review by the instructor. The author, employed by Rockwell International, the manufacturer of the AIM 65, provides 32 pages of answers to the experiments.

**CONTENTS:** Getting to Know the AIM 65; Addition Operations; Subtraction and Logical Operations; Program Sequencing; Debugging Programs; Multiplication Operations, with Shift & Rotate; Division Operations; Subroutines and the Stack; Unordered Lists; Sorting Unordered Data; Code Conversion from Input; Code Conversion for Output; Input/Output; A More Powerful I/O Device, the R6522 VIA; Interrupts; A Timing Program with Decimal Output; The AIM 65 Assembler; Answers to Experiments.

### General Microcomputer

**The Personal Computer Book** by Robin Bradbeer. Input Two-Nine, an imprint of MCB Publications Limited [198/200 Keighley Road, Bradford, West Yorkshire, England BD9 4JQ], 1980, 220 pages, illustrated, 8¼ × 5-6/8 inches, paperbound.

ISBN: 0-905897-56-0 U.S. \$15.00;  
£5.25

An introductory work on microcomputers, written especially for readers in the United Kingdom.

**CONTENTS:** *What's It All About!*—The computer can assist us tremendously, both in business and pleasure; How is it possible?; The first hobby computer; Who buys personal computers?; What do you use the computer for?; Developments in the next few years. *Where Do I Start!*—Ten hints to help you on your way. *The Computer—What Is It? How Does It Work!*—The computer—confusingly versatile; How the computer works, in simple terms; Binary numbers; How does the computer handle binary numbers?; The processor—the CPU—from the inside; The computer's own road network—the bus; Storage inside the computer. *How Do I Talk to the Computer!*—Machine Language; Assembly language; High-level languages; At which level do I begin?; BASIC—a convenient language; Firmware; Software; Which microprocessor is best? *What's In the Boxes!*; Input devices; Keyboard-based input; Speech recognition; Direct Input; Storage media; Cassette storage; Disk storage; Other storage media; Output devices; Video output; Printed output; Electric typewriter/TTY; Matrix printers; Daisy wheel printer; Other printers; Speech synthesis. *What Can I Buy!*—The Computer system; Personal computer equipment survey; Part 1, Section A—*Single board computers*; Kit-built systems; Training systems, Part 1, Section B—*Desk top systems*. Part 1, Section C—*Bus-based systems*—S100 Bus. Part 1, Section D—*Other Buses*—SS 50, Non-standard. Input/Output devices, memory storage media; other media; Part 2—*Printers*. Part 3—*Video display units*. Part 4—*Other peripherals*. How do I choose a system? *What Can I Do With It!*—Games; Education; Business use; Word processing; Information handling; Controlling things; Making money; Examples of personal computers in use. *Appendices:* A. Binary Arithmetic; Octal; Hexadecimal; ASCII Code. B. Bus Standards; S100 [IEEE]; SS50, etc. C. Manufacturers and Distributors in U.K. D. Computer Clubs in the U.K. E. Magazines in English... UK/USA/Continent. F. Bibliography of Selected Microcomputer Books. G. Glossary. H. Some Hints on Kit-build Systems.

(Continued on following page)

**The Carl Helmers Personal Computer Letter** is a monthly newsletter which began publication with the January 1981 issue. Helmers, a co-founder of *Byte* magazine and its former Editorial Director, provides subscribers with analyses of issues and trends affecting the small computer industry. Helmers plans to offer subscribers the opportunity to participate in a monthly Personal Computer Industry Conference Call which he will moderate. Each issue is a minimum of 8 pages; some may run to 24 or 48 pages. A one-year subscription is \$200.00 from North American Technology, Inc., 174 Concord Street, Suite 23, Peterborough, New Hampshire 03458.

### Microcomputers and Business

**Basic Business Software** by E.G. Brooner. Blacksburg Continuing Education Series, Howard W. Sams & Co., Inc. (4300 West 62nd Street, Indianapolis, Indiana 46268), 1980, 142 pages, charts, diagrams, and listings, 5½ × 8½ inches, paperbound. ISBN: 0-672-21751-1 \$9.95

This book is designed primarily for business people who want to understand some of the fundamentals of business software development. But it is also for programmers who want to learn more about business software. Some familiarity with BASIC-language programming is assumed. The author aims to teach readers either to write some of their own business software or evaluate programs written by others. Sample programs are included.

**CONTENTS:** *Introduction to Small-Business Software*—Objectives; Small-Business Computers Defined; Effect on Paper Work; Businesses that Benefit; Software Costs; Self-Help Test Questions. *Software Fundamentals*—Objectives; Software Functions; Computer Languages; The Operating System; Software Defined; Language-Independent Programming; BASIC Comparison and Translation; Self-Help Test Questions; References. *How To Choose Appropriate Business Software*—Objectives; Practical Limits; Where To Get It; When Customizing Is Needed; Compatibility; Self-Help Questions. *How Programs Are Put Together*—Objectives; Terms Defined; The Use of Symbols in Programming; The Step-by-Step Method; Subroutines, or Modules; Programming Hints; Summary of the Step-by-Step Method; Debugging Hints and Other Techniques; The Disk Subsystem; Self-Help Test Questions. *Information Storage and Retrieval*—Objectives; Data Generation and Storage; How Data Is Stored; Disk Handling; The Disk Library; File Structure; Overview of "CHECKING"

Program; Sorting Computer Data; Program Analysis; "NAMELIST"; Self-Help Test Questions; References. *Inventory Control*—Objectives; Who Needs an Inventory?; Inventory as a List; Inventory Functions; Program Analysis; Program Evaluation; Rapid Search Methods; Summary; Self-Help Test Questions; Reference. *Payroll Programs*—Objectives; Payroll Requirements; Printing on Prepared Forms; Program Development; The Master File; Master Payroll Program; Entering Employee Data; Payroll Entries and Calculations; Entering Pay Data; Pay Procedure; Payroll Summary; Conclusion; Self-Help Test Questions; Test Programming Project. *General Ledger Programs*—Objectives; Terms Defined; General Ledger Defined; System Overview; Transaction Examples; Program Descriptions; Operating the General Ledger System; Self-Help Test Questions; Test Project. *An Introduction to Word Processing*—Objectives; Word-Processing Functions; Office of the Future; Hardware Requirements; Suitable Software; Time Sharing. *Basic Computer Modeling and Simulation*—Objectives; The Break-Even Example; Graphical Method; The Computer Technique; Other Simulation Problems; Random Numbers; Self-Help Test Questions; References. *Appendix*—ASCII Code Chart; Glossary; Index.

**Small Computers for the Small Businessman** by Nicholas Rosa and Sharon Rosa, dilithium Press (30 N.W. 23rd Place, Portland, Oregon 97210), 1980, x, 332 pages, 5½ × 8-5/16 inches, paperbound. ISBN: 0-918398-31-2 \$12.95

This book is written for *small business* people and is mostly about small computers, specifically microcomputers. It is intended to help the reader select the computer that best meets his business needs.

**CONTENTS:** *The Small Computer Revolution*—But we're not trying to sell you; "The price of a new car"; Then why shouldn't you wait?; Now, about that rash idea...; Affording it; Turnkey in the store; Graphics; How "big" a system; Making money directly; "But I'm not a computer freak..."; That mini- and micro- distinction; What about just renting services?; Now whaddaya mean, "Revolution?"; The integrated circuit; But what's a semiconductor?; Large scale integration; And suddenly—; Voila!; The significance. *The Small Business Computer*—Interfacing; Memories are made of this...; A final memory; Mass storage; The other stuff. *This Thing Called Software*—Documentation; Programs; Computer languages; Those translating programs; What BASIC looks like; Enough, already; Now, about that problem...; Acquiring the stuff. *Data Processing and Word Processing*—The nature of data processing; The nature of word processing; Choosing a system. *How to Shape Your*

*Computer System*—Getting into it; Using the consultant; Finding the consultant; Finding the vendor; Getting it all in writing; Involving your staff; The happy outcome. *Buying Services Instead*—Service bureaus; Timesharing; Whither timesharing? Amen, amen. *The Minicomputer*—But anyway; Acquisition notes; Again, what's a mini?; Making a decision; The cloudy crystal ball; The onrushing dawn. *Shopping for Your Hardware*—How much to buy?; The double system; System in one cabinet? Memory options; Where to buy; Guarantees; Notes on I/O devices; Keyboards; Writewriter™; Teleprinters, Teletype™; Electric typewriters; CRT display; Other displays; Cassette drive; Floppy disks, diskettes; Hard disks: Winchesters; Printers; Isolators, noise suppressors; Power supplies; Front panel; Modems; The computer room; "Desk tops" and accessories; Cost and quality; Watch out. *The Professions and the Computer*—The accountant; The law office; The doctor's office; The writer's office; That bottom line (financing); Leasing; Tax benefits. *The Butcher, The Baker and The Candlestick Jobber*—The small manufacturer; Construction and lumber; Warehouses; Real estate; Insurance; A portrait studio; Pharmacy; Restaurant; Finding out more. *Glossary. Appendix*—How It All Works. *Index.*

### General Computer

**Software News — The Computer Software Products Newspaper** is a newspaper tabloid which will appear monthly beginning in May. Sentry Database Publishing, a division of Technical Publishing, will issue the tabloid [Technical Publishing is the publisher of *Datamation* and is owned by The Dun & Bradstreet Corporation]. *Software News* will report on the software industry. It will provide analysis and commentary on applications packages, systems software, productivity aids, databases, and language processors. It will cover data and software security, software legal issues, and job opportunities; and it will offer user ratings and surveys, software vendor profiles, market statistics, and other business and financial information. The newspaper will be distributed to 50,000 software buyers and specifiers. For information, write Software News, 5 Kane Industrial Drive, Hudson, Massachusetts 01749.

# DR. DALEY OFFERS SOFTWARE FOR EVERYONE

## DATA BASE

The data base package allows total user control over the contents of each entry in the file. Features user selectable record size from 5 to 242 characters per record, statistical and plotting package, output with WORDPRO files or printer. Includes full user definable output formatting. With optional indexing routine can produce a comprehensive index of a data set.

**\$299.95**

**Index 99.95**

For PET or CBM 4000 or 8000 series  
with 32K memory please specify  
your machine configuration.

## MAIL LIST

**\$159.95**

For PET or CBM 4000 or 8000 series  
with 32K memory please specify  
your machine configuration.

This powerful mailing list package features a variety of options for producing labels. It includes user defined file structure and label format. Label format can list to the printer or to WORDPRO format files.

## SOFTWARE LIBRARY

Hundreds of schools and individuals have purchased this package for use as an educational tool or just plain fun. It contains 50 (yes fifty!) programs. This ranges from our famous TREK 3 and horse race to fun learning programs for children to checkbook and a micro mail list program with lots in between. At about \$1.40 per program how can you miss?

**Cassette \$69.95**

**Diskette 79.95**

**For APPLE II or PET**

Charge to your MC/VISA



**DR. DALEY'S SOFTWARE**  
425 Grove, Berrien Springs, Michigan 49103  
Phone (616) 471-5514  
Sunday-Thursday noon to 9 p.m. Eastern Time

# CONTINENTAL SOFTWARE THE APPLE SOURCE.

**For Apple owners only. Thoroughly tested, well documented programs for business and pleasure. All written by professionals. Each checked out carefully by experts in its field.**

**HYPERSPACE WARS**  
**2 GAMES FOR THE PRICE OF 1 \$29.95**  
**48K Trek.** Stardate 3421.  
The Terraunion is being attacked. You command United Starship Excalibur. Your mission: destroy the deadly Klepton invasion force. Four levels, Novice to Master.

**3-D Space Battle.** Use your on-board scanners to search for alien ships in hires three-dimensional space. Destroy as many aliens as you can before you run out of fuel or your ship is destroyed. Hi-res graphics. Req. 48K, Applesoft in Rom+1 disk drive. Dos. 3.2 or 3.3.

**L.A. LAND MONOPOLY \$29.95**  
Bankrupt your opponents while becoming the richest player in the game. Buy, sell, rent and trade to accumulate the most cash and property. Two to six may play. Computer is banker. Create your own special version using streets in your own town.

Hi-res graphics. Req. 48K, Applesoft in Rom+1 disc drive. Dos. 3.2 or 3.3.

**HOME MONEY MINDER \$34.95**  
Complete home financial system combines an excellent Home Checkbook Program with Budgeting. Transactions by month by budget category. Bank reconciliation. Budget for year. Total expenses compared monthly and year-to-date. Plus much more.

Req. 48K, Applesoft in Rom, 1 disk drive + printer. Avail. in Dos. 3.3.

**THE MAILROOM \$34.95**  
Stores up to 750 names per disk. Prints master lists and labels 1, 2 or 3 across. Sorts in 5 seconds. Sort on any of 12 items, search any sorted item in 10-20 seconds maximum. Easy editing, customized inputs.

Req. 48K, Applesoft in Rom, 1 disk drive + printer (132 column capability needed to print Master List.) in Dos. 3.3.

## THE COMPUTER PROGRAMMED ACCOUNTANT FOUR MODULES

Buy all four now—or add as you expand \$175 each (\$250 after 6/1/81)

The first programs for your Apple that your accountant will like as much as you do. Nobody makes it better—or easier to use—than Continental Software. Simple step-by-step instructions. Excellent error checking. Modules can be used individually, or integrated into a complete Accounting System. Manuals only: just \$15 each.

### CPA1 GENERAL LEDGER.

True double entry bookkeeping with complete, accurate audit trails showing the source of each entry in the general ledger. Concise, meaningful reports generated include Balance Sheet, Profit & Loss Summary, Trial Balance and Complete Journal Activity Report. Reports show monthly, year-to-date and last year monthly + YTD for comparison. Custom charting feature includes hi-res plotting of one or more accounts.

### CPA2 ACCOUNTS RECEIVABLE

Prints invoices on available custom forms or on plain paper. Back orders and extensions computed. Issues statements for all customers, one or more customers, or only those with current, 30-, 60-, 90- or 150-day balances. Maintain up to 300 customers. Customized journals. Allows simulation of manual special journal entries. Posts to General Ledger. Prints aging report to 150 days. Also prints customer lists and labels.

### CPA3 ACCOUNTS PAYABLE

Prints checks to vendors and non-vendors on available pre-printed checks or plain paper. Each check stub shows invoice(s) paid, discounts taken, net paid, Prints Purchases and Cash

Disbursement Journals. Customized journals. Allows simulation of manual special journal entries. Prints Aging Report to 150 days, vendor list and labels and even a Cash Requirements Report. Posts to General Ledger.

### CPA4 PAYROLL

Maintains personnel records for as many as 100 employees. Quarter-to-date and year-to-date earnings and deduction records. Employees are departmentalized and designated hourly or salaried. Prints complete Payroll Checks, 941 information, W-2s, State of California DE-3 information. Prints Payroll Journal and posts to General Ledger.

These are just some of the features of each CPA module. All require 48K, Applesoft in Rom, Dos. 3.3, 2 disk drives + printer.

**At your local dealer or fill out and mail today. Phone for immediate delivery.**

## OK, I'LL BYTE.

Send me these revolutionary programs:

- Hyperspace Wars . . . \$ \_\_\_\_\_
- L.A. Land Monopoly. \_\_\_\_\_
- Home Money Minder \_\_\_\_\_
- The Mailroom . . . . . \_\_\_\_\_
- CPA1 General Ledger . . . . . \_\_\_\_\_
- CPA2 Accts. Rec. . . . . \_\_\_\_\_
- CPA3 Accts. Pay. . . . . \_\_\_\_\_
- CPA4 Payroll . . . . . \_\_\_\_\_
- No. C.O.D.s \_\_\_\_\_ Subtotal \_\_\_\_\_
- Cal. res. add 6% \_\_\_\_\_
- TOTAL \_\_\_\_\_

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Card No. \_\_\_\_\_ Exp. \_\_\_\_\_

M14/81

# CONTINENTAL SOFTWARE

12101 Jefferson Blvd.,  
Culver City, CA 90230

(213) 371-5612



# MICRO

---

## Dealers

---

*Presented here in zip-code order are those MICRO dealers who responded to our newsletter request for information concerning their dealership. Many have been MICRO dealers for quite some time while others are new. This service is provided to acquaint readers with these dealers and to encourage readers to visit dealers in their area. This listing is provided twice a year to update previous listings (see MICRO 29:69). This is not intended as a complete listing of MICRO dealers.*

### United States

#### Maine

Maine Micro Systems Inc.  
555 Center Street  
Auburn, Maine 04256  
Contact: Hugh Blair/Al Celetti  
207/782-7139

Hardware: Aim, Apple, Atari, CBM, KIM, PET, TRS-80  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Compute, Kilobaud, 80-Microcomputing

#### Vermont

Computers Plus  
177 Church St.  
Burlington, Vermont 05401  
Contact: Tim Barden  
802/658-5858

Hardware: Apple, Atari, HP-85  
Software: Educational, Personal, Business, Games, General Accounting  
Publications: MICRO, Byte, Creative Computing, Microcomputing

#### Connecticut

The Computer Store  
63 South Main St.  
Windsor Locks, Connecticut 06096  
Contact: Susan Bramley  
203/627-0188  
Hardware: Apple, HP-85  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Byte, Nibble, Creative Computing

Southbury Professional Systems Inc.  
D.B.A. The Micro-Computer Store  
Union Square  
Southbury, Connecticut 06488  
Contact: Marilyn or Joseph Osterman  
203/264-2983

Hardware: Apple, Atari, Vector Graphic

Software: Educational, Personal, Business, Games, Professional

#### New Jersey

Software City  
111 Grand Ave.  
River Edge, New Jersey 07661

#### New York

Time Enterprise  
8247 Genesee Road  
Springville, New York 14141  
Contact: Paul Zielinski  
716/592-7665  
Hardware: OSI  
Software: For OSI

#### Pennsylvania

Computer Mail Order  
501 E. Third St.  
Williamsport, Pennsylvania 17701  
Contact: Randy Gailit  
717/323-7921

Hardware: Atari, CBM, PET  
Software: Educational, Personal, Business, Games

#### Maryland

Computer Crossroads, Inc.  
9143 G Red Branch Road  
Columbia, Maryland 21045  
Contact: Richard Simpson  
301/730-5513

Hardware: Apple, Atari  
Software: Educational, Personal, Business, Games  
Publications: Many

#### Virginia

Computerland of Tysons Corner  
8411 Old Courthouse Road  
Vienna, Virginia 22180  
Contact: Rich Doud  
703/893-0424

Hardware: Apple, Atari, CBM, PET, North Star, Dynabyte, T.I., Cromemco  
Software: Educational, Personal, Business, Games, Languages, Utilities, etc.  
Publications: MICRO, Byte, Kilobaud, Personal Computing, Creative Computing, Nibble

Computer Center  
2927 Virginia Beach Blvd.  
Virginia Beach, Virginia 23452  
Contact: Jeff Wilson  
804/340-1977  
Hardware: Apple, Atari

Software: Educational, Personal, Business, Games  
Publications: MICRO, Byte, Creative Computing, Interface, Call-APPLE

#### North Carolina

ETC Corporation  
P.O. Box G - OLD NC 42  
Apex, North Carolina 27502  
Contact: Jeff Butler  
919/362-4200

Hardware: AIM, CBM, KIM, OSI, PET, Billings

Software: Educational, Personal, Business, Games, Scientific, Custom  
Publications: MICRO, Byte, Microcomputing, Compute

#### Florida

Associated Information Systems  
825 Osceola Drive  
Rockledge, Florida 32955  
Contact: D.R. Hendricks  
305/632-1090  
Hardware: OSI

Software: Educational, Personal, Business, Games, Custom Programming  
Publications: MICRO

AMF Microcomputer Center, Inc.  
11158 N. 30th St.  
Tampa, Florida 33612

Hardware: Apple  
Software: Educational, Personal, Business, Games  
Publications: All major computer magazines

#### Ohio

Microage Computer Store  
2591 Hamilton Road  
Columbus, Ohio 43227  
Contact: John W. Spencer  
616/868-1550

Hardware: Apple, Atari, North Star, HP, TI, Archives, Altos, Ithica, Zenith  
Software: Educational, Personal, Business, Games  
Publications: All

#### Michigan

New Dimensions in Computing, Inc.  
541 E. Grand River  
East Lansing, Michigan 48823  
Contact: Robert Gibbs  
517/337-2880

Hardware: Atari, Exidx, Vector Graphic, Intersystems  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Byte, Interface Age, Microcomputing, 80-Microcomputing, Compute, Creative Computing

## Wisconsin

Byte Shop of Milwaukee  
6019 W. Layton Avenue  
Greenfield, Wisconsin 53220  
Contact: Kathleen Preston  
414/281-7004  
Hardware: Apple, CBM, PET, North Star, APF  
Software: Educational, Personal, Business, Games  
Publications: MICRO, 68 Micro, Byte, Creative, Kilobaud, 80 Micro-computing, onComputing, Interface Age, Nibble, Apple Orchard, Compute, Softside, Personal Computing, etc.

PETTED micro systems  
4265 W. Loomis Rd.  
(P.O. Box 21851)  
Milwaukee, Wisconsin 53221  
(moving soon)  
Contact: Theodore J. Polczynski  
414/282-4181  
Hardware: Atari, CBM, KIM, PET,  
Software: Educational, Personal, Business, Games, TRS-80 Instant software and creative computing  
Publications: MICRO, Compute, Kilobaud, Creative Computing

## Minnesota

Personal Business Systems  
4306 Upton Ave. So.  
Minneapolis, Minnesota 55410  
Contact: Mike Carlson  
612/929-4120  
Hardware: Apple  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Apple Orchard, Creative Computing, Peelings, Nibble

## Illinois

Data Domain of Schaumburg  
1612 E. Algonquin Rd.  
Schaumburg, Illinois 60195  
Contact: Marilyn Clark, Steve Shendelman  
312/397-8700  
Hardware: Apple, Alpha Micro, Hewlett-Packard Calculators and Accessories  
Software: Educational, Personal, Business, Games  
Publications: Large selection

Farnsworth Computer Center  
1891 N. Farnsworth Ave.  
Aurora, Illinois 60505  
Contact: Luke Snyder  
312/851-3888  
Hardware: Apple, Hewlett-Packard, HP-85 A  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Apple Orchard,

Call APPLE, Kilobaud, 80 Micro-computing, Byte, Creative Computing, Interface Age

Wallace Computers, Inc.  
2619 N. University  
Peoria, Illinois 61604  
Contact: Ronald A. Wallace  
309/685-7876  
Hardware: Apple  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Byte, Call APPLE, Nibble, Softalk

Main Street Computer Company  
215 N. Main  
Decatur, Illinois 62523  
Contact: David B. Herriott  
217/429-5505  
Hardware: Apple  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Byte, Creative Computing, Interface Age

## Missouri

Back to Basic Computer Center  
43 Cross Keys  
Florissant, Missouri 63033  
Contact: Fred or Jane Hahn  
314/837-4495  
Hardware: Atari, OSI, Vector Graphic  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Compute, Byte, Kilobaud, Microcomputing, Creative Computing

Computer Mart  
1904 E. Meadowmere  
Springfield, Missouri 65804  
Contact: Rob Lurvey  
417/862-6500  
Hardware: Apple, Atari, IMS  
Software: Educational, Personal, Business, Games  
Publications: Most monthlies and quarterlies at present

## Nebraska

Computers West  
7351 Pacific St.  
Omaha, Nebraska 68114  
Contact: Kevin J. Burke  
402/391-3737  
Hardware: Apple, Atari, Data General, Archieves  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Interface Age

## Utah

Computer Translation, Inc.  
1455 S. State Street  
Orem, Utah 84057  
Hardware: Apple  
Software: Educational, Personal,

Business, Games  
Publications: Byte, Creative Computing, Personal Computing

## Nevada

Home Computers  
1775 E. Tropicana #6  
Las Vegas, Nevada 89109  
Contact: Ike  
702/798-1022  
Hardware: AIM, Apple, Atari, CBM, PET, Bally  
Software: Educational, Personal, Business, Games, Functional Programs  
Publications: Wide variety of computer magazines

The 6502 Program Exchange  
2920 Moana Lane  
Reno, Nevada 89509  
Contact: David or Don Marsh  
702/784-4991  
702/825-8413 (eves.)  
Software: Educational, Personal, Games, High-level Languages and Utilities

## California

Malibu Microcomputing  
2391DA DeVille Way  
Malibu, California 90265  
Contact: T. Nalevanko  
213/456-1137  
Hardware: Apple  
Software: Educational, Personal, Business, Games  
Publications: MICRO, Byte, 80 US, Compute

Omni Unlimited  
105 S. Los Robles  
Pasadena, California 91101  
Contact: Don K. Fenstermaker  
213/795-6664  
Hardware: CBM, PET, Billings  
Software: Educational, Personal, Business, Games, Legal, Medical, Dental, MFG  
Publications: MICRO

Computer Systems Design Group  
3632 Governor Drive  
San Diego, California 92122  
Contact: Mary Elizabeth Kroening  
415/856-1954  
Software: CAI/Adventure Authoring system for Apple II named "GROW"

Computer Business Systems  
22963 La Cadena  
Laguna Hills, California 92653  
Contact: Lou  
951-4640  
Hardware: OSI, Data General  
Software: For same

Desert Data & Electronics  
212 Balsam (PO Box 1396)  
Ridgecrest, California 93555  
Contact: Larry Jenkins  
714/375-4818

Hardware: Atari, CBM, OSI, PET, TI,  
Northstar, Dynabyte  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Byte, Creative  
Computing, Kilobaud

FORTH Interest Group  
P.O. Box 1105  
San Carlos, California 94070  
415/962-8653  
(Mall Order)  
Products/Services: Source Listing for  
6502

Sunset Electronics  
2254 Taraval St.  
San Francisco, California 94116  
Contact: John Warburton  
415/665-8330  
Hardware: OSI  
Software: Educational, Personal,  
Business, Games  
Publications: All computer

Computerland  
22634 Foothill Blvd.  
Hayward, California 94541  
538-8080  
Hardware: Apple, Atari, CBM, PET  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Byte, 80 US, 80  
Microcomputing, Kilobaud, Creative  
Interface

Computer Scene  
753 So. State St.  
Ukiah, California 95482  
Contact: A.D. Rorabaugh  
707/462-1578  
Hardware: Atari, CBM, PET  
Software: Educational, Personal,  
Business, Games

#### Oregon

Computerland of Portland  
12020 S.W. Main  
Tigard, Oregon 97223  
Contact: Cliff Bihl  
503/620-6170  
Hardware: Apple, Atari, CBM, PET,  
Cromemco, Vector  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Byte, etc.

#### Washington

The Electronics Shop  
131 North Decatur  
Olympia, Washington 98502  
Contact: Tim  
206/357-6304

Hardware: Atari, CBM, PET, S-100  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Byte, Interface  
Age, Kilobaud, 80 Microcomputing,  
S-100 Microsystems, Creative  
Computing

### FOREIGN Canada (Ontario)

Computer Innovations Head Office  
1719 St. Laurent Blvd.  
Ottawa, Ontario, Canada K1G 3V4  
Contact: Kathryn Miller, Purchasing  
or Bruce McLaws, Sales  
Hardware: Apple, CBM, PET,  
Cromemco  
Software: Educational, Personal,  
Business, Games  
Publications: Byte, Compute,  
Kilobaud, Nibble, etc.

House of Computers Inc.  
368 Eglinton Avenue West  
Toronto, Ontario, Canada M5N 1A2  
Contact: Anita Tchoryk  
Hardware: Apple, CBM, KIM, PET  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Byte, Interface  
Age, Microcomputing, 80 Magazine,  
Nibble, Compute, Creative  
Computing

The Computer Centre  
259 Davis Street  
Sarnia, Ontario N7T 1B4  
519/337-6332  
Publications: MICRO and others

#### (British Columbia)

Conti Electronics Ltd.  
7204 Main Street  
Vancouver, British Columbia, Canada  
V5X 3J4  
Contact: Gary W. Skett  
604/324-0505  
Hardware: PET  
Software: Educational (limited), Per-  
sonal, Business, Games, Industrial  
Monitoring and Testing Hardware  
Publications: MICRO, Compute,  
Creative Computing

#### Australia

Electronic Concepts Pty. Ltd.  
55 Clarence Street  
Sydney, N.S.W. Australia 2000  
Contact: D.T. or L. Hoess  
Hardware: Apple, Onyx  
Software: Educational, Personal,  
Business, Games, Scientific  
Publications: MICRO, Byte, Interface,  
Personal Computing, Kilobaud

#### Belgium

MICRO 2000  
32 Galerie D'Ixelles  
Brussels, Belgium 1050  
Contact: J. Marsily  
512 4305  
Hardware: Apple, TRS-80  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Nibble, 80-US,  
Call APPLE, Compute

Compulec  
Naamsesteenweg 382/W5  
3030 Leuven (Heverlee)  
Belgium 3030  
Contact: Y. Rummens  
16-22.34.88  
Hardware: AIM, Apple, Sharp-ITT 2020  
Software: Educational, Personal,  
Business

#### Netherlands

Computercollectief  
Amstel 312a  
1017 AP Amsterdam, Netherlands  
Contact: Frans de Vreeze  
020-223573  
Software: Educational, Personal,  
Business, Games (for Apple, Sorcerer  
and TRS-80)  
Publications: At least 30 magazines,  
300 books

#### France

Alpha Systemes  
51 Rue Thiers  
Grenoble, France 38000  
Contact: P. Binet  
76.87.98.27  
Hardware: Apple, OSI, Sharp,  
Hewlett-Packard  
Software: Educational, Personal,  
Business, Games  
Publications: Many

SIVEA  
31 BD des Batignolles  
Paris, France 75008  
Contact: J. Cleenewerck  
522 70 66  
Hardware: Apple, TRS-80  
Software: Educational, Personal,  
Business, Games  
Publications: MICRO, Nibble, Call  
APPLE, Byte, Creative Computing,  
80-US, etc.

# Decision Systems

Decision Systems  
P.O. Box 13006  
Denton, TX 76203

## SOFTWARE FOR THE APPLE II\*

**ISAM-DS** is an integrated set of Applesoft routines that gives indexed file capabilities to your **BASIC** programs. Retrieve by key, partial key or sequentially. Space from deleted records is automatically reused. Capabilities and performance that match products costing twice as much.  
\$50 Disk, Applesoft.

**PBASIC-DS** is a sophisticated preprocessor for structured **BASIC**. Use advanced logic constructs such as **IF...ELSE...**, **CASE**, **SELECT**, and many more. Develop programs for Integer or Applesoft. Enjoy the power of structured logic at a fraction of the cost of **PASCAL**.  
\$35 Disk, Applesoft (48K, ROM or Language Card).

**DSA-DS** is a dis-assembler for 6502 code. Now you can easily dis-assemble any machine language program for the Apple and use the dis-assembled code directly as input to your assembler. Dis-assembles instructions and data. Produces code compatible with the S-C Assembler (version 4.0), Apple's Toolkit assembler and others.  
\$25 Disk, Applesoft (32K, ROM or Language Card).

**FORM-DS** is a complete system for the definition of input and output forms. **FORM-DS** supplies the automatic checking of numeric input for acceptable range of values, automatic formatting of numeric output, and many more features.  
\$25 Disk, Applesoft (32K, ROM or Language Card).

**UTIL-DS** is a set of routines for use with Applesoft to format numeric output, selectively clear variables (Applesoft's **CLEAR** gets everything), improve error handling, and interface machine language with Applesoft programs. Includes a special load routine for placing machine language routines underneath Applesoft programs.  
\$25 Disk, Applesoft.

**SPEED-DS** is a routine to modify the statement linkage in an Applesoft program to speed its execution. Improvements of 5-20% are common. As a bonus, **SPEED-DS** includes machine language routines to speed string handling and reduce the need for garbage clean-up. Author: Lee Meador.  
\$15 Disk, Applesoft (32K, ROM or Language Card).

(Add \$4.00 for Foreign Mail)

\*Apple II is a registered trademark of the Apple Computer Co.

Singing the file transfer blues? Then...

## Get B.I.T.S.™!

Use your Micromodem (1), A I O<sup>2</sup> Card, or Apple Comm Card<sup>3</sup> to:

**Send data files, BASIC programs, even machine code**

to most computers over phone lines.

**Copy anything you see**

into a 31K buffer then save it on disk and/or print it under your complete control.

**Many more features!**

**See it at your favorite computer store today.**

Trademarks held by:

1 - Hayes Microcomputer Products Inc.

2 - SSM

3 - Apple Computer Inc.

B.I.T.S. is a trademark of:

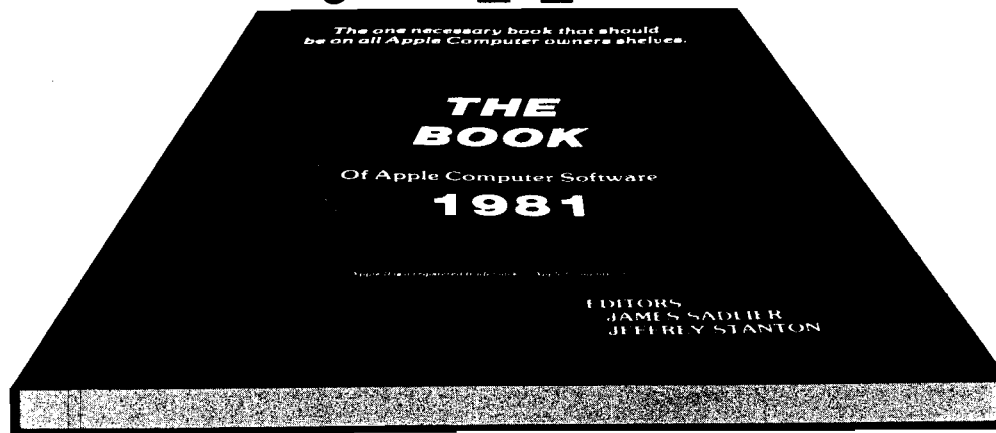
**Microsoft Systems**

7927 Jones Branch Dr. Suite 400

McLean, Virginia 22102

(703) 385-2944

# Don't buy Apple Software



## until you read this book.

First check **The Book**—the one complete critical analysis of most Apple Software available. Games, Educational, Business, Utility programs and more. Each comprehensively rated on 11 separate points. Each reviewed by an expert in its field. Just \$19.95.

Now you can compare and get more for your software dollar. Does the program you need exist? How good is it? Which software vendors offer the best support? Find out all this and much more.

MasterCard & Visa accepted. Fill out and mail today or call for shipment.

Calif. residents add 6%

16720 HAWTHORNE BLVD., LAWDALE, CA 90260. (213) 371-4012.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
CARD NUMBER \_\_\_\_\_ EXP. \_\_\_\_\_

**TheBookCompany**

M14/81



# MICRO

## PET Vet

By Loren Wright

### Numbering of BASIC Versions

There seems to be a bit of confusion on the numberings of BASIC versions. One popular numbering system for the BASICs is the one I have been following: 2.0, 3.0, and 4.0. However, the one used by Commodore is a little different. The original BASIC (the "old" ROM's) is called 1.0. The "upgrade" version, produced until recently, is 2.0, and now we have 4.0. I will use the latter convention from now on, and will edit manuscripts published in MICRO accordingly.

All 80-column machines have 4.0 ROMs, as do recent production 40-column machines. These new 40-column machines are called 4016 and 4032, but the actual circuit board is still the same. Some of the enclosures have plastic tops, apparently enlarged to accommodate a disk drive. The disk drive idea doesn't seem to have caught on, but I expect we'll be seeing more and more plastic tops. Also, boards continue to be delivered with holes drilled in the traces of 4016 PC boards where the second row of RAM chips would go. This is to prevent users or unscrupulous dealers from making a cheap and easy memory upgrade.

There is an upgrade kit to go from 2.0 to 4.0 BASIC, and you could even go from 24-pin 1.0 ROMs to 4.0 if you had another socket to install the eighth chip. As far as I know, there is no 28-pin (6540) upgrade kit.

There are several good reasons to upgrade—faster garbage collection and more powerful disk commands, for instance. All but the most serious programmers will stay with what they have. After all, the old ROMs weren't so bad were they?

### Toward Universal PET Programs

MICRO will continue to publish articles for all three BASIC ROM sets, and for both disk operating systems, but as I mentioned in a previous column, articles that apply to all three are much preferred.

I call your attention to "PRINT USING for the PET" by David Malmberg in this issue. Not only has he reworked an excellent Apple program for the PET, but he has also accommodated all three PET ROM sets. This involved knowing the right page-zero locations and system calls for each ROM set. These are available from the memory maps and entry point lists published by Jim Butterfield in *Compute* and *The Transactor*. Malmberg also uses the contents of 50003 to identify which BASIC is being used: 0—1.0; 1—2.0; 160—4.0. Because the numbers involved are easy to remember, this is fast becoming a standard technique. Some other frequently-used locations that vary from BASIC to BASIC are given in table 1.

Page zero locations tend to be the same in BASIC 2.0 and 4.0, but in 1.0 they are completely different. PET system calls have different addresses, but generally they work similarly in each BASIC. Malmberg's BASIC program will run on any PET or CBM machine without modification.

### 80-Column Functions

The 80-column function table that appeared in last month's column contained some errors. The corrected version, with a couple of additions, is shown in table 2.

The window feature on the 80-column machines can be very powerful. It confines user input (and the computer's attention) to a restricted area of the screen. The SET TOP and SET BOTTOM commands fix the upper left and lower right corners of the window. The window may also be defined by POKEing four values into memory for the four edges:

	Address	Range
TOP	224	0 to 24
BOTTOM	225	TOP to 24
LEFT	226	0 to 79
RIGHT	213	LEFT to 79

The window may be cleared by printing or striking on the keyboard two successive HOMEs.

Table 1

	1.0	2.0	4.0
1) End of memory pointer	134,135	52,53	52,53
2) # characters in keyboard buffer	525	158	158
3) Disable STOP key POKE	537,136	144,49	144,88
4) Enable STOP key POKE	537,133	144,46	144,85

Table 2

Function	ASCII	Reverse Field Character	Keyboard Combination
BELL	7	g	
DELETE LINE	21	u	ESC, RVS, K
ERASE to BEGINNING of line	150	V	LS, ←, 3
ERASE to END of line	22	v	←, Q, 4
GRAPHICS screen	142	N	LS, RS
INSERT line	149	U	SH, ESC, RVS, K
SCROLL DOWN	153	Y	LS, ESC, K
SCROLL UP	25	y	
SET BOTTOM	143	O	SH, Z, A, L
SET TOP	15	o	Z, A, L
SET TAB/CLEAR TAB	137	I	SH, TAB
TAB	9	i	TAB
TEXT screen	14	n	

SH = either shift

LS = left shift

RS = right shift

All digits are on the numeric keypad, not the main keyboard.

# Big Savings On Atari & PET!

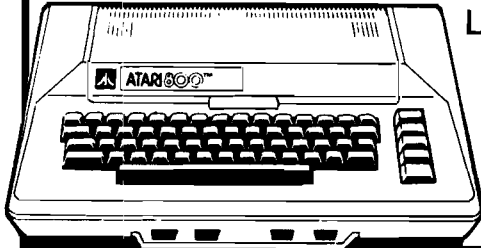
No Risk - No Deposit On Phone  
Orders - Shipped Same Day You  
Call<sup>o</sup> - C.O.D. or Credit Card

Please Call Between 11AM & 6PM  
(Eastern Standard Time)

**(800) 233-8950**

\* On all in stock units

## ATARI<sup>®</sup> 800<sup>™</sup> PERSONAL COMPUTER

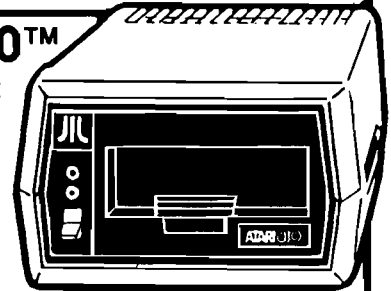


List \$1080  
**\$759**



## ATARI<sup>®</sup> 810<sup>™</sup> DISC DRIVE

List \$599.95  
**New Low Price  
only \$489.00**



Maxell Disks ..... 10 for \$34  
Sycam Disks ..... 10 for 29  
Atari Disks ..... 5 for 22

400 8K .....	\$419
400 16K .....	449
410 Recorder .....	62
815 Disk .....	1199
822 Printer .....	359
825 Printer .....	779
830 Modem .....	159
850 Interface Module .....	179
CX852 8K RAM .....	94
CX853 16K RAM .....	149
CX70 Light Pen .....	64
CX30 Paddle .....	18
CX40 Joystick .....	18
CX86 Printer Cable .....	42
CO16345 822 Thermal Printer Paper .....	5
CAO16087 825 80-col. Printer Ribbon (3/box) .....	17
CX4119 Conversational French .....	45
CX4118 Conversational German .....	45
CX4120 Conversational Spanish .....	45
CX4125 Conversational Italian .....	45
CXL4009 Chess .....	30
CXL4011 Star Raiders <sup>™</sup> .....	45
CXL4004 Basketball .....	30
CXL4006 Super Breakout <sup>™</sup> .....	30
CXL4010 3-D Tic-Tac-Toe .....	30
CXL4005 Video Easel <sup>™</sup> .....	30
CXL4007 Music Composer .....	45
CXL4015 TeleLink <sup>™</sup> .....	20
CXL4002 BASIC Computing Language .....	46
CXL4001 Education System Master .....	21
CXL4003 Assembler Editor .....	45

CX4115 Mortgage & Loan Analysis .....	\$13
CX4101 An Invitation to Programming 1 .....	17
CX4106 An Invitation to Programming 2 .....	20*
CX4117 An Invitation to Programming 3 .....	20*
CX4107 Biorhythm .....	13
CX4103 Statistics I .....	17*
CX4121 Energy Czar .....	13
CX4108 Hangman .....	13
CX4102 Kingdom .....	13
CX4112 States & Capitals .....	13
CX4114 European Countries & Captials .....	13
CX4105 Blackjack .....	13
CX4111 Space Invaders .....	18

\* These are scheduled for release in the first quarter of 1981.

**Talk & Teach Courseware;**  
CX6001 thru CX6017 ..... 23

*Atari Specialists . . .  
We carry it all!*

### Combination Special! 825 Printer & 850 Interface

825 Lists for \$1000  
Regular Mail Order Price: \$779  
850 Lists for \$220.  
Regular Mail Order Price: \$179

**Save \$20.00**  
**Buy Both For Only \$938**

### CX8104 Atari 810 Master Diskette II

**New DOS 2 Operating  
System Master**

**only \$21.00**

### Microtek RAM 16K or 32K

- Full 1 year warranty
- Compatible with 400 or 800
- Assembled and Tested

16K ..... \$ 99  
32K ..... 189

### Atari March Releases:

CX8106 Bond Analysis .....	\$20
CX8107 Stock Analysis .....	20
CX8108 Stock Charting .....	20
CX4104 Mailing List .....	17
CX4110 Touch Typing .....	20
CX8102 Calculator .....	24
CX4109 Graph It .....	17
CX4120 Conversational Spanish .....	45

### Software

WordPro 3 (40 col.) .....	\$186
WordPro 4 (80 col.) .....	279
WordPro 4 Plus (80 col.) .....	339

Visicalc - Apple .....	\$122
Atari .....	163
PET .....	163

### Printers

NEC 5530 .....	\$2495
Diablo 630 .....	2195
Trendcom 100 .....	299
Trendcom 200 .....	489
Paper Tiger 445G .....	769
Paper Tiger 460G .....	1219
Epson MX-80 .....	539

## commodore



### Commodore Computers:

4032 N .....	\$1090
4032 B .....	1090
8032 .....	1499

### Commodore Peripherals:

CBM 2022 Printer .....	675
CBM 4040 Dual Drive Floppy Disk .....	1090
CBM 8050 Dual Drive Floppy Disk .....	1420
CBM C2N Cassette Drive .....	87
Tally 8024 Printer .....	1679

### Commodore Software

EBS Accounts Receivable Inventory System .....	\$695
Dr. Daley Mailing List .....	129
Dr. Daley Inventory I .....	89
OZZ Information System .....	329
BPI General Ledger .....	329
Tax Package .....	399
Dow Jones Portfolio Management .....	129
Pascal .....	239

### Cables:

PET to IEEE Cable .....	37
IEEE to IEEE Cable .....	46

### To Order:

Phone orders invited (800 number is for order desk only). Or send check or money order.  
Equipment Shipped UPS collect. Pennsylvania residents add 6% sales tax. Add 3% for  
Visa or MC. Equipment is subject to price change and availability without notice.

**Computer Mail Order**  
501 E. Third St.  
Williamsport, PA 17701  
(717) 323-7921

# Add a Light Pen to your Micro

This article includes the hardware details necessary to install a light pen on any 6502 system. Software is included for an OSI implementation.

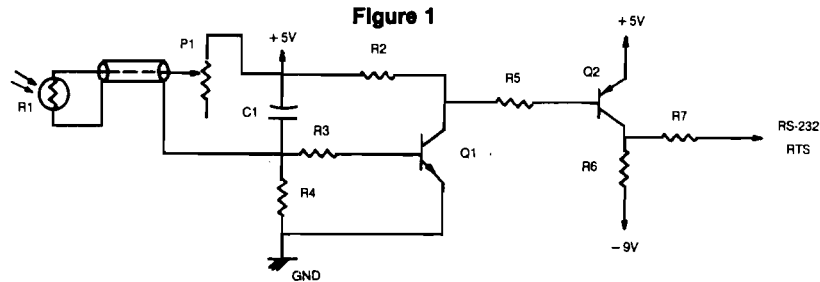
Peter Alan Koski  
27 Dogwood Drive  
Allendale, New Jersey 07401

Many computer installations today offer alternate forms of user I/O other than the standard CRT/keyboard combination. Among these is the light pen. In using a light pen, the user, if choosing from a menu for example, simply points the pen at what he desires. When locating a point on a grid, the user simply locates the point using the pen, rather than inputting coordinates through the keyboard.

Although the user may find this simplification of input fabulous, for the programmer there exists a lot of overhead. The programmer must keep track of where the information is located on the screen as the program progresses, and how the information changes during program execution.

## Principles of Operation

In theory, the operation of a light pen is extremely straightforward. When a request is made to locate the pen, a distinguishable token is swept across the display until the pen recognizes its presence. At that time, if we know where the token is, we also know where the pen is. Simple as this may seem, the hardware and software doesn't always follow suit on simplicity. On graphics systems where there is often a stand-alone microprocessor to control the terminal functions, the "token" is the raster sweep. This is



## Bill of Materials

- R1 — photo-resistor (see text)
- R2 — 1.8K
- R3 — 18K
- R4 — 120K
- R5 — 10K
- R6 — 470
- R7 — 470
- Q1 — 2N5300 (RS 276-2009)
- Q2 — 2N5226 (RS 276-2032)
- C1 — .005 uF
- P1 — 100K PC-type potentiometer

Table 1

0 D000	1 D008	2 D010	3 D018	4 D020	5 D028	6 D030	7 D038
8 D100	9 D108	10 D110	11 D118	12 D120	13 D128	14 D130	15 D138
16 D200	17 D208	18 D210	19 D218	20 D220	21 D228	22 D230	23 D238
24 D300	25 D308	26 D310	27 D318	28 D320	29 D328	30 D330	31 D338
32 D400	33 D408	34 D410	35 D418	36 D420	37 D428	38 D430	39 D438
40 D500	41 D508	42 D510	43 D518	44 D520	45 D528	46 D530	47 D538
48 D600	49 D608	50 D610	51 D618	52 D620	53 D628	54 D630	55 D638
56 D700	57 D708	58 D710	59 D718	60 D720	61 D728	62 D730	63 D738

probably the most sophisticated and elegant approach since the resolution is extremely high and the scan is invisible to the user.

I have taken a much more simplified approach. Rather than search the entire screen for the pen's location, I request verification at given screen locations. With this approach, the token must be displayed on the screen in order for the pen to see it. Since the standard scan rate for a monitor is 1/60 second, we have to display the token and then wait the required 1/60 second to guarantee that the token reaches the display. Obviously if we were to poll 2048 display locations, the time required wouldn't make this practical.

### Hardware

Figure 1 and the accompanying "bill of materials" presents the design for the light pen circuit I am using. The sensor used is a small Calectro photo-resistor mounted in a magic marker casing. The choice of the photo-resistor over a photo-transistor was based on spectrum sensitivity. Photo-transistors that I found were not responsive to a phosphorus source. The photo-resistor was, so the choice was obvious.

The light/dark conditions are reflected via an RS-232 line which is toggled between +5 and -9 volts. RS-232 was chosen as the communications link since I have an RS-232 port on my machine (as do most). By using the light pen to drive the RTS line on the port, I can monitor the status of the pen by monitoring the status word of the ACIA. The pen's condition will be found at the RTS bit.

The circuit goes together nicely on a small piece of perf-board. The interconnecting line used is a piece of miniature shielded micro-phone cable. There shouldn't be any problem assembling the circuit and all that remains is to adjust the light pen to match the CRT used.

A BASIC routine can be used to initially align the pen. While printing the contents of the status port, adjust the monitor's brightness/contrast and P1 of the light pen circuit. A point should be found so that touching the pen to an illuminated position will cause the RTS bit to be set low ("0"), a dark position should set the RTS bit high ("1"). It should be possible to find a position which is comparable to normal viewing intensity.

```

0800      1  ;*****
0800      2  ;*
0800      3  ;* LIGHT PEN QUADRANT QUERY *
0800      4  ;*          ROUTINE          *
0800      5  ;*
0800      6  ;*          PETER A. KOSKI    *
0800      7  ;*
0800      8  ;*****
0800      9  ;
0800     10  ;
3280     11          ORG $3280
3280     12  PENWRD EQU $FC00
3280 206C33 13          JSR GETBLK
3283     14  ;
3283     15  ;GET USR ARGUMENT (QUADRANT NUMBER) -- INSU
RE
3283     16  ;THAT THE VALUE IS ONLY 0 - 63
3283     17  ;
3283 A5B2 18          LDA $B2
3285 293F 19          AND #$00111111
3287 A8   20          TAY          ;GET ADDR LOOKUP
OFFSET
3288     21  ;
3288     22  ;LOAD BASE ADDRESS INTO STORE/BLANK/SCAN/RE
STR
3288     23  ;ROUTINES
3288     24  ;
3288 B9BA33 25          LDA LOADDR, Y
3288 8DBB32 26          STA STORE+1
328E 8DC332 27          STA BLANK+1
3291 8D0233 28          STA SCRNI+1
3294 8D3D33 29          STA RESTRE+1
3297     30  ;
3297 B97A33 31          LDA HIADDR, Y
329A 8DBC32 32          STA STORE+2
329D 8DC432 33          STA BLANK+2
32A0 8D0333 34          STA SCRNI+2
32A3 8D3E33 35          STA RESTRE+2
32A6     36  ;
32A6     37  ;INITIALIZE ADDRESSES FOR SAVE BUFFER
32A6     38  ;BUFFER STARTS AT $337E
32A6     39  ;
32A6 A97A   40          LDA #$7A
32A8 8DBE32 41          STA SCRNI+1
32AB 8D3A33 42          STA SCRNI+2
32AE A933   43          LDA #$33
32B0 8DBF32 44          STA SCRNI+2
32B3 8D3B33 45          STA SCRNI+2
32B6     46  ;
32B6     47  ;SAVE BLOCK DATA/BLANK (DARKEN) SELECTED
32B6     48  ;QUADRANT
32B6     49  ;
32B6 A000   50          LDY #00
32B8 A200   51          SAVE LDX #00
32BA BDFFFF 52          STORE LDA $FFFF, X
32BD 8DFFFF 53          SCRNI STA $FFFF          ;SAVE CHAR IN BU
FFER
32C0 A920   54          LDA #$20
32C2 9DFFFF 55          BLANK STA $FFFF, X
32C5 EEBE32 56          INC SCRNI+1
32C8 D003   57          BNE NOCRY1
32CA EEBF32 58          INC SCRNI+2
32CD E8     59          NOCRY1 INX
32CE E008   60          CPX #08          ;8 CHAR/LINE/QUA
D
32D0 D0E8   61          BNE STORE
32D2 C8     62          INY
32D3 C004   63          CPY #04          ;4 LINE/QUAD
32D5 F01A   64          BEQ OUT1
32D7 ADBB32 65          LDA STORE+1
32DA 18     66          CLC
32DB 6940   67          ADC #$40
32DD 8DBB32 68          STA STORE+1
32E0 8DC332 69          STA BLANK+1
32E3 ADBC32 70          LDA STORE+2
32E6 6900   71          ADC #00
32E8 8DBC32 72          STA STORE+2
32EB 8DC432 73          STA BLANK+2          ;GET NEXT LINE A
DDR
32EE 4CB832 74          JMP SAVE
32F1     75  ;

```

## Software

The two routines presented here are essentially identical except for the resulting resolution. Both are called via the BASIC USR function. The longer of the two routines accepts argument values from 0-63, the number corresponding to the screen quadrant to be queried. Table 1 shows the quadrant numbering scheme. The address associated with each quadrant is the address of the upper left memory location in the quadrant. Quadrants run eight locations horizontally and four locations vertically, or 32 locations total. Thus, touching the pen to any of these locations will score a hit. A hit is returned to BASIC as a 1 from the USR function, a miss is returned as a 0. This routine is thus most useful when resolution is not critical, such as for menu selection.

The single-cell query routine polls individual memory locations and thus provides 64 × 32 resolution. The argument of the USR function should be the requested memory address, less 32768. (BASIC only allows signed 15-bit arguments.) The return value is the same as the previous: 1 if hit, 0 if miss.

Both routines use the same idea in polling the requested position. The information at the quadrant or single cell is first saved and replaced by OSI graphics character \$20 (blank). If the pen is presently looking at a dark location, we *might* have its position. If not, we replace the data and return a miss. Should the pen be dark, we replace the \$20 with \$A1 [full illumination character]. At this point, if the pen sees a transition to light, we are at the correct position and return a hit after restoring the data. Had the transition not been seen by the pen, we obviously were not at the right location, and would return a miss.

### Programming with a Light Pen

When using the light pen, screen locations become very critical, thus careful formatting should be used through the memory map supplied by OSI. Remember that when using standard input and print statements, the screen has a tendency to scroll. Fortunately, this can be avoided by disabling the line feed. POKE 9644,42 will disable the scroll, POKE 9644,98 will re-enable the scroll routine.

(continued on page 63)

```

32F1      76 ;SEE IF LIGHT PEN WENT DARK
32F1      77 ;
32F1 206F33 78 OUT1 JSR TVDLA ;1/60 S. SCAN DE
LAY
32F4      79 ;
32F4 AD00FC 80 LDA PENWRD
32F7 2908 81 AND #$00001000
32F9 F037 82 BEQ NOTFND ;DARK PEN SETS R
TS
32FB      83 ;
32FB      84 ;PEN IS DARK/ENABLE QUADRANT AND SEE IF
32FB      85 ;PEN SEES CHANGE
32FB      86 ;
32FB A000 87 LDY #00
32FD A200 88 ENABLE LDX #00
32FF A9A1 89 LDA #$A1 ;WHITE SQUARE CH
AR.
3301 9DFFFF 90 SCRNI STA $FFFF,X
3304 E8 91 INX
3305 E408 92 CPX $08
3307 D0F8 93 BNE SCRNI
3309 C8 94 INY
330A C004 95 CPY #04
330C F014 96 BEQ OUT2 ;ENTIRE QUAD ENA
BLED
330E AD0233 97 LDA SCRNI+1
3311 18 98 CLC
3312 6940 99 ADC #$40
3314 8D0233 100 STA SCRNI+1
3317 AD0333 101 LDA SCRNI+2
331A 6900 102 ADC #00
331C 8D0333 103 STA SCRNI+2
331F 4CFD32 104 JMP ENABLE ;ADDR OF NEXT LI
NE
3322      105 ;
3322      106 ;CHECK TO SEE IF PEN SEES ENABLED QUADRANT
3322      107 ;
3322 206F33 108 OUT2 JSR TVDLA ;1/60 S. SCAN DE
LAY
3325      109 ;
3325 AD00FC 110 LDA PENWRD
3328 2908 111 AND #$00001000
332A D006 112 BNE NOTFND ;HI PEN DISABLES
RTS
332C      113 ;
332C      114 ;RETURN CODE FOR PEN:
332C      115 ;1 TO BASIC = PEN WAS IN QUADRANT
332C      116 ;0 TO BASIC = PEN WAS NOT IN QUAD
332C      117 ;
332C A901 118 LDA #01
332E 48 119 PHA ;SAVE RETURN COD
E ON STACK
332F 4C3533 120 JMP REPLCE
3332      121 ;
3332 A900 122 NOTFND LDA #00
3334 48 123 PHA ;SAVE RETURN COD
E ON STACK
3335      124 ;
3335      125 ;RESTORE ORIGINAL DATA FOUND AT QUADRANT
3335      126 ;
3335 A000 127 REPLCE LDY #00
3337 A200 128 RPLCE LDX #00
3339 ADFFFF 129 SCRNI LDA $FFFF
333C 9DFFFF 130 RESTRE STA $FFFF,X
333F EE3A33 131 INC SCRNI+1
3342 D003 132 BNE NOCRY2
3344 EE3B33 133 INC SCRNI+2
3347 E8 134 NOCRY2 INX
3348 E008 135 CPX #08
334A D0ED 136 BNE SCRNI
334C C8 137 INY
334D C004 138 CPY #04
334F F014 139 BEQ OUT3
3351 AD3D33 140 LDA RESTRE+1
3354 18 141 CLC
3355 6940 142 ADC #$40
3357 8D3D33 143 STA RESTRE+1
335A AD3E33 144 LDA RESTRE+2
335D 6900 145 ADC #00

```

# MICRO

## Classified

### Programmer Fatigue?

SYM-BUG/MONEX adds 15 commands to SYM's repertoire including an interactive trace/debug. Cassette @ \$0200 or \$3800: \$19.95. EPROM (2716-5v) @ \$F000-\$F7FF: \$39.95. Commented source listing: \$9.95. RAE-1(1/2) FORMAT CASSETTE: \$35 (requires 8K). Custom assembly add \$2.00. Foreign add \$2.00. SASE for more information.

Jeff Holtzman  
6820 Delmar-203  
St. Louis, Missouri 63130

### PET Machine Language Guide

Comprehensive manual to aid machine language programmer. More than 30 routines are fully detailed so that the reader can put them to immediate use. OLD or NEW ROMS. \$6.95 + .75 postage. VISA & Mastercharge accepted.

Abacus Software  
P.O. Box 7211  
Grand Rapids, Michigan 49510

### Spanish Hangman

2,000 SPANISH words and sentences taught in a fun way on the Apple. Send for your school's free 30-day evaluation diskette, from:

George Earl  
1302 South General McMullen  
San Antonio, Texas 78237

### Save Money — You Can!

By building your own computer interfaces. 80% savings. Send \$3.95 for simple how-to package today.

ADS  
Box 9770  
Jacksonville, Florida 32208

### C1P Extended Monitor

2K EPROM has 14 cursor control/editing functions, improved keyboard decoding. Machine language save, load, display, modify, move, breakpoint processing and much more. For 24, 32, 64 char/line. \$39.95 plus \$1.00 shipping. \$1.00 for complete information.

Bustek  
P.O. Box A  
St. Charles, MO 63301

### The DI-SECTOR Disk for the Apple

makes 'Disecting' your Apple diskettes fast and easy. Now you can display and edit any sector from an Apple diskette on the screen and more for only \$20.00 postpaid! ROM Applesoft is required and both DOS 3.2 and 3.3 versions are supplied.

Mike Rowe Productions  
P.O. Box 43504  
Tucson, Arizona 85733

(Add a Light Pen...)

```

335F 8D3E33 146          STA RESTRE+2
3362 4C3733 147          JMP RPLCE
3365          148          ;
3365          149          ;RETURN TO BASIC CALLING ROUTINE
3365          150          ;
3365 68      151          OUT3   PLA                      ;POP RETURN CODE

3366 A8      152          TAY
3367 A900    153          LDA #00
3369 6C0800 154          JMP (08)                      RTS
336C          155          ;
336C 6C0600 156          GETBLK JMP (06)
336F          157          ;
336F          158          ;TV SCAN DELAY
336F          159          ;
336F A040    160          TVDLA  LDY #S40
3371 A2FF    161          LOOP1  LDX #SFF
3373 CA      162          LOOP2  DEX
3374 D0FD    163          BNE LOOP2
3376 88      164          DEY
3377 D0F8    165          BNE LOOP1
3379 60      166          RTS
337A          167          ;
337A          168          ;QUADRANT CHARACTER HOLD BUFFER
337A          169          ;
337A          170          ;BUFFER EQU *+32
337A          171          ;
337A          172          ;ADDRESS LOOK UP TABLE FOR 64 GIVEN QUADRAM
TS
337A          173          ;
337A D0D0D0 174          HIADDR  HEX D0D0D0D0D0D0D0D0
337D D0D0D0
3380 D0D0
3382 D1D1D1 175          HEX D1D1D1D1D1D1D1D1
3385 D1D1D1
3388 D1D1
338A D2D2D2 176          HEX D2D2D2D2D2D2D2D2
338D D2D2D2
3390 D2D2
3392 D3D3D3 177          HEX D3D3D3D3D3D3D3D3
3395 D3D3D3
3398 D3D3
339A D4D4D4 178          HEX D4D4D4D4D4D4D4D4
339D D4D4D4
33A0 D4D4
33A2 D5D5D5 179          HEX D5D5D5D5D5D5D5D5
33A5 D5D5D5
33A8 D5D5
33AA D6D6D6 180          HEX D6D6D6D6D6D6D6D6
33AD D6D6D6
33B0 D6D6
33B2 D7D7D7 181          HEX D7D7D7D7D7D7D7D7
33B5 D7D7D7
33B8 D7D7
33BA          182          ;
33BA 000810 183          LOADDR  HEX 0008101820283038
33BD 182028
33C0 3038
33C2 000810 184          HEX 0008101820283038
33C5 182028
33C8 3038
33CA 000810 185          HEX 0008101820283038
33CD 182028
33D0 3038
33D2 000810 186          HEX 0008101820283038
33D5 182028
33D8 3038
33DA 000810 187          HEX 0008101820283038
33DD 182028
33E0 3038
33E2 000810 188          HEX 0008101820283038
33E5 182028
33E8 3038
33EA 000810 189          HEX 0008101820283038
33ED 182028
33F0 3038
33F2 000810 190          HEX 0008101820283038
33F5 182028
33F8 3038

```

```

0800      1  ;*****
0800      2  ;*
0800      3  ;* SINGLE VIDEO CELL QUERY *
0800      4  ;*      ROUTINE      *
0800      5  ;*
0800      6  ;*      PETER A KOSKI      *
0800      7  ;*
0800      8  ;*****
0800      9  ;
3280     10      ORG $3280
3280     11      OBJ $800
3280     12  PENWRD EQU $FC00
3280 20C432 13      JSR GETBLK
3283     14  ;
3283     15  ; TURN USR ARGUMENT INTO 6502 ADDRESS
3283     16  ;
3283 A5B2 17      LDA $B2
3285 48    18      PHA
3286 A5B1 19      LDA $B1
3288 0980 20      ORA #10000000
328A 85B2 21      STA $B2
328C 68    22      PLA
328D 85B1 23      STA $B1
328F     24  ;
328F A200 25      LDX #00
3291     26  ;
3291     27  ;SAVE CHARACTER AT CELL AND DARKEN
3291     28  ;SELECTED CELL
3291     29  ;
3291 A1B1 30      LDA ($B1,X)
3293 48    31      PHA                      ;SAVE CHAR ON ST
ACK
3294 A920 32      LDA #$20
3296 81B1 33      STA ($B1,X)
3298     34  ;
3298     35  ;SEE IF LIGHT PEN WENT DARK
3298     36  ;
3298 20C732 37      JSR TVDLA                      ,1/60 S. SCAN DE
LAY
329B AD00FC 38      LDA PENWRD
329E 2908 39      AND #00001000
32A0 F018 40      BEQ NOTFND                      ;DARK PEN SETS R
TS
32A2     41  ;
32A2     42  ;PEN IS DARK / ENABLE CELL AND CHECK IF
32A2     43  ;PEN SEES TRANSITION
32A2     44  ;
32A2 A9A1 45      LDA #$A1                      ;WHITE SQUARE CH
AR.
32A4 81B1 46      STA ($B1,X)
32A6     47  ;
32A6     48  ;CHECK TO SEE IF PEN SAW ENABLED CELL
32A6     49  ;
32A6 20C732 50      JSR TVDLA                      ;1/60 S. SCAN DE
LAY
32A9     51  ;
32A9 AD00FC 52      LDA PENWRD
32AC 2908 53      AND #00001000
32AE D00A 54      BNE NOTFND                      ;HI PEN DISABLES
RTS
32B0     55  ;
32B0     56  ;RETURN CODE FOR PEN:
32B0     57  ;1==PEN WAS AT CELL
32B0     58  ;0==PEN WAS NOT AT CELL
32B0     59  ;
32B0 68    60      PLA                      ;GET CELL'S CHAR
ACTER
32B1 81B1 61      STA ($B1,X)
32B3 A900 62      LDA #00
32B5 A001 63      LDY #01
32B7 6C0800 64      JMP (08)
32BA     65  ;RTS -- BASIC
32BA     66  ;
32BA 68    67      NOTFND PLA                      ;GET CELL'S CHAR
ACTER
32BB 81B1 68      STA ($B1,X)
32BD A900 69      LDA #00
32BF A000 70      LDY #00
32C1 6C0800 71      JMP (08)
32C4     72  ;RTS -- BASIC

```

## Liquidating

Selling out all my software—all for CP/M disks: Cobol, Fortran, Pascal, Compiler, Editor, Assembler, Linker, Macro, Utilities, Sorts, Forth, CBas2, CP/M Vols. 1-45. All of IMSAI's software. Some TRS, Apple, too.

Mike Sheffield  
3204 "A" Production  
Oceanside, California 92054

## Fig-FORTH for OSI C1P/Superboard

This implementation of the FORTH Interest Group model (Release 1.1) runs under OS-65D and includes single/double precision integer arithmetic, compiler, editor and assembler. \$50.00 includes postage, fig-FORTH installation manual, source listing, operating manual for C1P/Superboard and 5 1/4" disk.

Mike Alport  
5 Woodland Mounds Road  
Iowa City, Iowa 52240

## AIM-65 High Quality Power Supply

Exceeds Rockwell's specifications. *Over-voltage protection*, fuse, switch, pilot light, line cord, cable—all included. Handsome metal case. Satisfaction or return unit within 10 days for full refund. VISA/MC, check (allow 2 weeks to clear). \$64.95 plus shipping (5 lbs.).

CompuTech  
P.O. Box 20054  
Riverside, California 92516

## AIM-65 Newsletter \* \* Target

Target provides hardware and software information useful for AIM-65 and 6502 users. The 1979 and 1980 back issues are available for \$12.00 while a continuing subscription costs \$6.00. Just write to:

Target  
Donald Clem  
Route 2  
Spenserville, Ohio 45887

## OSI SUPERB/C1P - New MonitorROM

You haven't seen a better utility ROM! Exchange MonitorROM and get: Screen-editor (insert, delete), cursor control, f. 24/32/64 chr/line; cassette-sys. w. file name handler (3-4 times faster), handles BASIC, Hexcode and variable arrays, and more. Further applications and program information \$1.00.

Gerwin Bleich  
Boschstr. 1,3004  
Isernhagen 1, West Germany

## New - Wine Steward and Bar Guide

Want to know which wine to buy for that special meal, or any occasion? The Super Bar and Wine Guide has it all. Complete description of over 54 Red, White and Specialty types as well as over 200 Brand Name recommendations and prices.

Glossary of Terms, Wine Tips, Pronunciation Guide, Serving Suggestions and "Computer" Wine Steward. Also included is a Bartender's Guide and recipes for 40 popular Mixed Drinks. An incomparable value! Applesoft, 48K, Disk, \$24.95 + \$1.50 postage.

Cine-Aero  
1821 N. Frederick Street  
Burbank, California 91505

### Ohio Scientific

SPACE WARS for C1P, Hi- or Lo-Res graphics. Maneuver into attack position making S turns and then make the kill with your lasers! Or use evasive action and hide off the screen, but be careful! Don't get lost! 8K, \$4.95 for cassette.

Danny Ledesma  
P.O. Box 5784  
Elmonte, California 91731

### Atari — PET Owners

KINETIC DESIGNS has software for you! Games and Simulations, Music, Astronomy, Ham Radio, home use, utility, and many others. MTU Visible Memory and music programs now available! Prices start at only \$2.50! (Atari \$3.50) Guaranteed! Send SASE for full details.

Kinetic Designs  
401 Monument Road 171  
Jacksonville, Florida 32211

### Want Something Different?

1. Be Your Own Astrologer—AST-T2-001 (\$15.95). For anyone with 8K PET.
2. Primary Arcs—AST-T1-002 (\$24.95). For experienced Astrologers with 16K PET. California residents add 6% sales tax. Foreign add \$3.00.

Access  
P.O. Box 8726  
Rowland Heights, California 91748

## OHIO SCIENTIFIC

**S-FORTH** - a full implementation of Fig-FORTH including editor, virtual disk sub-system, and compatibility with OS65D-3 on 5¼" or 8" disk. \$29.95.

Source listing \$24.95.  
Both for \$49.95.

**TOUCH TYPING** - 15 lesson set teaches you to use all letters and numerals without the need to look at the keyboard. Requires 32x64 display. 8K. \$19.95.

**FAILSAFE +2** - a sophisticated game based on the electronic warfare environment encountered by aircraft during nuclear war. 8K. \$8.95.

**INTELLIGENT TERMINAL EMULATOR** - down load, edit, then send files back to host computer. Full or half duplex, many other features. Disk systems. \$24.95.

Send for a FREE complete software and hardware catalog.

**Aurora Software Associates**  
P.O. Box 99553  
Cleveland, Ohio 44199  
(216) 221-6981

(Add a Light Pen...)

```
32C4          73 ;
32C4 6C0600   74 GETBLK JMP (06)
32C7          75 ;
32C7          76 ;DELAY TO ALLOW FOR STANDARD TV SCAN
32C7          77 ;
32C7 A000     78 TVDLA LDY #00
32C9 A200     79 LOOP1 LDX #00
32CB E8       80 LOOP2 INX
32CC D0FD     81 BNE LOOP2
32CE C8       82 INY
32CF C040     83 CPY #$40
32D1 D0F6     84 BNE LOOP1
32D3 60       85 RTS
```

```
950 REM *****
952 REM *
954 REM * LIGHT PEN DEMONSTRATION *
956 REM * BY PETER A KOSKI *
958 REM *
960 REM *****
1004 REM CALL IN SCREEN CLEAR ROUTINE
1005 REM
1006 DISK!"CALL 3280=31,3"
1010 POKE 574,128: POKE 575.50
1020 X=USR(X)
1021 REM
1022 REM LOAD SELECTION DATA ONTO SCREEN
1023 REM
1030 PRINT " == ELEMENTARY MATH LIGHT PEN DEMO == "

1040 PRINT : PRINT : PRINT
1050 PRINT " 0 1 2 3 4 5 6 7
8";
1060 PRINT " 9"
1070 PRINT : PRINT : PRINT : PRINT
1080 PRINT " + - * /"
1090 PRINT : PRINT : PRINT : PRINT : PRINT
2000 REM
2010 REM RUN THE PROGRAM USING SUBROUTINES
2020 REM
2021 REM CALL IN SINGLE CELL QUERY ROUTINE
2022 REM
2025 DISK!"CALL 3280=31,2":RPT=0
2030 GOSUB 3000:A1=NUM
2040 GOSUB 4000:O=OP:RPT=RPT+1
2050 GOSUB 3000:A2=NUM
2060 ON O GOTO 2100,2200,2300,2400
2100 ANS=A1+A2
2110 GOTO 2500
2200 ANS=A1-A2
2210 GOTO 2500
2300 ANS=A1*A2
2310 GOTO 2500
2400 ANS=A1/A2
2500 REM
2510 REM PRINT OUTPUT
2520 REM
2530 POKE 9644,42: REM DISABLE SCROLL ON PRINT
2600 PRINT " THE RESULT IS ";ANS
2605 FOR PS=1 TO 200:PS=ABS(PS): NEXT PS
2620 PRINT "
2625 IF RPT=5 THEN 5000
2630 GOTO 2030
3000 REM
3010 REM NUMERIC INPUT (SINGLE DIGITS)
3020 REM
3025 NUM=0:CNT=0
3030 FOR CELL=54402 TO 54458 STEP 6
```



```

3040 NUM=USR(CELL-32768)
3050 IF NUM=1 THEN NUM=CNT: RETURN
3060 CNT=CNT+1
3100 NEXT CELL
3110 CNT=0
3120 GOTO 3030
4000 REM
4010 REM OPERATOR INPUT
4020 REM
4025 CNT=1
4030 FOR CELL=54730 TO 54760 STEP 10
4040 OP=USR(CELL-32768)
4045 IF OP=1 THEN OP=CNT: RETURN
4046 CNT=CNT+1
4050 NEXT CELL
4100 GOTO 4025
5000 REM
5010 REM ANOTHER 5 ROUNDS ?
5020 REM
5021 REM CALL IN SCREEN CLEAR
5022 REM
5030 DISK!"CALL 3280=31,3
5040 X=USR(X)
5045 REM
5046 REM CALL IN QUADRANT QUERY ROUTINE
5047 REM
5050 DISK!"CALL 3280=31,1
5060 POKE 9644,98: REM RE-ENABLE SCROLL
5065 REM
5066 REM DISPLAY QUESTION/INPUT SELECTION
5067 REM
5070 PRINT " WOULD YOU LIKE ANOTHER GO AT IT ?"
5080 PRINT : PRINT : PRINT : PRINT
5090 PRINT " YES NO"
5100 PRINT : PRINT
5110 IF USR(49)=1 THEN 950
5120 IF USR(52)=1 THEN 6000
5130 GOTO 5110
6000 REM
6010 REM EXIT TO BASIC
6020 REM
6030 DISK!"CALL 3280=31,3
6040 X=USR(X)
6050 END

```

Other thoughts to keep in mind, especially if taking input from a graph, is that the pen can move only to a block adjacent to the one where it is presently. Thus, once the original position is known, the next move can only be one of, at most, eight positions. The accompanying demonstration program should help to explain. The two routines and a screen clear are on track 31 in this example, and are all called in to \$3280 for execution. The quadrant routine is on sector 1, the individual cell routine on sector 2, and the screen clear code on sector 3. The program is a simple arithmetic demo. Single-digit arguments and operators are input via the light pen and the result is printed to the screen without line feed. After five repetitions, the program asks the user if he would like another session. Again, the yes/no response is accepted through the light pen.

### Conclusion

Although the routines presented were written for an OSI mini-floppy system, any 6502 system supporting memory mapped video should be able to employ them. The only changes to be made are the addresses of the display block and of the ACIA.

One last thought for disk owners—a menu or display block which is repeatedly used at various points of the program may be held resident on a disk track and then CALLED to \$D000. As you'll discover, speed plays an important part in light pen I/O, since the time spent for input is nil. The processing and output must therefore be as streamlined as possible in developing an efficient system.

**MICRO**

# OHIO SCIENTIFIC USERS

SOFTWARE - GAME AND UTILITY PROGRAMS FOR AS LOW AS \$1.00. ALL WITH LISTINGS AND COMPLETE DOCUMENTATION.

KITS - UPDATE YOUR COMPUTER TO PLAY MUSIC, INCREASE OPERATING SPEED, HIGH RESOLUTION GRAPHICS AND MUCH MORE. KITS INCLUDE PARTS AND COMPLETE ASSEMBLY INSTRUCTIONS. LOW AS \$3.00.

OUR \$1.00 CATALOG INCLUDES OSI PROGRAMMING TIPS PLUS DESCRIPTIONS OF AVAILABLE PROGRAMS AND KITS.

**MITTENDORF ENGINEERING 905 VILLA NUEVA DR. LITCHFIELD PARK, AZ 85340**

**MEMOIR**

# The Most Exciting Event of All Time for Apple\* Computer Users

For the first time ever, a computer show devoted exclusively to the Apple computers. Applefest '81. The largest event in the world for Apple users.

You'll see it all at Applefest. All of the latest Apple software for home, business and education. New peripherals and accessories. Useful publications and support services. Over a hundred exhibits of products and applications from around the country.

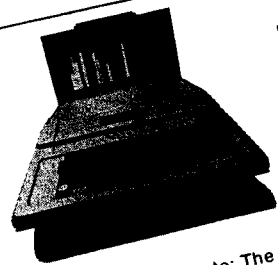
Don't miss the Applefest '81 Seminar Program, a two day series with different topics running every hour. Learn about business software, making the Apple work for you at home, programming from Apple Computer and other leading Apple support manufacturers. All of the seminars are free of charge to Applefest attendees.

Regular adult admission is just \$3 per day. You can register at the door, or use the pre-registration form. If you use the Apple, or are thinking about buying one, you won't want to miss a minute of Applefest '81.

**Saturday, June 6 — Sunday, June 7, 1981**  
 11:00 A.M. - 7:00 P.M. Saturday; 11:00 A.M. - 6:00 P.M. Sunday

## The Plaza Castle

Arlington Street at Columbus Avenue, Boston, Massachusetts



Name \_\_\_\_\_  
 Street \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 City \_\_\_\_\_  
 Please send me \_\_\_\_\_ tickets. \$ \_\_\_\_\_ enclosed.

Detach and return to: The Boston Computer Society, Three Center Plaza, Boston, Massachusetts 02108

# applefest '81

Sponsored by Apple/Boston  
 The Boston Computer Society's Apple User Group  
 Three Center Plaza, Boston, Mass. 02108  
 (617) 367-8080

\*Apple is a registered trademark of Apple Computer, Inc.

# Integer BASIC Internals

Here's a sorted list of Apple Integer BASIC memory locations and routines, with some examples of how to use them.

Glenn R. Sogge  
P.O. Box 203  
Evanston, Illinois 60204

Apple Computer Co. has released to its dealers a set of application and information notes that are quite informative. Included in the package is a listing of memory locations and routines used by Integer BASIC. The table with this article is a numerically sorted (by hex address) listing of this information. Also included are the corresponding decimal equivalents of the addresses and a little information about the routines. In general, routines without descriptions are the handlers for the functions named.

Hardly any information is given about how the routines are called or are used but with a little digging I'm sure you can figure out how to use at least a few of these in your own programs. At least, you now know where to begin looking. For example, the routine at \$E51B ("HEX/DEC") converts the

16-bit number contained in the X (lo) and A (hi) registers to a decimal number from 0-65535 and prints it out.

The routine at \$EE68 prints out the "\*\*\*\* RANGE ERR" message and the routine at \$E36B prints out the "\*\*\*\* MEM FULL ERR" message. A couple of useful tricks are also mentioned in the Apple material.

1. To find the absolute address of a given line, place the line number (in hex) into locations \$CE-\$CF (lo and hi). Then jump to address \$E56D (\*E56DG); the absolute address will be returned in locations \$E4-\$E5 (lo and hi).

2. To execute a GOTO from the monitor, put the absolute address of the line (found by the above procedure) into \$C6-\$C7 and put a negative byte into \$D9—a negative value indicates run mode, a positive one indicates immediate mode). Then jump to \$E867 (\*E867G) and you will be back in BASIC running at that line.

This item was picked up from a bulletin board here in Chicago and is from Mark Pump.

"If you've ever accidentally pressed RESET while an Integer BASIC program was running, this is for you. In the monitor, enter:

\*E3E3G

and the statement number which was last executed is displayed. Press RESET again and re-enter DOS with \*3D0G. This method can also be used to find the statement number of an outstanding Integer BASIC input statement. When the input prompt occurs, press RESET and \*E3E3G to find the statement number. Exiting the program with control-C will not show the statement number if an input statement was active."

You should also notice that there seems to be some discrepancy between the list of page zero locations used given in the list and the chart on page 75 of the new Apple II Reference Manual (the white book). According to the chart, locations \$E0-\$FF are not used by Integer BASIC but the detailed list shows this to be incorrect. Some of those locations are indeed used by BASIC! Also, some locations are used for a couple of things, depending on the routine in command, so the values might not always be what you would expect.

HEX	DEC	NAME	DESCR	HEX	DEC	NAME	DESCR
004A	74	LOMEML	LOW MEMORY LO	00CE	206	ACL	GEN'L ACC LO
004B	75	LOMEMH	LOW MEMORY HI	00CE	206	VALGETL	PRIMARY EVAL TEMP LO
004C	76	HIMEML	HIGH MEMORY LO	00CE-00CF	206-207	VAL	16-BIT TEMP FOR MATH
004D	77	HIMEMH	HIGH MEMORY HI	00CF	207	VALGETH	PRIMARY EVAL TEMP HI
004E	78	RNDL	RANDOM # LO	00CF	207	ACH	GEN'L ACC HI
004F	79	RNDH	RANDOM # HI	00D0	208	SRCHL	PTR FOR SEARCH VAR TBL LO
0050-006F	80-111	NOUNSTKL	NOUN STACK LO	00D1	209	SRCHH	PTR FOR SEARCH VAR TBL HI
0050-0077	80-119	SYNSTKH	SYNTAX STACK HI LOCS	00D1-00F0	209-240	TOKNDXSTK	TOKEN INDEX STACK
0078-0097	120-151	NOUNSTKH	NOUN STACK HI	00D2	210	SRCH2L	VAR TAB SEARCH PTR2 LO
0080-009F	120-159	SYNSTKL	SYNTAX STACK LO LOCS	00D3	211	SRCH2H	VAR TAB SEARCH PTR2 HI
00A0-00BF	160-191	NOUNSTKC	NOUN STACK COUNTER	00D4	212	IFSAIP	IF ? THEN FAIL FLAG
00A0-00C7	160-199	TXINDXSTK	TEXT INDEX STACK	00D5	213	CRFLAG	CARR RTN FLAG
00C8	200	TXINDX	TEXT INDEX VALUE	00D6	214	VERBNOW	CURR VERB IN USE
00C8	200	OUTVAL	OUTPUT VAL TEMP	00D7	215	PRINOW	PRINT IT NOW FLAG
00C9	201	YTEMP	TEMP FOR Y-REG	00D8	216	XSAVE	TEMP FOR X-REG
00C9	201	LEADBL	LEADING BLANKS INDEX	00D9	217	RUNMODE	RUN MODE FLAG
00CA	202	PPL	PGM PTR LO	00DA	218	AUXL	AUX CNTR LO
00CB	203	PPH	PGM PTR HI	00DB	219	AUXH	AUX CNTR HI
00CC	204	PVL	CURR VAR PNTR LO	00DC	220	PRL	CURR LN VAL LO
00CD	205	PVH	CURR VAR PNTR HI	00DD	221	PRH	CURR LN VAL HI
				00DE	222	PNL	CURR NOUN PTR LO
				00DF	223	PNH	CURR NOUN PTR HI

(continued)

00E0	224	PXL	CURR VERB PTR LO	E7E2	-6174	AUTO	AUTO LINE #
00E1	225	PXH	CURR VERB PTR HI	E828	-6104	IF/THEN	IF ? THEN ROUTINE
00E2	226	PIL	AUX PTR1 LO	E83C	-6061	GOSUB	
00E2	226	DELL	DELETE LN PTR LO	E858	-6056	GOTO	
00E3	227	DELH	DELETE LN PTR HI	E867	-6041	COLINE	GOTO LINE ADDR IN #C6-C7
00E3	227	P1H	AUX PTR1 HI	E875	-6027	GETNEXT	FETCH NEXT TEXT STATEMENT
00E4	228	FLAG	GEN'L FLAG BYTE	E885	-5979	RETURN	
00E4	228	P2L	AUX PTR2 LO	E8C3	-5949	STOPPED AT	PRINT 'STOPPED AT LINE #'
00E4	228	LNAL	LINE # ADDR LO	E8D6	-5930	NEXT	NEXT END LOOP
00E5	229	LNAH	LINE # ADDR HI	E93A	-5830	FOR	FOR INITIAL ENTRY
00E5	229	P2H	AUX PTR2 HI	E950	-5808	TO/FOR	LOOP CNTR # TO # STEP #
00E6	230	NXTL	NEXT PTR LO	E910-E9B7	-5616 -5497	VERBADRL	VERB DISPATCH TAB LO
00E6	230	P3L	AUX PTR3 LO	E9B8-EA9F	-5496 -5377	VERBADRH	VERB DISPATCH TAB HI
00E7	231	NEXH	NEXT PTR HI	EA00-EB79	-5376 -5223	MESSTXT	ERROR MESS. TEXT
00E7	231	P3H	AUX PTR3 HI	EB8A	-5206	INPUT	INPUT ROUTINE
00F1	241	TOKNDX	TOKEN INDEX VAL	EC00-EDFF	-5120 -4609	SYNTABL	SYNTAX TABLE LIST
00F2	242	CONL	CONTINUE PTR LO	EE03	-4605	PRNTSTR	PRINT A STRING
00F3	243	CONH	CONTINUE PTR HI	EE22	-4574	LEN	
00F4	244	AUTOINCL	AUTO INC VAL LO	EE3A	-4554	GETVAL<255	GET VALUE < 255
00F5	245	AUTOINCH	AUTO INC VAL HI	EE3F	-4545	PLOT	
00F6	246	AUTOLNL	CURR AUTO LINE # LO	EE4E	-4530	COLOR	
00F7	247	AUTOLNH	CURR AUTO LINE # HI	EES4	-4524	MAN	
00F8	248	AUTOMODE	AUTO FLAG	EES7	-4521	VTAB	
00F9	249	COUNT	GEN'L CNTR BYTE	EE68	-4504	RNGERR	PRINTS '*** RANGE ERR'
00F9	249	CHAR	CURR CHAR	EE80	-4448	CALL	CALL A ML SUBR
00FA	250	LEADZR	LEADING ZEROS INDEX	EEB0	-4432	HLIN	
00FB	251	FORNDX	FOR/NEXT LOOP INDEX	EEC6	-4410	VLIN	
00FC	252	COSUBNDX	GOSUB INDEX	EED3	-4397	PRINT	PRINT ERROR MSG/BELL
00FD	253	SYNSYNDX	SYNTAX STACK INDEX VAL	EEF6	-4362	PEEK	
00FE	254	SYNPAGE	SYNTAX PAGE PTR LO	EF00	-4352	GETVAL255	GET A VALUE FOR 1 BYTE
00FF	255	SYNPACH	SYNTAX PAGE PTR HI	EF08	-4344	POKE	
0200-02FF	512-767	INBUFF	INPUT BUFFER	EF10	-4336	DIVIDE	
E000	-8192	CNTLB	COLD ENTRY	EF1E	-4322	DIMVARD	DIMENSION A VARIABLE
E003	-8189	CNTLC	WARM ENTRY	EF4E	-4274	RND	RANDOM # GENERATOR
E006	-8186	SETPRMP	SET UP > PROMPT	EFEC	-4116	RUN	RUN FROM BEGINNING
E02A	-8150	NXTBYTE	GET NEXT BYTE 16BIT PNTR	EFF2	-4110	RUN #N	RUN FROM LINE #
E04B	-8117	LIST	LIST ALL	F000	-4096	SCRATCH	SCRATCH EVERYTHING
E050	-8099	LISTXY	LIST A RANGE	F04D	-4019	HIMEM	
E0D	-8083	UNPACK	TOKENED CODE TO MNEMONICS	F0C9	-3895	LOMEM	
E130	-7888	DIMSTR	DIMENSION A STRING	F0DF	-3873	LOAD	LOAD A PGM FROM TAPE
E171	-7823	INPUTSTR	INPUT A STRING	F11E	-3810	SETHDR	SETUP HDR FOR SAVE/LOAD PARAM
E222	-7646	MULT	MULTIPLY	F12C	-3796	SETBUF	SETUP PGM SAVE/LOAD PARAM
E27A	-7558	MOD		F140	-3776	SAVE	SAVE A PGM TO TAPE
E28A	-7542	SCRN	RETURN SCRN COLOR	F161	-3743	PRNTERR	PRINT AN ERROR MESS
E2B3	-7501	MAINLINE	MAIN COMP/EXEC CODE	F167	-3737	POP	
E36B	-7317	MEMFUL	PRINTS '*** MEM FULL ERR'	F171	-3727	TRACE	
E36F	-7313	DELETE	DELETE LINES X-Y	F176	-3722	NOTRACE	
E3C0	-7232	ERRORMESS*	INPUT ERROR MSG	F17D	-3715	TRACEIT	EXEC TRACE FUNC
E3CE	-7218	GETCMD	GET KEYBOARD CMD	F279	-3463	STEP	FOR/NEXT STEP FUNC
E3E0	-7200	ERRORMESS	PRNT ERR MSG GOTO MAINLINE	F2E0	-3360	NODSP	
E51B	-6885	HEX/DEC	PRINT VAL(X=LO ACC=HI) 0-65535	F304	-3324	DSP	
E56D	-6803	LINADR	FIND LINE #'S ADDRESS	F30A	-3318	CON	CONTINUE EXEC
E5AD	-6739	NEW		F31D	-3299	ASC	
E5B7	-6729	CLR		F33B	-3269	PDL	
E6EC	-6420	BRANCH	GET LO/HI THEN JSR	F351	-3247	RIDKEY	READ AN INPUT
E6FF	-6401	GETVERB	NEXT VERB TO USE	F371	-3215	EXP ^	RAISE TO A POWER
E715	-6379	GET16BIT	GET A 16-BIT VAL	F3C9	-3127	PR#S	
E736	-6346	NOT		F41A	-3046	IN#S	
E74A	-6326	ABS					
E75C	-6308	SGN					
E782	-6270	SUBTRACTION					
E785	-6267	ADDITION					
E7A1	-6236	TAB					
E7C1	-6207	COMMA					

ACRO™

Send for FREE  
Control Page  
Also Available soon on Atari

# EDIT 6502 T.M. LJK

Two Pass Assembler, Disassembler, and Editor Single Load Program  
DOS 3.3., 40/80 Columns, for Apple II or Apple II Plus\*

A MUST FOR THE MACHINE LANGUAGE PROGRAMMER. Edit 6502\* is a two pass Assembler, Disassembler and text editor for the Apple computer. It is a single load program that only occupies 7K of memory. You can move freely between assembling and disassembling. Editing is both character and line orientated, the two pass disassemblies create editable source files. The program is so written so as to encompass combined disassemblies of 6502 Code, ASCII text, hex data and Sweet 16 code. Edit 6502 makes the user feel he has never left the environment of basic. It encompasses a large number of pseudo opcodes, allows linked assemblies, software stacking (single and multiple page) and complete control of printer (paganation and tab setting). User is free to move source, object and symbol table anywhere in memory. Requirements: 48K of RAM, and ONE DISK DRIVE. Optional use of 80 column M&R board, or lower case available with Paymar Lower Case Generator.

TAKE A LOOK AT JUST SOME OF THE EDITING COMMAND FEATURES. Insert at line # n Delete a character Insert a character Delete a line # n List line # n1, n2 to line # n3 Change line # n1 to n2 "string1" Search line # n1 to n2 "string1".

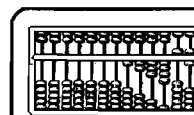
LJK Enterprises Inc. P.O. Box 10827 St. Louis, MO 63129 (314) 846-2313

\*Edit 6502 T.M. of LJK Ent. Inc. — \*Apple T.M. of Apple Computer Inc.

LOOK AT THESE KEY BOARD FUNCTIONS: Copy to the end of line and exit: Go to the beginning of the line: abort operation: delete a character at cursor location: go to end of line: find character after cursor location: non destructive backspace: insert a character at cursor location: shift lock: shift release: forward copy: delete line number: prefix special print characters. Complete cursor control: home and clear, right, left down up. Scroll a line at a time. Never type a line number again.

All this and much much more — Send for FREE information.

Introductory Price \$50.00.



COMPUTER BASED SOFTWARE

LJK™

ENTERPRISES



## Turn your Apple into the world's most versatile personal computer.

**The SoftCard™ Solution.** SoftCard turns your Apple into two computers. A Z-80 and a 6502. By adding a Z-80 microprocessor and CP/M to your Apple, SoftCard turns your Apple into a CP/M based machine. That means you can access the single largest body of microcomputer software in existence. Two computers in one. And, the advantages of both.

**Plug and go.** The SoftCard system starts with a Z-80 based circuit card. Just plug it into any slot (except 0) of your Apple. No modifications required. SoftCard supports most of your Apple peripherals, and, in 6502-mode, your Apple is still your Apple.

**CP/M for your Apple.** You get CP/M on disk with the SoftCard package. It's a powerful and simple-to-use operating system. It supports more software than any other microcomputer operating system. And that's the key to the versatility of the SoftCard/Apple.

**BASIC included.** A powerful tool, BASIC-80 is included in the SoftCard package. Running under CP/M, ANSI Standard BASIC-80 is the most powerful microcomputer BASIC available. It includes extensive disk I/O statements, error trapping, integer variables, 16-digit precision, extensive EDIT commands and string functions, high and low-res Apple graphics, PRINT USING, CHAIN and COMMON, plus many additional commands. And, it's a BASIC you can compile with Microsoft's BASIC Compiler.

**More languages.** With SoftCard and CP/M, you can add Microsoft's ANSI Standard COBOL, and FORTRAN, or

Basic Compiler and Assembly Language Development System. All, more powerful tools for your Apple.

**Seeing is believing.** See the SoftCard in operation at your Microsoft or Apple dealer. We think you'll agree that the SoftCard turns your Apple into the world's most versatile personal computer.

**Complete information?** It's at your dealer's now. Or, we'll send it to you and include a dealer list. Write us. Call us. Or, circle the reader service card number below.

SoftCard is a trademark of Microsoft. Apple II and Apple II Plus are registered trademarks of Apple Computer. Z-80 is a registered trademark of Zilog, Inc. CP/M is a registered trademark of Digital Research, Inc.

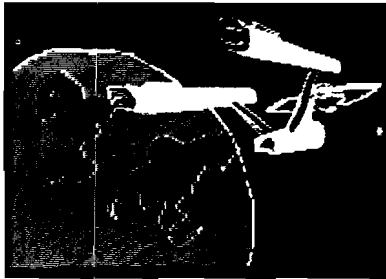
**MICROSOFT**  
CONSUMER PRODUCTS

Microsoft Consumer Products, 400 108th Ave. N.E.,  
Bellevue, WA 98004. (206) 454-1315

# VersaWriter & APPLE II: The Keys to Unlimited Graphics

## DRAWING TABLET

Although VersaWriter operates on a simple principle, it produces graphics which match or exceed those of other digitizers. Rugged construction, translucent base, easy to use — plugs directly into APPLE II.



## GRAPHICS SOFTWARE

Easily the most capable and complete graphics software for the home computer available. Fast fill drawings in 100 colors. All text in five sizes, compile and display shapes, edit, move and much more!



## UNIQUE OFFER

See VersaWriter at your local dealer and pick up a copy of our demonstration disk. The complete VersaWriter hardware and software package is a real bargain at \$249. For more information call or write:

Versa Computing, Inc. • 887 Conestoga Circle • Newbury Park, CA 91320 • (805) 498-1956

## NIKROM TECHNICAL PRODUCTS PRESENTS A DIAGNOSTIC PACKAGE FOR THE APPLE II AND APPLE II+ COMPUTER.

### "THE BRAIN SURGEON"

All major computer systems are checked for functional hardware analysis on a regular basis for logical as well as some practical reasons. Finding what is exactly wrong can account for most of the money consuming down-time.

Apple Computer Co. has provided you with the best equipment available to date. The Diagnostic's Package was designed to check every major area of your computer, detect errors, and report any malfunctions. *The Brain Surgeon* will put your system through exhaustive, thorough procedures, testing and reporting all findings.

#### The Tests Include:

- MOTHERBOARD ROM TEST FOR BOTH APPLE II AND APPLE II+
- APPLESOFT CARD TEST • INTEGER CARD TEST • MEMORY RAM TEST
- DISK DRIVE ANALYSIS • MONITOR ALIGNMENT
- DC HAYES MICRODODEM II TEST

System Diagnosis is an invaluable aid to your program library even if your system is working fine. Hours have been wasted trying to track down a "program bug" when actually hardware could be the blame!

*The Brain Surgeon* allows you to be confident of your system. This can be critical when file handling, sorts or backups are involved. You *must* depend on your computer during all these critical times. Running *The Brain Surgeon* prior to these important functions helps to insure that your system is operating at peak performance.

*The Brain Surgeon* is easy to use and supplied on diskette with complete documentation.

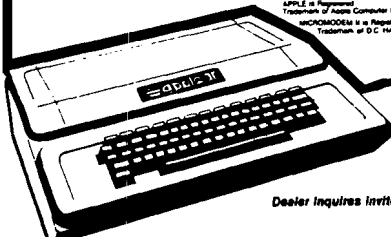
PRICE: \$45.00  
REQUIRES: 48K  
APPLESOFT in ROM, 1 Disk Drive  
DOS 3.2 or 3.3



© Nikrom Technical Products  
25 PROSPECT STREET • LEOMINSTER, MA 01453

Order Toll-Free Anytime  
Master Charge & VISA users call: 1-800-835-2248  
Kansas Residents call: 1-800-362-2421

APPLE II Registered  
Trademark of Apple Computer Co.  
MICRODODEM II is a Registered  
Trademark of D.C. HAYES



Dealer Inquiries Invited



Presenting.....

## A-STAT™ 79

A Statistical Analysis and File Maintenance System  
for the Apple II™ Microcomputer\*

A subset language of P-STAT™ 78  
computes:

**FREQUENCIES**  
**BI-VARIATE TABLES — CHI SQUARES**  
**CORRELATION MATRICES**  
**MULTIPLE REGRESSIONS**  
**APPLE FILE CABINET INTERFACE**  
**COMPLETE VARIABLE TRANSFORMATIONS**

Uses Standard DOS Text Files and EXEC's

A-STAT™ 79 on disk with 80-page manual... \$125.00

48K version — All programs in Applesoft™

Available from:

Rosen Grandon Associates  
296 Peter Green Road  
Tolland, Connecticut 06084  
(203) 875-3541

\* Apple II™ is a trademark of the Apple Computer, Inc.  
P-STAT™ 78 is a trademark of P-STAT Inc., Princeton, N.J.  
A-STAT™ 79 is copyrighted by Gary M. Grandon, Ph.D.

# Atari Error Messages

This program, when included in a BASIC program, will display the English language versions of Atari's number-coded error messages.

David P. Allen  
19 Damon Road  
Scituate, Massachusetts 02066

Within a few days after putting my Atari computer in operation I wound up with a sore thumb. This was a result of having to continually thumb through the Atari manual to find out the meaning of the latest error message which the Atari was giving me. My threshold of discontent was being depressed lower and lower by the invidious message "ERROR- 12 AT LINE 200", which continually thrust me back to the manual to find out just what I had done wrong. I figured there had to be a better way. There is.

Atari BASIC language is equipped with the very handy 'TRAP' function which you can cause to spring into action every time it encounters an error condition. This command tells the computer to go to the line number immediately following the command (such as TRAP 32000) and continue executing the program at that point. The solution to my problem was simply to direct the computer to a list of error messages with instructions to find the right message, and then print it out on the screen in plain English.

Here's the way it works. The error trapping subroutine is started at line 32500, high enough to be included in most programs without getting in the way of the rest of the program. Way up in the beginning, at the earliest line possible [line 0 is a good place] we enter 'DIM SNAP\$(50): TRAP 32500'. This sets up SNAP\$ to collect the error messages ['snap', 'trap', — get it? Oh, well...] and instructs the program to

```
2 PRINT " ": REM CLEARS SCREEN
5 DIM SNAP$(50):TRAP32500
6 REM
7 REM
10 REM <<< ERROR TRAPPING DEMO >>>
20 REM <<< BY DAVID P. ALLEN >>>
30 REM
40 REM
50 REM
60 REM
70 REM
80 REM THIS PROGRAM DEMONSTRATES
90 REM THE PRINTOUT OF ERROR
100 REM STATEMENTS. THE FOLLOWING
110 REM LINES ARE DESIGNED TO PRO-
120 REM DUCE ERRORS. AFTER EACH
130 REM ERROR, TYPE 'GOTO' PLUS THE
140 REM THE LINE NUMBER WHERE THE
150 REM ERROR OCCURRED +10. I.E.,
160 REM IF THE ERROR MESSAGE SAYS
170 REM THE ERROR OCCURRED AT LINE
180 REM 220, THEY TYPE 'GOTO 230' TO
190 REM CONTINUE THE DEMONSTRATION
195 REM
197 REM
200 GOTO 1000
210 NEXT X
220 READ Y
230 SAVE "D2:TEST"
240 PRINT #1,A$
250 PRINT " ": POSITION 5,12
260 PRINT "**** END OF DEMONSTRATION ****"

270 END
326 LIST 32660
32490 REM <<< ERROR TRAPPING >>>
32491 REM <<< SUBROUTINE >>>
32493 REM
32494 REM
32495 REM INSERT 'DIM SNAP$(50):
32496 REM TRAP 32500' AT AN
32497 REM EARLY LINE NUMBER.
32498 REM
32499 REM
32500 SNAP = PEEK (195):LNM = 256 * PEE
K (187) + PEEK (186): GOSUB SNAP + 32500:
PRINT "**** ":SNAP$: PRINT "AT LINE ";LNM;"
****"
32501 TRAP32500: PRINT " ": END
32502 SNAP$ = "INSUFFICIENT MEMORY": RETU
RN
32503 SNAP$ = "VALUE ERROR": RETURN
32504 SNAP$ = "TOO MANY VARIABLES": RETUR
N
32505 SNAP$ = "STRING LENGTH ERROR": RETU
RN
```

proceed at line 32500 whenever it encounters an error condition. Line 32500 takes a PEEK at two locations which find out first what error occurred [SNAP], and where it occurred [LNM]. The computer then finds the correct error message and prints it out on the screen.

Line 32501 resets the trap and ends the program, but you can have your program continue. If you replace 'END' with 'INPUT A\$: GOTO LNM + 10' your program will pause at the error message while you reflect on the wisdom of what it is telling you, then when you press 'RETURN' the program will jump to the line number that is ten places further down from where the error occurred. To make this work, all your line numbers must be ten numbers apart, and you must 'DIM A\$(1)' back in the beginning of the program. If you leave 'END' in place in line 32501, then you must use 'RUN' or some other immediate command to get things going again.

To save this program for inclusion in your future programs, enter lines 32500 through 32761 into memory through your keyboard. If you are going to save the routine on cassette, then set the program recorder up to record and execute 'LIST "C:"' and the whole nine yards will be saved on your tape in tokenized form. To retrieve it for use in another program execute 'ENTER "C:"' after cuing up your tape to the right spot for this routine. The error trapping subroutine will then be added to whatever program you have in BASIC memory at that time.

Disk users follow almost the same routine except use 'D:' and a filename where 'C:' is mentioned above. The filename will be the one you use to identify this subroutine on your disk. I use 'ERRSUB.LST' which reminds me that this file was put on the disk with a 'LIST' instead of a 'SAVE'.

That's all there is to it. If you enter the listing contained herein, the line numbers below 32490 will cause a demonstration of the subroutine procedure to be executed. The price you pay for all of this is the use of 1982 bytes of memory. Atari 800 users with 48K of RAM memory will not give this a second thought; Atari 400 users with only 8K will pause and reflect before dedicating almost 2K to the reduction of their irritation. If it fits your program and your memory then try it out. You'll like it.

**MICRO**

```

32506 SNAP$ = "OUT OF DATA": RETURN
32507 SNAP$ = "ERROR > 32767": RETURN
32508 SNAP$ = "INPUT STATEMENT ERROR": RE
TURN
32509 SNAP$ = "DIM ERROR": RETURN
32510 SNAP$ = "ARGUMENT STACK OVERFLOW":
RETURN
32511 SNAP$ = "FP OVER/UNDERFLOW ERROR":
RETURN
32512 SNAP$ = "LINE NOT FOUND": RETURN
32513 SNAP$ = "NEXT WITHOUT FOR": RETURN

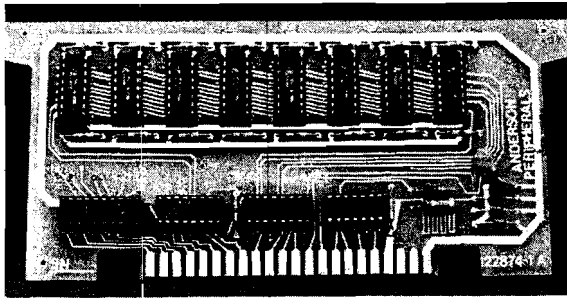
32514 SNAP$ = "LINE TOO LONG": RETURN
32515 SNAP$ = "GOSUB/FOR LINE DELETED": R
ETURN
32516 SNAP$ = "RETURN WITHOUT GOSUB": RET
URN
32517 SNAP$ = "GARBAGE": RETURN
32518 SNAP$ = "INVALID STRING CHARACTER":
RETURN
32519 SNAP$ = "CAN'T LOAD - TOO LONG": RE
TURN
32520 SNAP$ = "DEVICE # >7 OR =0": RETURN

32521 SNAP$ = "NON-LOAD FILE": RETURN
32628 SNAP$ = "BREAK KEY ABORT": RETURN
32629 SNAP$ = "IOCB ALREADY OPEN": RETURN

32630 SNAP$ = "NON-EXISTENT DEVICE": RETU
RN
32631 SNAP$ = "IOCB WRITE ONLY": RETURN
32632 SNAP$ = "INVALID COMMAND": RETURN
32633 SNAP$ = "DEVICE/FILE NOT OPENED": R
ETURN
32634 SNAP$ = "ILLEGAL IOCB #": RETURN
32635 SNAP$ = "IOCB READ ONLY": RETURN
32636 SNAP$ = "END OF FILE": RETURN
32637 SNAP$ = "RECORD > 256 CHARACTERS":
RETURN
32638 SNAP$ = "DEVICE DOESN'T RESOND": RE
TURN
32639 SNAP$ = "GARBAGE AT SERIAL PORT": R
ETURN
32640 SNAP$ = "SERIAL BUS INPUT FRAMING E
RROR": RETURN
32641 SNAP$ = "CURSOR OUT OF RANGE": RETU
RN
32642 SNAP$ = "SERIAL BUS DATA FRAME OVER
RUN": RETURN
32643 SNAP$ = "SERIAL BUS DATA CHECKSUM E
RROR": RETURN
32644 SNAP$ = "WRITE PROTECTED": RETURN
32645 SNAP$ = "DISK/SCREEN MODE HANDLER E
RROR": RETURN
32646 SNAP$ = "FUNCTION NOT IMPLEMENTED":
RETURN
32647 SNAP$ = "GRAPHICS MODE NEEDS MORE M
EMORY": RETURN
32660 SNAP$ = "DRIVE NUMBER ERROR": RETUR
N
32661 SNAP$ = "DISK FULL": RETURN
32662 SNAP$ = "DISK FULL": RETURN
32663 SNAP$ = "UNRECOVERABLE SYSTEM DATA
- I/O ERROR": RETURN
32664 SNAP$ = "FILE NUMBER MISMATCH": RET
URN
32665 SNAP$ = "FILENAME ERROR": RETURN
32666 SNAP$ = "POINT DATA LENGTH ERROR":
RETURN
32667 SNAP$ = "FILE LOCKED": RETURN
32668 SNAP$ = "INVALID COMMAND": RETURN
32669 SNAP$ = "DIRECTORY FULL": RETURN
32670 SNAP$ = "FILE NOT FOUND": RETURN
32671 SNAP$ = "POINT INVALID": RETURN

```





### Memory Boards for ATARI™ 800 & 400 Computers

Assembled and Tested Completely Compatible  
 Ready to plug in One Year Warranty  
 No Modifications necessary

- 16K ..... \$ 99.95
- 16K with gold plated connector tabs ..... 109.95
- 32K with gold plated connector tabs ..... 199.95

Visa and Mastercard accepted Quality discounts available  
 Dealer inquiries invited

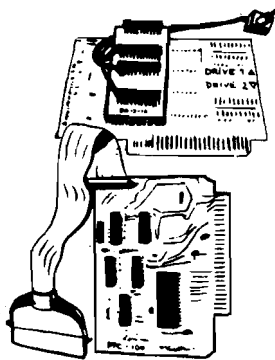
## Anderson Peripherals, Inc.

P.O. Box 629  
 Richardson, Texas 75080  
 214-231-6866

™ATARI is trademark of Atari Corp.

# NEW FOR APPLE II® COMPUTERS

201-839-3478 DEALER INQUIRES INVITED !! FROM TYMAC CONTROLS CORP.

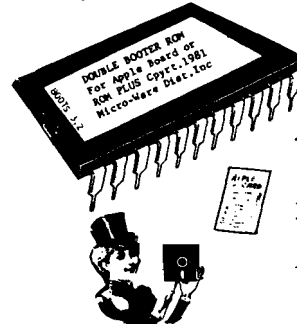


**DOUBLE DOS PLUS - 0013-16** A piggyback board that plugs into the disk controller card so that you can switch select between 13 and 16 sector disks. Works great with the language system eliminating the need in many cases, to boot the Basics disk. Eliminates the need to convert all of your disks to 3.3 format..... ONLY \$39.00  
 REQUIRES APPLE DOS ROMS FULL 90 DAY WARRANTY

**THE APPLE CARD** - A TWO SIDED 100 PERCENT PLASTIC 8 1/2 X 11 REFERENCE CARD FOR THE APPLE COMPUTER, LOADED WITH INFORMATION OF INTEREST TO EVERY APPLE OWNER OR USER.....\$3.98

**PARALLEL PRINTER CARD - PPC-100** A universal Centronics® type parallel printer board complete with cable and connector for the Apple computer. This unique board will allow you to turn on and off the high bit in software so that text and graphics can be mixed on many printers.....\$139.00

**THE DOUBLE BOOTER ROM PLUGS INTO THE EMPTY D8 SOCKET ON THE APPLE MOTHERBOARD OR INTEGER CARD.** A SIMPLE CALL WILL PROVIDE A 13 SECTOR BOOT FROM ANY MACHINE WITH 3.3 ROMS IN THE DISK CONTROLLER. THIS CHIP WILL NOT WORK IN APPLE PLUS MACHINES UNLESS THEY CONTAIN AN INTEGER CARD. THE DOUBLE BOOTER ROM MAY ALSO BE USED ON THE MOUNTAIN COMPUTER ROM PLUS BOARD IN ANY OF THE SPARE ROM SOCKETS. ELIMINATES THE NEED FOR USING THE BASICS DISK FOR 3.2 BOOTING. ONLY .....\$29.00



**SOFTWARE FOR THE APPLE - SUPER SEA WAR** - HIRES BATTLESHIP TYPE SIMULATION.....\$13.95  
**ULTIMATE TRANSFER** - A TELEPHONE SOFTWARE TRANSFER, USES DC HAYES MICROMODEM.....\$25.00  
**ROAD RALLYE** - HIRES DRIVING GAME WITH 5 DIFFERENT FULL SCREEN TRACKS.....\$15.00  
**GRAPH FIT** - HIRES BAR, PIE & LINE GRAPHING SOFTWARE .....\$25.00  
**MISSILE CHALLENGER** - HIRES ARCADE TYPE GAME WHERE YOU DEFEND YOUR CITIES AGAINST FALLING MISSILES. WRITES NAME & HI-SCORE TO DISK.....\$19.95  
**SUPER-PIX HIRES SCREEN DUMP FOR THE EPSON MX-80** - OFFERS 2 ORIENTATIONS, NORMAL OR INVERSE, LARGER THAN FULL PAGE SIZES, SCRUNCH MODES. NEEDS TYMAC PPC-100 PARALLEL PRINTER CARD OR WE WILL UPGRADE YOUR EPSON BOARD FOR \$25.00.....\$39.95

ALL OF THE ABOVE PRODUCTS ARE AVAILABLE FROM  
 NOTE: APPLE is a registered trademark of APPLE COMPUTER INC., CUPERTINO, California. Rom Plus is a registered trademark of Mountain Computer, 300 Harvey M. Blvd., Santa Cruz, Ca., 95060

MICRO-WARE DISTRIBUTING INC. PO BOX 113  
 439 A ROUTE 23. POMPTON PL. NJ 07444  
 CALL 201/839-3478 MON THRU FRI

### \*\*SPECIAL INTRODUCTORY OFFER\*\*

#### Programmable Character Generator Board \$89.95

You can use OSI's characters or you can make your own. Imagine you can now do true high resolution graphics 512 x 256 dots in the 64 x 32 screen format. And all under your control!

Other mods available — send for catalog.

#### SOFTWARE (with Documentation)

**PC Chess V1.9** \$14.95

Play Chess against your computer!

**Helicopter Pilot: (64 CHR Video Only)** \$ 8.95

An Excellent Graphics Program!

**Golf Challenger** \$14.95

From 1 to 4 players. Play a round of golf on your 18 hole golf course. One of the best programs I have ever seen! You can even design your own course. Comes with full documentation (14 pages).

#### Two Very Intricate Simulations!

**Wild Weasel II:** You operate a Sam Missile base during a Nuclear War. Not as easy as you think! You must operate in a three dimensional environment.

**Fallsafe II:** The shoe is on the other foot! Here you are in the attacking bomber and you must penetrate deep into enemy territory. Can you survive? An extremely complex electronic warfare simulation! SPECIAL: both for 19.95

**Hardware: C1P Video Mod:** Makes your 600 Video every bit as good as the 4P and 8P. Gives 32/64 CHR/Line with guardbands 1 and 2 Mhz. CPU clock with 300, 600 and 1200 baud for Serial Port. Complete Plans \$19.95

**KIT(Hardware and Software) \$39.95**

Installed: 32CHR — \$79.95, 64CHR-\$89.95

Extra K of Video RAM for 64CHR not included!

Set of 3 ROMs available \$75.00

**C1P Sound Effects Board:** Completely programmable! For the discriminating hobbist, the best board on the market for creating sound and music. Can be interrupt driven so that you can use it for gaming purposes. Has on board audio amp, 16 bit interval timer, 128 Bytes of RAM and two 8 bit parallel I/O Ports.

Assembled and tested \$89.95 Bare Board \$39.95  
 Both include Prog. Manual and Sample Software.

**C1P HI Speed Cassette Kit:** Gives a reliable 300, 600, and 1200 Baud. No symmetry adjustments — the ideal fix for OSI's cassette interface. Easily implemented in 30 minutes. Will save you time and money even the first night you use it! \$12.95

Many, many more. Send for Catalog with free program (Hard Copy) and BASIC Memory Map. \$1.00. Two locations to serve you:

Progressive Computing  
 3336 Avondale Court, Windsor, Ontario  
 Canada, N9E 1X6  
 (519) 969-2500

or

3281 Countryside Circle, Pontiac TWP, MI 48057  
 (313) 373-0468

VISA

MASTER CHARGE

## Introduction to OS-65D V3.3

OS-65 V3.2 was an ultra sophisticated development-oriented operating system. However, several problems kept arising:

1. Output was difficult to format in BASIC.
2. There was no way to trap disk errors in BASIC.
3. Disk file operations were both slow and limited.
4. The nature of the OSI polled keyboard made the use of lower case alphabets tedious.

OS-65D V3.3 has been designed to eliminate these problems in earlier releases of 65D. In addition, the 65D BASIC line editor has been added as a permanent feature of BASIC. The following describes all the changes that have been made in V3.3. Enjoy!

### Compatibility

OS-65D V3.3 has the BASIC workspace moved to \$3A7E as opposed to \$327E on OS-65D V3.2. This change makes no difference whatsoever to the average BASIC programmer. In fact, enhancements to 65D V3.3 allow existing V3.2 files to be both upward and downward compatible to the new system. However, care must be taken when using V3.2 files that contain assembler language subroutines. The subroutines will be transferred, along with the program that contains them, but will be physically relocated in memory and will probably not execute properly, if at all.

### Programmable Error Action

In OS-65D V3.3 BASIC, the WAIT command has been replaced by the TRAP function which is used as an "ON ERROR GOTO" (but is easier to type). The TRAP function can be used either in the immediate mode or inside BASIC program and is effective whether a BASIC ERROR or DOS ERROR occurred. For example, consider the following program segment:

```

10 TRAP 1000
20 DISK OPEN,6,"DATA"
30 TRAP 40
40 INPUT#6,A:B = A/A
50 PRINT A:END
1000 ?"DISK ERROR":END

```

If a DISK ERROR occurred in line 20, control would be transferred to line 1000. Lines 30 and 40 are used to read the first non-zero number in the file. The TRAP function is disabled by the statement "TRAP 0".

### Keyboard Driver

The standard OSI polled keyboard driver has been replaced in OS-65D V3.3 by an all new keyboard decoder. The SHIFT LOCK key now acts as a CAP LOCK key and the RUBOUT key actually does delete characters. However, three characters still cause problems. These are listed below along with their keystroke equivalents:

```

^ - SHIFT N
[ - SHIFT K
] - SHIFT M

```

*Note:* The SHIFT LOCK key must be depressed when these three characters are typed.

### Random Files

OS-65D V3.3 incorporates several improvements in the random file capabilities in OS-65D. First, the DISK GET command has been altered to check which track is currently resident in RAM before actually reading a track. If the GET command determines that this is the track that is needed, no reread is performed. Thus, the random file access time is up to 48 times faster than in 65D V3.2.

Secondly, a DISK FIND command has been added. The syntax is "DISK FIND,string" where string is any BASIC string variable or quoted literal. The search begins at the current file pointer and will continue through the file. If the string is not found, an ERR#D will be reported (unless the TRAP command is used). If the string is found, the file pointer will be set to the beginning of the *next* field entry. For example:

```

10 DISK OPEN,6,"DATA"
20 DISK GET,10
30 PRINT#6,"HELLO":PRINT#6,"THERE!"
40 DISK GET,0
50 DISK FIND, "HELLO"
60 INPUT#6,A$
70 PRINT A$

```

This program will print out "HELLO!".

*Note:* The search rate for the FIND command is about 8K/second on 8" systems and 5K/second on mini-floppies.

### Printer Drivers

The printer drivers in OS-65D V3.3 (devices 1 and 4) have a programmable paging feature which is enabled by the following:

```
PRINT#LP,CHR$(27);"C";CHR$(FL)
```

CALL 1-800-321-6850 TOLL FREE

# SMALL SYSTEMS JOURNAL

where LP is the printer device number and FL is the form length you want. Ten percent of the form length is always reserved for the top and bottom margins. For example,

```
PRINT#1,CHR$(27);"C";CHR$(66)
```

indicates form length of 66 where 60 lines are printed per page and six lines are reserved for the top and bottom margins. Immediately after the form length is set, a top of form is executed. At this time, position the paper in the printer as desired. To print a top of form to the next page, enter

```
PRINT#LP,CHR$(12);
```

The printer drivers also have a screen dump utility which may be used if you have an EPSON MX-80 printer and a standard OSI 540 video system. To use this feature, enter

```
PRINT#LP,CHR$(27);"P";
```

## OS-65D V3.3 Editor

In OS-65D BASIC, the keyword NULL is replaced by the word EDIT. After the system is booted, immediately type a non-destructive forward and backspace to tell the editor what type of keyboard you are using, (CTRL-L and CTRL-P are the forward space and backspace, respectively, for the OSI keyboards.) The syntax for editing a line is given in table 1.

**Table 1**

0 = < LN < 64000

EDIT LN < CR > or !LN < CR >	Edit the statement with the line number LN.
EDIT! < CR > or !! < CR >	Edit the same line that was just edited.
EDIT < CR > or ! < CR >	Edit the line immediately following the line that was just edited.

The line with its line number will be displayed following the < CR >. If the line number LN does not exist, the statement with the next line number will be displayed. (Typing EDIT0 or !0 will always give the first line of the program.) After the statement is displayed, the cursor will reside at the end of that line. The commands listed in table 2 are used for the actual line editing.

**Table 2**

→ /CTRL-L/Forward Space	Non-destructive forward space. Moves the cursor one space to the right.
← /CTRL-H/CTRL-P/Backspace	Non-destructive backspace. Moves the cursor one space to the left.
RUBOUT/DELETE/SHIFT-0	Single character delete. The editor makes the correct delete keys operational as well as the old ones (i.e., the RUBOUT key as well as SHIFT-0 will work on the OSI polled keyboard when the editor is enabled).
@/SHIFT-P	Entry delete. This will erase the line currently being edited, leaving the line in the text as it was before it was edited.
CTRL-R	Non-destructively moves the cursor to the rear of the statement.
CTRL-F	Non-destructively moves the cursor to the front of the statement.
CTRL-I	Non-destructively moves the cursor eight spaces forward (to the right).
CTRL-T	Retypes the statement you are currently editing.
< CR > / < RETURN > / < ENTER >	Enters the line as written or viewed. The line will look (to the BASIC interpreter) as if it were typed in by the user from scratch.

Character insertion and deletions can be accomplished anywhere by using the commands for non-destructive movement of the cursor. After the cursor is positioned, the user can type in insertions or delete unwanted characters. *Note:* Characters are inserted to the left of the character on which the cursor resided. The character on which the cursor resides is deleted until the end of the line is reached, and the characters to the left will be deleted if the cursor resides at the end of a line.

### Video Driver

The video driver for 65D has been rewritten in order to provide (X,Y) cursor addressing and more than a dozen screen editing commands. These commands are used by printing CHR\$(27), an ASCII ESC, followed by the desired command. For example,

```
PRINT CHR$(27);CHR$(28);
```

clears the video screen and homes the cursor. The rest of the commands are given in table 3.

**Table 3**

Code	Effect
CHR\$(1)	Causes following data to be printed in the color yellow.
CHR\$(2);CHR\$(n); CHR\$(m)	All screen positions marked by color n are changed to color m.
CHR\$(5)	Sends the current cursor address through the keyboard driver, i.e., <pre>PRINT CHR\$(27); CHR\$(5);:INPUT A\$</pre> then, <pre>A\$ = CHR\$(65 + X) CHR\$(65 + Y)</pre>
CHR\$(11)	Cursor moves down one line.
CHR\$(12)	Cursor moves up one line.
CHR\$(15)	Clears from the current cursor position to the end of line.
CHR\$(17);CHR\$(X); CHR\$(Y)	Moves cursor to screen position (X,Y). $0 \leq X < 64$ $0 \leq Y < 24$

CHR\$(18)	Moves cursor to the home position, i.e., (0,0) — the upper left-hand corner.
CHR\$(19)	Deletes the line the cursor is on. Lines below the cursor scroll up one line.
CHR\$(24)	Clears from the current cursor position to the end of the screen.
CHR\$(25)	Causes output to be printed in no color (black).
CHR\$(26)	Inserts a line at the cursor position. Lines below the cursor scroll down one line.
CHR\$(28)	Clears screen and homes cursor.
CHR\$(29);CHR\$(n)	Clears all occurrences of color n on the screen.
CHR\$(31);CHR\$(n)	Causes the following data to be printed in the color n.
CHR\$(33)	Sends the character at the cursor position through the keyboard driver, e.g., <pre>PRINT CHR\$(27); CHR\$(33) INPUT A\$</pre>

### Indirect File Problems? Why Not Use a Diskette?

In this section we describe a method for merging two BASIC files under the OS-65D operating system. The procedure uses the disk I/O capabilities of 65D to make your diskette into an indirect file. The following step-by-step procedure can be used to merge two programs. We start with both programs, say PROG1 and PROG2, stored on a diskette.

```
PROG1 N1 = 1 TRACK
40 REM THIS IS PROG1
50 REM
60 REM
70 END
```

```
PROG2 N2 = 1 TRACK
10 REM THIS IS PROG1
20 REM
30 REM
40 END
```

**CALL 1-800-321-6850 TOLL FREE**

# SMALL SYSTEMS JOURNAL

1. Load PROG 1 into the workspace

```
DISK!"LOAD PROG1"
```

Enter

```
EXIT
```

The number of tracks necessary to hold PROG1 will be displayed, say N1 tracks. Return to BASIC by entering

```
RE BA
```

Now do the same with PROG2, obtaining its size, N2 tracks.

2. Run the disk utility CREATE and create a file PROG3, N1 + N2 (N3) tracks long, to hold the merged programs. If PROG2 already has enough space, the merged program can be stored as PROG2.

3. The number, N1, of tracks necessary to store PROG1 was determined in step 1. Run CREATE again and make a file called "DATA" with three times N1 tracks for a five inch diskette, and four times N1 tracks for an eight inch diskette. Answer NO to the query about pages per track. Specify four pages per track.

4. Load PROG1 into the workspace

```
DISK!"LOAD PROG1"
```

5. Enter the following POKEs to create a four-page buffer and to disable the scrolling of the screen (the screen will hold the buffer).

```
POKE 8998,0
POKE 8999,208
POKE 9000,0
POKE 9001,212
POKE 9770,0
```

6. Enter on a *single line*

```
DISK OPEN,6,"DATA":DISK!"IO ,22":LIST
```

A listing of the workspace will appear on the screen while PROG1 is being stored in the file DATA.

7. When the listing is finished, reset the I/O pointers and close the file by entering

```
DISK!"IO 02,02":DISK CLOSE,6
```

8. Load PROG2 into the workspace by entering

```
DISK!"LOAD PROG2"
```

9. Reopen the file DATA and merge PROG1 into PROG2 by entering

```
DISK OPEN,6,"DATA":DISK!"IO 20"
```

10. Reset the I/O pointers, close the file, and enable scrolling by entering

```
DISK!IO 02,02":DISK CLOSE,6
POKE 9770,64
```

11. Store the merged file by entering

```
DISK!"PUT PROG3"
```

12. Clean house by rebooting the system.

If each of the programs has a line with the same number, the line in PROG1 will be the one that appears in the merged program.

```
MERGED PROGRAM PROG3 N3 = 1 TRACK
N1 + N2
```

```
10 REM THIS IS PROG2
20 REM
30 REM
40 REM THIS IS PROG1
50 REM
60 REM
70 END
```

*Note:* Line 40 of PROG2 was overwritten.

Finally, by changing the LIST specification in step 6, you can merge any part of a program, or just break up large programs. The uses are unlimited.

# DISK 1

A fantastic new game disk for OSI-C4P's running with DOS 3.2. Most of the games on this disk are single player such as a multiple level Othello game, Cavern Chase, and more. Other games are designed for single or multiple players such as Tank, and Crystalize. Over seven games and variations in all. (Note that many of these games are in machine code for enhanced play-ability and speed.)

To order send \$26 to:

Simulations  
Programming

Rt. 2 Box 98  
Burton, WA  
98013

## OSI BASIC

Summary Manual for 65U & 65D  
8" Disk — 65U V1.2 Utility Enhancements

Tired of searching for commands & statements, peeks, error msgs, system limits? Need hints? Then send \$9 for our 12/80 manual.

Want prompts for utility pgm inputs? File searching demo? pgm exits? round numbers to 3 decimals? more disk space with utility pgms? latest updating? Then send license copy and \$20 for 8" Floppy. Specify video or serial.

Both for license copy and \$25.

(Indiana residents add 4% sales tax.)

C & J Supply  
Box 806, Marion, IN 46952

## ☆ SOFTWARE FOR OSI

- ☆ **VIDEO GAMES 1** ..... \$15.  
Three Games. Head-On is like the popular arcade game. Tank Battle is a tank game for two to four. Trap! is an enhanced blockade style game.
- ☆ **VIDEO GAMES 2** ..... \$15.  
Three games. Gremlin Hunt is an arcade-style game for one to three. Gunfight is a duel of mobile artillery. Indy is a race game for one or two.
- ☆ **ADVENTURE: MAROONED IN SPACE** ..... \$12.  
An adventure that runs in 8K! Save your ship and yourself from destruction.
- ☆ **DUNGEON CHASE** ..... \$10.  
A real-time video game where you explore a twenty level dungeon.
- ☆ **BOARD GAMES 1** ..... \$15.  
Two games. Mini-gomoku is a machine language version of five stones gomoku. Cubic is a 3-D tic-tac-toe game. Both with graphics.
- ☆ **DISASSEMBLER** ..... \$12.  
Use this to look at the ROMs in your machine to see what makes BASIC tick. Reconstruct the assembler source code of machine language programs to understand how they work. Our disassembler outputs unique suffixes which identify the addressing mode being used, no other program has this!
- ☆ **SUPER! BIORHYTHMS** ..... \$15.  
A sophisticated biorhythm program with many unique features.
- ☆ **C1 SHORTHAND** ..... \$12.  
Use only two keys to enter any one of the BASIC commands or keywords. Saves much typing when entering programs. Written in machine language.

For all BASIC-in-ROM systems. Selected programs available on disk. Color and sound on video games.

Send for **FREE** catalog



**ORION SOFTWARE ASSOC.**  
147 Main St. Ossining, NY 10562

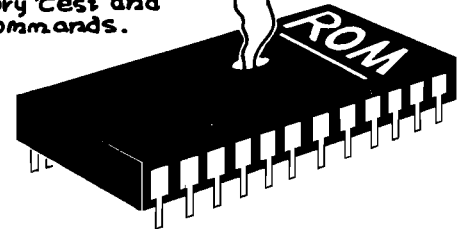
## "The ROM Rabbit"

"Your Wish... ..Is My Command"  
It's all in a 24-pin ROM at EHS!!



Pet Owners  
Granted 3 Wishes:

1. Faster Cassette Load
2. Auto-repeat on all keys
3. Memory Test and 12 Commands.



ROM and MANUAL — \$49.95  
Specify 3.0 or 4.0 Basic (Works with or without toolkit)

**EASTERN HOUSE SOFTWARE** (919) 924-2889  
3239 Linda Drive (919) 748-8446  
Winston-Salem, N. C. 27106

# MICRO

## Challenges

By Paul Geffen

### The Superboard

The OSI Model 600, better known as the Superboard, is one of the oldest of the single-board microcomputers. At \$299 (list) it provides more computing power per dollar than almost any other system in its class. For the beginner this system is close to ideal, both affordable and accessible.

For \$299 you get one board with these features: a typewriter-style keyboard, a 6502 microprocessor, 4K of program RAM, 1K of display RAM, video output circuitry, 8K Microsoft BASIC-in-ROM and a 2K ROM monitor. The board comes with a User's Manual to help the beginner find his way around. You will also need a power supply (five volts at two amps) and a video monitor or an RF modulator to connect the computer to a TV set. These may cost between fifty and two hundred dollars more.

Or you could buy the OSI C1P for \$429, which is a Model 600 with an extra 4K of program RAM in a case with a power supply. A good cassette recorder (not battery operated) is almost essential, and you would do well to arm yourself with additional reference materials which I will describe below.

Now you have a complete computer system which will allow you to write programs in BASIC and/or machine language. You can also run programs which others have written, as long as they were written for the OSI Superboard or C1P. Converting BASIC programs from other machines is sometimes easy, but sometimes almost impossible. For instance, tapes written for other micros probably won't load on the OSI.

### Information Resources

As they become more experienced, most beginners notice that there is a lot that can be done with the Superboard that isn't explained or even hinted at in the OSI documentation. Many of the apparent limitations of the board are really only deficiencies in the User's Manual. Of course this is what user's

groups are for. There are a few good books available which offer much useful information, both for the beginner and the experienced programmer.

Perhaps the best to start with is Ed Carlson's *OSI BASIC in ROM*. This book, now in its second edition, is written by a C2P/C4P user, but almost everything in the book applies to the Superboard because the same BASIC comes with both machines. Carlson describes the capabilities of BASIC in considerably more detail than the User's Manual and he includes a few things the manual leaves out, like the bugs. Carlson goes into detail on solutions to the infamous Garbage Collector bug (which OSI doesn't even mention). Then he explains how to write good, well-organized BASIC programs and he provides many useful utility programs for clearing the screen (fast), converting hex to decimal, writing monitor format tapes, and so on.

The material on the actual mechanics of the BASIC interpreter is very useful and informative, and gives the key to many clever and efficient ways of writing programs for this machine. Finally, this book has a comprehensive list of publications and vendors of software for the OSI. In short, this is the book every Superboard owner should have alongside his User's Manual.

The next book I recommend for the more experienced user, is Williams and Dorner's *First Book of OSI*, published by Aardvark Technical Services. (Do not confuse this with a book with almost the same title, by Clothier and Adams, published by ELCOMP.) Williams and Dorner provide much of the same information as Carlson, with less introductory material, and more technically sophisticated material. Williams and Dorner's book is not for the beginner, as Carlson's is, so this should be the second book to buy.

The User's Manual does have some good points, namely a good job of printing and production. Of the books I have mentioned, it has the best graphics table and the best hex-to-decimal conversion table. Carlson has the most complete map of BASIC ROM entry points. Williams and Dorner go into more detail on what the ROM routines do.

The *First Book of Ohio Scientific* and *Second Book of Ohio Scientific* by Clothier and Adams contain mostly promotional material reprinted from OSI newsletters and entries from the

"Small Systems Journal." Most of the informative material here is also available, and better presented in Carlson's or Williams and Dorner's books.

Unfortunately, that about covers the available books written specifically for the OSI user. In addition to these books, two other sources of information exist: periodicals and plans for sale.

Two of the best periodicals were described last month, the *OSIO Newsletter* and *PEEK(65)*. I also recommend the *Aardvark Journal*, which is now about six issues old. This is a bi-monthly journal, published by a leading supplier of software for OSI systems. For more information write to: Aardvark Journal, 1690 Bolton, Walled Lake, Michigan 48088.

There is one other OSI-only publication, the *Independent Newsletter, O. S. I. U. I. N.* put out by Charles Curley at 6061 Lime Ave., #2, Long Beach, California 90806. I have seen only one issue of this, and I don't feel it is enough to judge this relatively young newsletter.

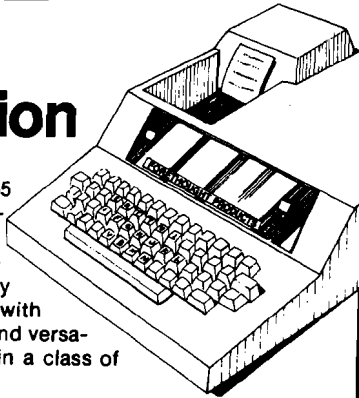
MICRO publishes at least one OSI-related article each month as well as this column. *COMPUTE!* has an "OSI Gazette" and *Kilobaud Micro-computing* runs about four or five OSI-related articles per year.

All of these publications supply short programs and hardware projects of real utility as well as good introductory material.

Finally, it is possible to buy plans and/or kits for various modifications to the Superboard. Ads for these run in MICRO and other publications, and similar plans can be found in the above-mentioned publications. For instance, Video Mods, to increase the number of characters displayed per line, are described in *Aardvark #5* (simple), and *PEEK(65) #11* (complex).

I plan to publish a more complete list of OSI information resources in a future column. I am sure that I have overlooked some newsletters and magazines. I am particularly interested in boards or kits or plans that will: expand the Superboard memory, expand the video display, increase the cassette speed, and provide RS 232 and modem support. Please send catalogs, etc. in care of this column, to ensure your product's inclusion in this list.

# Complete AIM 65 Expansion



For complete AIM 65 expansion, Forethought Products brings you the AIM-Mate Series, quality expansion products with price, performance and versatility that puts them in a class of their own.

AIM-Mate Series expansion, including RAM (to 48K), PROM, I/O, video and floppy disk interface, STD BUS interface, parity protection and more, lets you configure the kind of system you need.

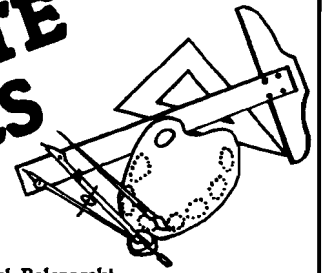
The compact AIM-Mate case puts it all together in a sturdy, portable, desk top unit.

Write today for complete details on the AIM-Mate System- AIM 65 expansion products for the professional.

**FORETHOUGHT  
PRODUCTS**

87070 Dukhobar Road, Eugene, Oregon 97402 (503) 485-8575

# THE COMPLETE GRAPHICS SYSTEM



by Mark Pelczarski  
for the Apple II

- Over 100 Hi-Res colors!
- Drawing program includes automatic filling and user-definable "paintbrushes".
- The finest 3-D graphics available, capable of color and multiple figures with machine language speed.
- Create shape tables with paddles or keystrokes.
- Hi-Res text anywhere on the screen. Define your own fonts.
- Thorough, easy-to-use manual even shows how to use drawings and 100 color fill routine in your own programs.

**\$59.95** on disk

DOS 3.2 or 3.3, requires Applesoft firmware or language system.

from **CO-OP software**  
a division of Micro Co-op

VISA and MasterCard accepted  
Dealer inquiries invited

Post Office Box 432  
West Chicago, IL 60185  
(312) 231-0912

Apple II is a trademark of Apple Computer, Inc.



PET & APPLE II USERS  
**TINY PASCAL**  
Plus +  
GRAPHICS



The TINY Pascal System turns your APPLE II micro into a 16-bit P-machine. You too can learn the language that is slated to become the successor to BASIC. TINY Pascal offers the following:

- LINE EDITOR to create, modify and maintain source
- COMPILER to produce P-codes, the assembly language of the P-machine
- INTERPRETER to execute the compiled P-codes (has TRACE)
- Structured programmed constructs: CASE-OF-ELSE, WHILE-DO, IF-THEN-ELSE, REPEAT-UNTIL, FOR-TO/DOWNTO-DO, BEGIN-END, MEM, CONST, VAR ARRAY

Our new TINY Pascal PLUS+ provides graphics and other builtin functions: GRAPHICS, PLOT, POINT, TEXT, INKEY, ABS AND SQR. The PET version supports double density plotting on 40 column screen giving 80 x 50 plot positions. The APPLE II version supports LORES and for ROM APPLESOFT owners the HIRES graphics plus other features with: COLOR, HGRAPHICS, HCOLOR, HPLOT, PDL and TONE. For those who do not require graphics capabilities, you may still order our original Tiny Pascal package.

**TINY Pascal PLUS+ GRAPHICS VERSION-**

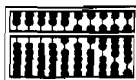
PET 32K NEW Rom's cassette..... \$55  
PET 32K NEW Rom's diskette..... \$50  
APPLE II 32K/48K w/DOS 3.2 or 3.3..... \$50

**TINY Pascal NON-GRAPHICS VERSIONS-**

PET 16K/32K NEW Rom's cassette..... \$40  
PET 16K/32K NEW Rom's diskette..... \$35  
APPLE II w/ROM Applesoft 32K w/DOS..... \$35  
APPLE II w/ROM Applesoft 48K w/DOS..... \$35

USER'S Manual (refundable with software order)..... \$10  
6502 Assembly Listing of INTERPRETER-graphics..... \$25  
6502 Assembly Listing of INTERPRETER-non graphics.. \$20

FREE postage in U.S. and CANADA. Orders may be prepaid by bankcard (include card number and expiration date). Michigan residents include 4% state sales tax. Orders accepted via THE SOURCE - CLO852.



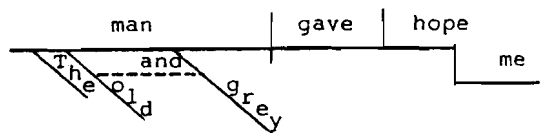
**ABACUS SOFTWARE**  
P. O. Box 7211  
Grand Rapids, Michigan 49510



From AVANT-GARDE CREATIONS  
**SENTENCE DIAGRAMMING**  
PARTS OF SPEECH  
USAGE

Includes:

- 3 Levels of Difficulty, 20 sentences per level
- Optional Record-Keeping on Data Disk
- Optional Print-outs of Records
- Teacher-formatted Requirements for Advancing to the Next Level
- Teacher-formatted Options to Exclude Actual Sentence Diagramming
- Student Option for Record-Keeping



**APPLE II PLUS, 48K**  
1 or 2 Disk Drives

**\$19.95**

VISA/Mastercharge

AVANT-GARDE CREATIONS  
Dept. G1  
Box 30160  
Eugene, OR 97403

PHONE:  
**503-345-3043**  
NOON to 6 P.M. PST



# BASIC Program Converter Between SYM and KIM

This program allows a person to transfer BASIC programs from SYM to KIM or from KIM to SYM without having to spend hours typing in and debugging the programs.

Lee Chapel  
2349 Wiggins  
Springfield, Illinois 62704

Have you ever wanted to put somebody's SYM BASIC program on your KIM without spending hours typing the program in and debugging it? Or have you ever wanted to put somebody's KIM program on your SYM? This converter program allows you to easily transfer BASIC programs from SYM to KIM, or from KIM to SYM. It is especially useful for long, 8 to 12K, programs. I used it to transfer a 14K program I call "Monster Combat" from KIM to SYM in roughly half an hour.

## Description of BASIC Format

The BASIC format used in the SYM and KIM is as follows. The first two bytes of a program line point to the start of the next line (see diagram). The next two bytes are the line number, and the remaining bytes are BASIC tokens or data in ASCII. A token is one byte [80 to C5 hex] which represents a 2 to 6 letter BASIC word.

## Tokens or Data in ASCII Code (Hex)

LO HI	LO HI
Byte	Byte
Next line pointer in hex	Line number in hex

The tokens in both SYM and KIM (such as INPUT and PRINT) are the same hex value. For example, on both systems INPUT is 84 in hex, and PRINT is 97 in hex. An example of how a BASIC line is formed is shown in figure 1.

Figure 1

4000	00	14	40	05	00	97	22	48	49	20	54	48	45	52	45	22	3A	88	35
Pointer	Line	PR	"	H	I	T	H	E	R	E	"	:	GO	TO	5				
to next	num	INT																	
line	ber																		

## Comparison of SYM and KIM Systems

KIM begins program storage at 4000 hex, SYM begins storage at 0200 hex. Since the data and the tokens are the same, only the line pointers and actual program location in memory need to be changed. The program can be relocated on SYM by use of the Block Move, "B". On KIM the use of a supplementary monitor such as "XIM" can be used to relocate the program. It's also possible to relocate the program by using the tape load FF function and new address. The regular KIM tape record and playback are the same as the low speed SYM tape record and playback.

The only remaining difference between the two systems is the pointer values. They all need to be changed to reflect the new location in the other system. The BASIC converter program is written to convert all these pointer locations. The BASIC program takes only a few seconds to convert long programs, so speed is not a problem.

## Converter Program Description

In both program listings, A is the address where the low byte of the first pointer is located. B is the value found in the address A, and C is the value of the high byte of the pointer. D is set

equal to the first hex digit of C, and E is set equal to the other hex digit of C. D, E, and B are then placed in an equation where F becomes the value of the address of the next line pointer. Since only the high byte needs to be changed, the address A + 1 is POKEd with a new value. A is then set equal to F and the entire process continues with a new value of the line pointer until two zeros are found in adjacent addresses.

## Program Examples

The following is an example of a KIM to SYM conversion. First check addresses 7D and 7E. These are, respectively, the low and the high bytes of the end of the program being transferred. Make a record of these values and make a recording from 4000 hex to the address in those two memory locations at normal record speed. Next the tape is loaded into SYM at slow speed and placed in memory so that it starts at 4000. SYM BASIC is then entered with a J 0 and when Memory Size is asked for, a low value, such as 1500, should be entered. Type in the converter program. Make sure there are no errors and then run the program. Once the program finishes, go back into the monitor, move the program at 4000 hex down to 0200 hex. Take the value in 7D that you noted and subtract 3E hex

from it, and place that number in 7D. Next take the value noted for 7E and place it in 7E. Then set memory locations 87 and 88 to the proper size of your BASIC program area.

Converting from SYM to KIM is similar. Again, check memories 7D and 7E and make a note of them. Make a tape of the program in the SYM's low speed format. Load it into KIM and place it in memory so that it starts at 5000 hex. Then start KIM BASIC and when you are asked for Memory Size, give a low value such as 17000. Type in the conversion program, make sure there are no errors, and run it. When the program finishes, go back to the monitor and move the converted program from 5000 to 4000. Take the value noted for 7D and add 3E hex to it. Take the value noted for 7E, and place it in 7E. Change memory locations 87 and 88 to the proper size of your BASIC program memory. After moving and testing, a final tape dump can be made.

### Conclusion

I have used both these conversion programs successfully on several BASIC programs. Any USRs or special

I/Os will have to be modified. It should also work on AIM, assuming the tokens are the same. These programs have saved many hours of retyping programs between systems.

Lee Chapel has been working with KIM and SYM for about 3 years. He is majoring in Computer Science at the University of Wisconsin-Madison and has worked there as a programmer in the Agriculture Economics department.

MICRO

#### Listing 1

```
5 REM SYM TO KIM CONVERSION IN BASIC
10 A=20481
15 IF PEEK(A)=0 AND PEEK(A+1)=0 THEN END
20 B=PEEK(A):C=PEEK(A+1)
25 D=INT(D/16):E=C-16*D
30 F=4096*D+256*E+B+19968
35 POKEA+1,C+62
40 A=F:GOTO15
45 END
```

#### Listing 2

```
5 REM KIM TO SYM CONVERSION IN BASIC
10 A=16385
15 IF PEEK(A)=0 AND PEEK(A+1)=0 THEN END
20 B=PEEK(A):C=PEEK(A+1)
25 D=INT(C/16):E=C-D*16
30 F=4096*D+256*E+B
35 POKEA+1,C-62
40 A=F:GOTO15
```

## 32 K BYTE MEMORY RELIABLE AND COST EFFECTIVE RAM FOR 6502 & 6800 BASED MICROCOMPUTERS

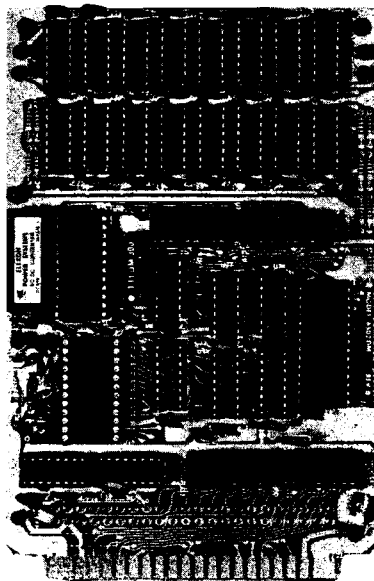
AIM 65-\*KIM\*SYM  
PET\*S44-BUS

- \* PLUG COMPATIBLE WITH THE AIM-65/SYM EXPANSION CONNECTOR BY USING A RIGHT ANGLE CONNECTOR (SUPPLIED) MOUNTED ON THE BACK OF THE MEMORY BOARD.
- \* MEMORY BOARD EDGE CONNECTOR PLUGS INTO THE 6800 S 44 BUS.
- \* CONNECTS TO PET OR KIM USING AN ADAPTOR CABLE.
- \* RELIABLE—DYNAMIC RAM WITH ON BOARD INVISIBLE REFRESH—LOOKS LIKE STATIC MEMORY BUT AT LOWER COST AND A FRACTION OF THE POWER REQUIRED FOR STATIC BOARDS.
- \* USES +5V ONLY, SUPPLIED FROM HOST COMPUTER.
- \* FULL DOCUMENTATION, ASSEMBLED AND TESTED BOARDS ARE GUARANTEED FOR ONE YEAR AND PURCHASE PRICE IS FULLY REFUNDABLE IF BOARD IS RETURNED UNDAMAGED WITHIN 14 DAYS.

ASSEMBLED WITH 32K RAM .....\$395.00  
& WITH 16K RAM .....\$339.00  
TESTED WITHOUT RAM CHIPS .....\$279.00  
HARD TO GET PARTS (NO RAM CHIPS)  
WITH BOARD AND MANUAL .....\$109.00  
BARE BOARD & MANUAL .....\$49.00

PET INTERFACE KIT—CONNECTS THE 32K RAM BOARD TO A PET OR KIM. CONTAINS INTERFACE CABLE, BOARD STANDOFFS, POWER SUPPLY MODIFICATION KIT AND COMPLETE INSTRUCTIONS \$49.00

U.S. PRICES ONLY



### 16K MEMORY EXPANSION KIT ONLY \$58

FOR APPLE, TRS-80 KEYBOARD, EXIDY, AND ALL OTHER 16K DYNAMIC SYSTEMS USING MK4116-3 OR EQUIVALENT DEVICES.

- ★ 200 NSEC ACCESS, 375 NSEC CYCLE
- ★ BURNED-IN AND FULLY TESTED
- ★ 1 YR. PARTS REPLACEMENT GUARANTEE
- ★ QTY. DISCOUNTS AVAILABLE

ALL ASSEMBLED BOARDS AND MEMORY CHIPS CARRY A FULL ONE YEAR REPLACEMENT WARRANTY

**BETA**  
COMPUTER DEVICES

1230 W. COLLINS AVE.  
ORANGE, CA 92668  
(714) 633-7280

Calif. residents please add 6% sales tax. MasterCard & Visa accepted. Please allow 14 days for checks to clear bank. Phone orders welcome. Shipping charges will be added to all shipments.

# MICRO

## Microbes and Updates

Mike Rowe  
Microbes & Updates  
P.O. Box 6502  
Chelmsford, MA 01824

*This month, we offer the following improvements, rather than corrections.*

*Les Cain, of Grand Junction, Colorado, sent this update to his article in the January issue (32:75):* There is a problem with Control C in "Fun with OSI." I apologize to the readers for the oversight in not replacing the Disk control C POKE with the proper ROM POKE. To correct the problem, change the following lines:

```
Line 760 POKE 530,1:K=57088
Line 1710 POKE 530,0:END
Line 1740 POKE 530,0:END
```

*Charles F. Taylor, Jr. of Monterey, California, offers the following tip:* "Business Dollars and Sense in Applesoft" by Barton M. Bauers, Jr. (MICRO 27:65) was most interesting and useful. Here are a couple of simple changes which will make the routine "Mask" even more useful:

1. "Mask" produces output left-justified in a variable-width field. While this is useful for some applications, it will not do for producing columns of figures. Ideally, the output should be right-justified in a predetermined field width (specified by the user). This can be accomplished by adding lines 16 and 15025 and by modifying line 15110 as shown below:

```
16 FW = 12 : REM SET FIELD
   WIDTH (5 =FW =12)
15025 BL$ = " " : REM 8 BLANKS
15110 XW$ = XV$ + LEFT$(BL$,
   FW-4-LEN(XV$)) + XX$ +
   XZ$
```

Line 16 as shown, produces the maximum allowable field width and is sufficient to handle dollar amounts from \$-999,999.99 to \$9,999,999.99, which is the range handled by Mr. Bauers' original routine, and which should be adequate for most small applications. [It is certainly adequate for my personal checkbook.] The field width can be changed anywhere in the calling program by assigning the desired value to the variable "FW". Line 15110 as shown left-justifies the leading "\$", but this is easily changed.

2. Because of the behavior of the function "INT" [described by Mr. Bauers in his article], the routine as it stands will round fractional cents incorrectly for negative amounts, e.g. -1.009 rounds to -1.00 instead of -1.01. [Fractional cents occur most often when computing percentages.] Here is a simple fix to line 15 which solves the problem:

```
15 DEF FN VL(X) = INT((X +
   SGN(X)*.0001)*100 + .5)
```

*John P. Molineaux of Cheverly, Maryland, sent this enhancement:* There is always a better way. On reading Frank Chipchase's excellent article on "Better Utilization of Apple Computer Renumber and Merge Program" in the August 1980 issue (27:17), I was struck by the awkwardness of the series of EXEC file POKES required to configure the A/S-R/N-M program. Machine language is far better than Applesoft at POKES and it doesn't fill the screen with Applesoft prompt characters ([]).

Recall that HIMEM:32352 is equivalent to POKE 115,0:POKE 116,142. Hiding A/S-R/N-M and resetting the &-pointer therefore translates to:

Assembly	Decimal
LDA 0	169 0
STA 115	133 115
STA 1014	141 246,3
LDA 142	169 142
STA 116	133 116
STA 1015	141 247,3
LDA 76	169 76
STA 1013	141 245,3
RTS	96

If this short program is appended to the front of the A/S-R/N-M and the whole mess is BSAVED as a unit under the name RENUM, then the loading and reconfiguration is quickly achieved by

BRUN RENUM

Here's how:

1. RUN Apple's RENUMBER from the system disk.

2. POKE in the 20 bytes of the program as follows:

```
POKE 36332,169
POKE 36333,0
POKE 36334,133
POKE 36335,115
POKE 36336,141
POKE 36337,246
POKE 36338,3
POKE 36339,169
POKE 36340,142
POKE 36341,133
POKE 36342,116
POKE 36343,141
POKE 36344,247
POKE 36345,3
POKE 36346,169
POKE 36347,76
POKE 36348,141
POKE 36349,245
POKE 36350,3
POKE 36351,96
```

Of course, the monitor is zippier on this kind of task, if you want to enter the hex equivalents of the decimal POKES in \$8DEC through \$8DFF.

3. BSAVE RENUM,A36332,L2068

Notice that an additional 20 bytes spill over onto one more track in the RENUM data set.

This way of saving the program saves a second or two on each run and dispenses with the screenful of empty "]" lines that scoot your last display off the screen. After the BRUN RENUM, the 20-byte program is eventually destroyed the next time an Applesoft string is created.

DDJ



# DR. DOBB'S JOURNAL of COMPUTER Calisthenics & Orthodontia

*Running Light Without Overbyte*

Twelve Times Per Year

\$21/1 Year — \$39/2 Years

### Recent issues have included:

*ZX65: Simulating a Micro*

*EXOS-6500 Software Development Tool Kit*

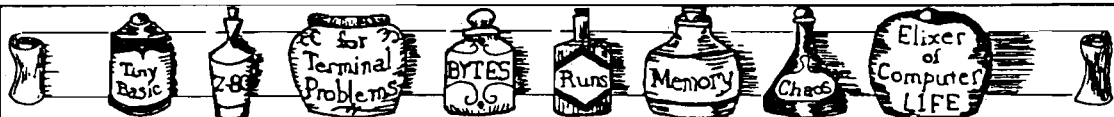
*6502 Assembler—Pet 8K-32K*

*A Note on 6502 Indirect Addressing*

*The C Programming Language*

What you see is what you get.

To subscribe, send your name and address to *Dr. Dobb's Journal*,  
Department V4, Post Office Box E, Menlo Park, CA 94025.  
We'll bill you.



PG

## Software Catalog: XXXI

Name: **The DI-SECTOR Disk**  
System: Apple II, Apple Plus  
Memory: 48K  
Language: ROM Applesoft,  
Assembly

Hardware: Disk Drive, optional;  
printer, language card

Description: A set of seven disk utility programs to help 'DI-SECT' your disks. Now you can easily display and edit any sector of a disk, list sectors used by a file, create a new VTOC, display free and used sectors, create 'EXEC' files easily, print text files on the screen or a printer, and load the language card with the old ROM code.

Price: \$20.00 on disk postpaid.  
Includes both DOS 3.2  
and 3.3 versions, and  
documentation.

Author: **Jeffrey Durham**  
Available: **Mike Rowe Productions**  
P.O. Box 43504  
Tucson, Arizona 85733

Name: **NDE—Package**  
System: CBM Commodore  
Memory: 32K  
Language: BASIC  
Hardware: CBM 3032/  
CBM 3040/CBM 3022

Description: It is a whole package for handling the results of X-Ray-Examinations and liquid dye examinations of welds, 6 languages (German, Italian, French, English, Spanish and Portuguese), aic implemented.

Copies: Disk

Price: \$800.00

Author: **M. Bauer**

Available: **M. Bauer**  
Aindorferstr.86  
D-8000 Muenchen 2A  
West Germany

Name: **0-1. Options**  
System: PET  
Memory: 8K  
Language: BASIC  
Hardware: PET/CBM

Description: Options are evaluated. A unique measure of option value is computed and used to compare options for up to three expiration dates and three striking prices. Normal prices for puts or calls may be computed for any assumed situation and tables printed as a function of stock price.

Price: \$15.00 for cassette and  
documentation

Author: **Claud E. Cleeton**

Available: **Claud E. Cleeton**  
122-109th Ave., S.E.  
Bellevue, Washington  
98004

Name: **Star Cruiser**  
System: Apple II or Plus  
Memory: 32K RAM  
Language: 20K of assembly  
Hardware: One drive. Either 13 or 16  
sector controller.

Description: Simply stated, the  
ULTIMATE ACTION GAME. If you're  
looking for fast Hi-Res action with col-  
or, sound and action to rival Atari's  
Galaxian game, then this is it. Make it  
past the first two levels and the third  
level will really kill you. Hundreds sold  
in the first week of sale.

Price: \$24.95

Author: **Nasir Gebelli**  
Available: **Sirius Software**  
1537 Howe Ave.,  
Suite 106  
Sacramento, California  
95825

Name: **Commodity File**  
System: Apple II, Apple Plus  
Memory: 32K with Applesoft ROM  
or 48K with Applesoft  
RAM  
Language: Applesoft II  
Hardware: Disk II, 132 column  
printer [optional]

Description: Commodity File stores  
and retrieves virtually every commodi-  
ty traded on all Future's exchanges. A  
self-prompting program allowing the  
user to enter short/long contracts.  
Computes gross and net profits/losses,  
and maintains a running cash balance.  
Takes into account any amending of  
cash balances such as new deposits or  
withdrawals from the account. Instan-  
taneous readouts (CRT or printer) of  
contracts on file, cash balances, P/L  
statement. Includes color bar graphs  
depicting cumulative and individual  
transactions. Also includes routine to  
proofread contracts before filing.

Price: \$19.95 plus \$2.00 (p&h)  
first class mail.

Author: **Mind Machine, Inc.**

Available: **Mind Machine, Inc.**  
31 Woodhollow Lane  
Huntington, New York  
11743

Name: **SEX-O-SCOPE™:  
THE PRIVATE-LIFE  
HOROSCOPE™**

System: Apple II or TRS-80  
Memory: 32K for screen version,  
48K for printout version  
Language: Apple II—Applesoft in  
ROM with DOS 3.2;  
TRS-80—Disk BASIC 2.3

Hardware: Apple II—1 disk with  
screen version, 2 disks  
with printout version.  
TRS-80—2 disks with  
both versions.

Description: Casts an accurate  
horoscope, then interprets it from a  
sexual viewpoint in 1500 words or  
more. Not just a paragraph about your  
sign, but rather a reading of all the  
planets, signs and houses in a  
horoscope that is unique to the in-  
dividual. Text, by best-selling author of  
*Planets In Love* and former editor of  
*Sexology Today*, outlines tastes, turn-  
ons and hang-ups in a tolerant, witty  
style. Computations are precise within  
a tenth of a degree for any date and time  
from 1880 to 2000.

Price: \$30.00—screen version  
\$200.00—printout version  
(includes license to repro-  
duce textual material  
commercially)

Author: **John Townley and AGS  
Software**  
Available: **AGS Software**  
Box 28  
Orleans,  
Massachusetts 02653

Name: **The Ultimate Catalog**  
System: Apple II/Apple II Plus  
Memory: Min. 20K (ROM  
Applesoft)

Language: Applesoft and Machine  
RWTS

Hardware: Apple II, Disk II, DOS 3.2  
Description: Now you can format your  
directory to appear any way you wish.  
Block similar programs together; write

headers mid-directory; separate by sections. This 5K, menu-driven utility is easy to use and performs the following functions: Alphabetize any portion or all of directory, move any file, exchange any two files, highlight or remove highlighting from any file name, insert blank line(s), delete any file, lock or unlock all files, delete or restore all files.

Price: \$6.50 for listing/  
instructions

Author: **Larry Abrams**  
Available: **ARIES SOFTWARE**  
P.O. Box 58  
Los Altos, California  
94022

Name: **The Math Machine**

System: Apple  
Memory: 32K  
Language: Applesoft in ROM  
Hardware: Disk, optional printer  
Description: Kid-tested, effective instructional software to improve math skills. Covers pre-math through division with over 110 skill levels. Designed by educators and written by programmers for use by parents and teachers. Includes such features as: reinforcement system, management, record keeping, individualization, personalized lessons, performance objectives, and immediate feedback.

Price: \$79.95 includes original and back-up disk, teacher and parent manual, support.

Author: **Larry Johnson**  
Available: **SouthWest EdPsych Services**  
P.O. Box 1870  
Phoenix, Arizona 85001

Name: **The Mailing Label and Filing System**

System: Apple II  
Memory: 48K  
Language: Applesoft  
Hardware: Apple II, Disk II (one or two drives)

Description: Has loads of features: binary sorting; 1 - 3-second access of records by name or record number; user formatted; optional 9-digit zip code update; performs COUNT/SORTS which enables the user to display a certain type of population off the disk and/or make print-outs or mailing labels; reversible directory reading; special backup programs, insert programs, copy-by-record (for backup) programs; automatic formatting file and directory updating; edit; delete; write; count; read; print; customized mailing labels, quicksort utilization; much more.

Price: \$24.95 includes disk, manual, demo sheet.

Author: **Avant-Garde Creations**  
Available: **Avant-Garde Creations**  
P.O. Box 30161 MCC  
Eugene, Oregon 97403

Name: **Z-Term**

System: Apple II or Apple II Plus  
Memory: 48K  
Language: CP/M,  
[Machine Language]

Hardware: Disk II (DOS 3.2 or 3.3), Z-80 Softcard, Micro-modem II or most other communications devices, 80-column board or external terminal optional.

Description: Upload and download data files between the Apple and another computer. A number of "luxury" features are also provided. Commonly used systems can be put into a directory for auto-dialing, keyboard Macros allow you to define strings for output with simple keystrokes for fast log-ins to system, or to issue various commands within the system. Table-driven prefix keys allow you to produce any character not already on the Apple keyboard without losing any other keys! Fully compatible with standard CP/M sequential text files, and can send files from disk of any size, and can receive up to 36K of data at a time. Auto-save mode will send XOFF character to host, save file (with operator prompting) and then continue.

Price: \$79.95, introductory (until May 1, 1981)

Author: **Bill Blue**  
Available: **Southwestern Data Systems**  
P.O. Box 582-M  
Santee, California  
92071

Name: **Display-it**

System: OSI, C1P or Superboard  
Memory: 4K  
Language: 8K BASIC-in-ROM

Description: Displays messages from right to left in large letters made up of any graphics character. Messages can be up to 255 characters long.

Price: \$5.95 ppd.  
includes cassette and documentation

Author: **Brian and Craig Zupke**  
Available: **BC Software**  
9425 Victoria Drive  
Upper Marlboro  
Maryland 20870

Name: **Small Business Accounting (SBA)**

System: OSI C4P MF  
Language: BASIC under OS65D  
Hardware: Printer, 2 Disks (second optional)

Description: Provides double-entry journal system for cash flow analysis and reports. Automatic checking of distribution account totals at time of entry. User-defined fields in data base files; up to 99 expense and income accounts, 999 vendor/customer accounts, with names up to 72 characters. Six digit (XXXX.xx) capability in base module is expandable. Prints Income Statement, Trial Balance, Charts of Accounts and Vendor/Customer lists. Summary financial information totalable by month, quarter, and YTD. Sorting is available on user specified fields. All records are MDMS compatible and code allows user system configuration.

Price: \$100.00 (3rd Class mail free, 1st Class add \$2.00).

Includes: (1) program disk and (1) data disk with sample file. User manual and Accounting System Guide and sample source documents provided. Program listings only are available for \$20.00 each.

Author: **J.O. Rector**  
Available: **Video Ventures**  
1708 Beechwood Avenue  
Fullerton, CA 92635

Name: **GRAPPAK APPLE**

System: Apple II  
Memory: 32K minimum  
Language: Either BASIC and 6502 ML

Hardware: Disk and graphic printer  
Description: GRAPPAK is a family of programs for reproducing the Hi-Res pages using grab-the-wire printer graphics. 1x and 2x scaling are standard, and 3x and 5x are available with some printers. Normal and inverse inking is selectable, and variable indent is provided. Features vary with make and model of printer. Packages available for IDS-440,445 and 460, Anadex DP-9xxx family, and Epson MX-70 and MX-80 with graphic PROMs.

Price: \$24.95 (+1.65 in Ohio) includes diskette and user's guide (specify DOS release and printer model).

Available: **SmartWare**  
2281 Cobble Stone Court  
Dayton, Ohio 45431

# MR. RAINBOW

presents our valuable free catalog (over 100 pages). He **PROMPTS** you to **PEEK** at the latest collection of software and hardware products for your **APPLE II™**



## A STELLAR TREK

the definitive Hi-Res color version of the classic Startrek game. Three different Klingon opponents. Many command prerogatives from use of weapons to repair of damages. Needs 48K Applesoft ROM. Disk... **\$24.95**

## VERSAWRITER II

A drawing tablet, simply plugs into your game I/O port. Trace, draw, design, or color any type of graphic. Adds words to pictures. Creates schematics. Computes Distance/Area of any figure. New - fill any area on the screen in seconds with over 100 different and distinct colors. Needs 32K Applesoft ROM and disk drive. A bargain at... **\$249.95**

## BOWLING DATA SYSTEM

This data mangement program provides accurate record keeping and report generation for bowling leagues of up to 40 teams with 6 bowlers per team. Needs 80-column printer, 32K Applesoft ROM. Disk... **\$79.95**

## SUPER SOUND

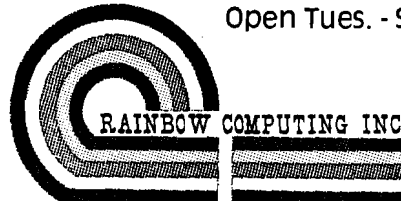
Musical rhythms, gunshots, sirens, laser blasts, explosions... add these and many more exciting sounds to your Apple. Use them in your programs, or create your own SUPER SOUNDS. Needs 16K Applesoft. Have a blast for only **\$12.95... Tape**  
**\$16.95... Disk**

ADD \$2.00 U.S. \$10.00 FOREIGN FOR SHIPPING  
CALIFORNIA RESIDENTS ADD 6% SALES TAX

Don't see what you want here, then write or call today for your free catalog. We're saving one just for you.

Visa/Mastercharge welcome.

Open Tues. - Sun.



GARDEN PLAZA SHOPPING CENTER  
9719 RESEDA BOULEVARD DEPT. 1MI  
NORTHRIDGE, CALIFORNIA 91324  
PHONE (213) 349-0300



# The Newest In

## Apple Fun

We've taken five of our most popular programs and combined them into one tremendous package full of fun and excitement. This disk-based package now offers you these great games:

**Mimic**—How good is your memory? Here's a chance to find out! Your Apple will display a sequence of figures on a 3x3 grid. You must respond with the exact same sequence, within the time limit.

There are five different, increasingly difficult versions of the game, including one that will keep going indefinitely. Mimic is exciting, fast paced and challenging—fun for all!

**Air Flight Simulation**—Your mission: Take off and land your aircraft without crashing. You're flying blind—on instruments only.

A full tank of fuel gives you a maximum range of about 50 miles. The computer will constantly display updates of your air speed, compass heading and altitude. Your most important instrument is the Angle of Ascent/Bank Indicator. It tells if the plane is climbing or descending, whether banking into a right or left turn.

After you've acquired a few hours of flying time, you can try flying a course against a map or doing aerobatic maneuvers. Get a little more flight time under your belt, the sky's the limit.

**Colormaster**—Test your powers of deduction as you try to guess the secret color code in this Mastermind-type game. There are two levels of difficulty, and three options of play to vary your games. Not only can you guess the computer's color code, but it will guess yours! It can also serve as referee in a game between two human opponents. Can you make and break the color code...?

**Star Ship Attack**—Your mission is to protect our orbiting food station satellites from destruction by an enemy star ship. You must capture, destroy or drive off the attacking ship. If you fail, our planet is doomed...

**Trilogy**—This contest has its origins in the simple game of tic-tac-toe. The object of the game is to place three of your colors, in a row, into the delta-like, multi-level display. The rows may be horizontal, vertical, diagonal and wrapped around, through the "third dimension". Your Apple will be trying to do the same. You can even have your Apple play against itself!

Minimum system requirements are an Apple II or Apple II Plus computer with 32K of memory and one mindisk drive. Mimic requires Applesoft in ROM, all others run in RAM or ROM Applesoft.

Order No. 0161AD \$19.95

## Solar Energy For The Home

With the price of fossil fuels rising astronomically, solar space-heating systems are starting to become very attractive. But is solar heat cost-effective for you? This program can answer that question.

Just input this data for your home: location, size, interior details and amount of window space. It will then calculate your current heat loss and the amount of gain from any south facing windows. Then, enter the data for the contemplated solar heating installation. The program will compute the NET heating gain, the cost of conventional fuels vs. solar heat, and the calculated payback period—showing if the investment will save you money.

**Solar Energy for the Home:** It's a natural for architects, designers, contractors, homeowners... anyone who wants to tap the limitless energy of our sun.

Minimum system requirements are an Apple II or Apple II Plus with one disk drive and 28K of RAM. Includes AppledOS 3.2.

Order No. 0235AD (disk-based version) \$34.95

## Math Fun

The Math Fun package uses the techniques of immediate feedback and positive reinforcement so that students can improve their math skills while playing these games:

**Hangman**—A little man is walking up the steps to the hangman's noose. But YOU can save him by answering the decimal math problems posed by the computer. Correct answers will move the man down the steps and cheat the hangman.

**Spellbinder**—You are a magician battling a computerized wizard. In order to cast death clouds, fireballs and other magic spells on him, you must correctly answer problems involving fractions.

**Whole Space**—Pilot your space craft to attack the enemy planet. Each time you give a correct answer to the whole number problems, you can move your ship or fire. But for every wrong answer, the enemy gets a chance to fire at you.

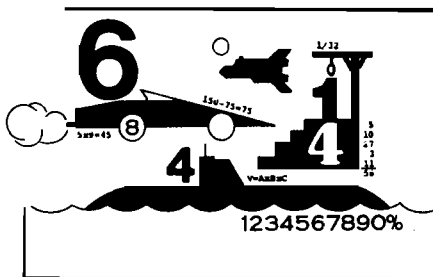
**Car Jump**—Make your stunt car jump the ramps. Each correct answer will increase the number of buses your car must jump over. These problems involve calculating the areas of different geometric figures.

**Robot Duel**—Fire your laser at the computer's robot. If you give the correct answer to problems on calculating volumes, your robot can shoot at his opponent. If you give the wrong answer, your shield power will be depleted and the computer's robot can shoot at yours.

**Sub Attack**—Practice using percentages as you maneuver your sub into the harbor. A correct answer lets you move your sub and fire at the enemy fleet.

All of these programs run in Applesoft BASIC, except Whole Space, which requires Integer BASIC.

Order No. 0160AD \$19.95



## Skybombers

Two nations, separated by The Big Green Mountain, are in mortal combat! Because of the terrain, their's is an aerial war—a war of SKYBOMBERS!

In this two-player game, you and your opponent command opposing fleets of fighter-bombers armed with bombs and missiles. Your orders? Fly over the mountain and bomb the enemy blockhouse into dust!

Flying a bombing mission over that innocent looking mountain is no milk run. The opposition's aircraft can fire missiles at you or you may even be destroyed by the bombs as they drop. Desperate pilots may even ram your plane or plunge into your blockhouse, suicidally.

Flight personnel are sometimes forced to parachute from badly damaged aircraft. As they float helplessly to earth, they become targets for enemy missiles.

The greater the damage you deal to your enemy, the higher your score, which is constantly updated at the bottom of the display screen.

The sounds of battle, from exploding bombs to the pathetic screams from wounded parachutists, remind each micro-commander of his bounden duty. Press On, SKYBOMBERS—Press On!

Minimum system requirements: An Apple II or Apple II Plus, with 32K RAM, one disk drive and game paddles.

Order No. 0271AD (disk-based version) \$19.95



## Paddle Fun

This new Apple disk package requires a steady eye and a quick hand at the game paddles! It includes:

**Invaders**—You must destroy an invading fleet of 55 flying saucers while dodging the carpet of bombs they drop. Your bomb shelters will help you—for a while. Our version of a well known arcade game! Requires Applesoft in ROM.

**Howitzer**—This is a one or two person game in which you must fire upon another howitzer position. This program is written in HIGH-RESOLUTION graphics using different terrain and wind conditions each round to make this a demanding game. The difficulty level can be altered to suit the ability of the players. Requires Applesoft in ROM.

**Space Wars**—This program has three parts: (1) Two flying saucers meet in laser combat—for two players, (2) two saucers compete to see which can shoot out the most stars—for two players, and (3) one saucer shoots the stars in order to get a higher rank—for one player only. Requires Applesoft.

**Golf**—Whether you win or lose, you're bound to have fun on our 18 hole Apple golf course. Choose your club and your direction and hope to avoid the sandtraps. Losing too many strokes in the water hazards? You can always increase your handicap. Get off the tee and onto the green with Apple Golf. Requires Applesoft.

The minimum system requirement for this package is an Apple II or Apple II Plus computer with 32K of memory and one mindisk drive.

Order No. 0163AD \$19.95

# Instant Software™

\* A trademark of Apple Computer Inc.

PETERBOROUGH, N.H. 03458  
603-924-7296



# Apple\* Software

## From Instant Software

### Santa Paravia and Fiumaccio

*Buon giorno, signore!*

Welcome to the province of Santa Paravia. As your steward, I hope you will enjoy your reign here. I feel sure that you will find it, shall we say, profitable.

Perhaps I should acquaint you with our little domain. It is not a wealthy area, signore, but riches and glory are possible for one who is aware of political realities. These realities include your serfs. They constantly request more food from your grain reserves, grain that could be sold instead for gold florins. And should your justice become a trifle harsh, they will flee to other lands.

Yet another concern is the weather. If it is good, so is the harvest. But the rats may eat much of our surplus and we have had years of drought when famine threatened our population.

Certainly, the administration of a growing city-state will require tax revenues. And where better to gather such funds than the local marketplaces and mills? You may find it necessary to increase custom duties or tax the incomes of the merchants and nobles. Whatever you do, there will be far-reaching consequences... and, perhaps, an elevation of your noble title.

Your standing will surely be enhanced by building a new palace or a magnificent *cattedrale*. You will do well to increase your landholdings, if you also equip a few units of soldiers. There is, alas, no small need for soldiery here, for the unscrupulous Baron Peppone may invade you at any time.

To measure your progress, the official cartographer will draw you a *mappa*. From



it, you can see how much land you hold, how much of it is under the plow and how adequate your defenses are. We are unique in that here, the map IS the territory.

I trust that I have been of help, signore. I look forward to the day when I may address you as His Royal Highness, King of Santa Paravia. *Buona fortuna* or, as you say, "Good luck". For the Apple 48K.

Order No. 0174A \$9.95 (cassette version).

Order No. 0229AD \$19.95 (disk version).

**TO ORDER** SEE YOUR LOCAL INSTANT SOFTWARE DEALER OR USE THE ORDER FORM BELOW

For Fast Service

*call now*

Toll-Free

1-800-258-5473

### Apple Cassettes

0018A Golf.....	\$7.95
0025A Mimic.....	\$7.95
0040A Bowling/Trilogy.....	\$7.95
0073A Math Tutor I.....	\$7.95
0079A Oil Tycoon.....	\$9.95
0080A Sahara Warriors.....	\$7.95
0088A Accounting Assistant.....	\$7.95
0094A Mortgage w/Prepayment Option/ Financier.....	\$7.95
0096A Space Wars.....	\$7.95
0098A Math Tutor II.....	\$7.95
0174A Santa Paravia and Fiumaccio.....	\$9.95
0148A Air Flight Simulation.....	\$9.95

### We Guarantee It!

**Instant Software  
Guarantee**

OUR PROGRAMS ARE GUARANTEED TO BE QUALITY PRODUCTS. IF NOT COMPLETELY SATISFIED YOU MAY RETURN THE PROGRAM WITHIN 60 DAYS. A CREDIT OR REPLACEMENT WILL BE WILLINGLY GIVEN FOR ANY REASON.

109

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Check     Money Order     VISA     AMEX     Master Charge

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_

**Order your Instant Software today!**

Quantity	Order No.	Program name	Unit cost	Total cost
Shipping and handling				\$1.00
Total order				

Instant Software Inc.

Peterborough, N.H. 03458

# Apple II<sup>TM</sup> Memory Management System<sup>TM</sup>

## A LITTLE HISTORY

Many years ago, when the Apple II first came out, it was possible to program a 48K computer. At this time you were somewhat constrained to Integer BASIC and a cassette storage medium.

Shortly thereafter, APPLESOFT<sup>TM</sup> appeared. The original (RAM) version improved upon the Apple's capabilities but reduced the programmer memory by about 12K. You could now do more but had less memory to do it with.

The situation soon changed again when Apple introduced the APPLESOFT ROM card. For \$195 the programmer now had both Integer and APPLESOFT capabilities and 48K available.

In keeping with tradition, Apple followed the ROM card with an even more classier act: the Disk drive. A majority of Apple owners now have a 48K Apple computer with Integer BASIC, APPLESOFT, and a Disk Operating System (DOS). But the 48K in the computer is no longer fully available to the programmer since DOS occupies 10.5K of memory (actually 10752 bytes). A 48K Apple actually has 37.5K of programmable memory if DOS is booted.

## APPLE II PLUS OWNERS

Owners of Apple II PLUS<sup>TM</sup> computers can follow the same procedure with an INTEGER ROM card in slot 4.

The final configuration of your Apple will be the **same** as above.

## SINGLE LANGUAGE ALSO

If you don't need dual language capabilities (PLUS owners who only program in APPLESOFT, for example), then MMS will still relocate DOS on the 16K RAM card in slot 0. A full 48K will still be available to the programmer.

## WHAT IS REQUIRED

- \* 48K Apple II or Apple II PLUS
- \* 1 or more disk drives.
- \* 1 or 2 16K RAM EXPANSION BOARDS or APPLESOFT or INTEGER ROM CARD
- \* MEMORY MANAGEMENT SYSTEM by C.D.S.

## ONE TIME GOOD DEAL

MMS diskette .....	\$ 39.95
ANDROMEDA 16K RAM BOARD .....	\$195.00
ANDROMEDA 16K RAM BOARD plus MMS diskette .....	\$215.00
2 ANDROMEDA BOARDS plus MMS diskette .....	\$375.00

## A FEW PROGRAMMER NOTES

DOS is somewhat altered with MMS. The command INIT is disabled, so you should INIT all your diskettes prior to starting up with MMS. In addition, MAXFILES automatically defaults to 2 but can be changed if desired.

The MMS program uses page 3 (\$300.-\$3FF) for interfacing and it is not available for programmer use.

Regardless of your Apple's configuration, approximately 2K of memory is devoted to the internal operating system (monitor).

Special configurations of MMS are available upon request.

## HOW TO ORDER

MMS and the ANDROMEDA 16K RAM EXPANSION BOARD are available through your local computer store.

Or you can order **direct** by calling **COMPUTER DATA SERVICES** at (516) 360-0988. VISA, MasterCard, and COD accepted. Credit card and check orders are shipped postage - paid. Shipping charges are:

\$1.50 for MMS  
\$3.00 for ANDROMEDA 16K RAM BOARD.

## THE MEAT OF THIS AD

MEMORY MANAGEMENT SYSTEM (MMS)<sup>TM</sup> by C.D.S. is a unique, exciting **new** way to get back the 10.5K of memory allotted to DOS. Here's how it operates:

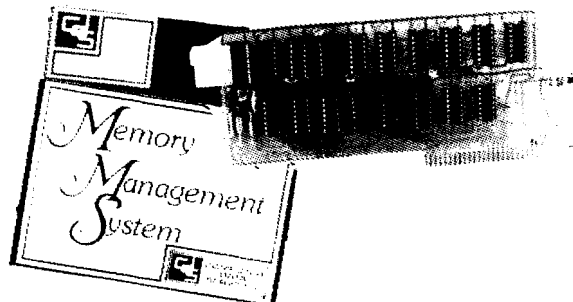
(1) A 48K Apple is configured with a 16K RAM EXPANSION BOARD in slot 0, and an APPLESOFT card or another 16K RAM EXPANSION BOARD in slot 4.

(2) DOS is booted as you normally would, using a DOS 3.3 System Master diskette, or DOS 3.2 BASICS diskette followed by a DOS 3.2 System Master.

(3) BRUN the **MMS** program.

In a few seconds your Apple computer will recognize both Integer BASIC and APPLESOFT **AND** the DOS will be relocated on the 16K RAM EXPANSION BOARD!

With DOS now resident on the 16K RAM board, 10.5K of memory is **released** for your programming use.



## 16K EXPANSION BOARDS

Currently there are three 16K RAM boards available for the Apple computer.

Apple Language Card <sup>TM</sup>	(retail \$495.00)
MICROSOFT RAMCard <sup>TM</sup>	(retail \$195.00)
ANDROMEDA BOARD <sup>TM</sup>	(retail \$195.00)

ALL of these boards will work with MMS. However, since we market the ANDROMEDA 16K RAM EXPANSION BOARD, we are able to make the following offer:

MEMORY MANAGEMENT SYSTEM (MMS) is a trademark of Computer Data Services (C.D.S.)

Apple II, Apple II PLUS, APPLESOFT, Apple Language Card are trademarks of Apple Computer Company.

RAMCard is a trademark of Microsoft.

ANDROMEDA 16K RAM EXPANSION BOARD is a trademark of ANDROMEDA, Inc.



(516) 360-0988

P.O. Box 94, Hauppauge, N.Y. 11787

## 6502 Bibliography: Part XXXI

### 890. The Cider Press (October, 1980)

- Weiglin, Peter C., "Formatting," pg. 5-6.  
Formatting and printing backwards on the Apple.
- Bernheim, Phil, "Initialize New Files Automatically," pg. 6.  
A handy tip for handling files kept on a periodic basis.  
For the Apple.
- Bernheim, Phil, "Another Way to Find Hidden Characters," pg. 6.  
A fix for hidden characters in Apple programs.
- Bernheim, Phil, "Dates," pg. 8.  
An easy way to encode and decode dates.
- Hertzfeld, Andy, "Delete the Flashing Cursor," pg. 8.  
A short monitor routine to silence the flashing cursor.
- Bernheim, Phil, "Converting String Dates," pg. 11.  
Routine to convert string dates to datum of the form MMDDYY.
- Wilson, Gene, "Je M'Apple' PASCAL." Several Pascal programs for the Apple.

### 891. The Apple Barrel 3, No. 7 (September/October, 1980)

- Anon., "File Cabinet Partially Exposed," pg. 5-6.  
A tutorial on the use of this important Apple utility.
- Winter, Kevin, "Using the Backspace as a Delete Key," pg. 7.  
A technique to add special functions to the Apple.
- McGee, Pat, "Pascal Problems," pg. 9-13.  
A number of problems with Apple Pascal and the fixes.
- Barber, Bruce, "Screen Create," pg. 13-19.  
A poor man's graphic tablet for the Apple.
- Meador, Lee, "Disassembly of DOS 3.2," pg. 19-31.  
The fifth installment of this excellent series, on the Apple DOS 3.2.

### 892. Stems from Apple 3, Issue 10 (October, 1980)

- Sittel, Randy, "Are You Overtaxing Your Computer?," pg. 3.  
A table of the current requirements of various Apple peripherals.
- Ward, Dennis, "Display and Dec/Hex Converter," pg. 5.  
Two short programs for the Apple.
- Anon., "Kent's Puzzle Entries," pg. 8-11.  
A series of 18 short programs for the Apple.
- Todd, Allen W., "Blockedit," pg. 13-20.  
An Apple Pascal disk utility, allowing examination and editing of any diskette block.

### 893. The Apple-Dillo (October, 1980)

- Sethre, Tom, "Roots," pg. 3.  
Another installment of this tutorial on Apple machine language, dealing with handling keyboard input.
- Teas, George, "Pascal Primer," pg. 5.  
A new column to help novice Pascal users with helpful programming hints.

Huffman, David, "Personalizing Your Catalog Heading," pg. 5.

An Apple DOS 3.2.1 tutorial.

Bartley, David, "Getting There Faster in Applesoft BASIC," pg. 6-7.

Speed up your Applesoft programs.

Sethre, Tom, "The Official Computer Game Player Cheater's Guide," pg. 7-8.

Sethre, Tom, "Memory Display," pg. 9.

A machine language routine for the Apple.

### 894. The G.R.A.P.E. Vine (September, 1980)

Sander-Cederlof, "One-Liner," pg. 1.

A one-liner for the Apple.

Anon., "Hi-Res Plotting of Characters from Character Table," pg. 2.

A Hi-Res writing program.

Anon., "Faster Shell," pg. 8.

This Faster Shell Sort is approximately 25% faster than the Hibbard Sort appearing in the last issue.

### 895. The Seed 2, No. 10 (October, 1980)

Anon., "Apple Pi Conventions," pg. 7.

A listing to standardize title pages on donated programs—for the Apple.

### 896. Applications 3, No. 2 (August, 1980)

Camiller, Derek, "GET vs. INPUT," pg. 12.

Simplify your input statements and responses.

Webster, Ian, "Telecom, Modems and Other Mysteries," pg. 14-17.

All about Modem use with the Apple in Australia.

Webster, Ian, "Relocation of Apple Machine Code," pg. 20-25.

This program will relocate machine code programs.

Haines, Ron, "Some Notes on the UCSD Assembler," pg. 26-27.

Additional comments to augment skimpy documentation of the Apple Pascal system.

Fields, Randy and Thompson, C., "Shorten Disk Commands," pg. 28.

Significantly shorten the Apple Disk Operating commands.

### 897. Radio Electronics 51, No. 10 (October, 1980)

Staff, "Buyer's Guide to Home Computers," pg. 45-84.

Among others, covers Apple; PET, OSI and Atari micros, including peripherals and accessories.

### 898. Fort Worth Apple User Group Newsletter (FWAUG) 2, No. 2 (October, 1980)

McVay, Ray, "Ampersoft," pg. 2-4.

Three routines for machine language string manipulation to forestall garbage collection and quicken sorting.

Meador, Lee, "DOS 3.2 Disassembly—9," pg. 6-21.  
This installment of this important series discusses the Output State Machine and the data area and tables of commands and error messages.

Matzinger, Bob, "Make a Hello a Binary File," pg. 23.  
A tricky way to put the boot program in Binary, for the Apple.

#### 899. Personal Computing 4, No. 10 (October, 1980)

Fischer, Mike, "Word Search," pg. 34-39.  
An Apple program to solve those jumbled letter matrices with hidden words.

Lubar, David, "Problem Solving and Computers," pg. 49-50.  
Use of the Apple in problem solving.

Gaylord, Sam, "Cash In On the Power of Pascal," pg. 52-53.  
Pascal program on the "melt value" of silver coins.

Jones, Jeremy C., "A Computer Spelling Exercise," pg. 54-55.  
An educational program for OSI computers.

Welsh, Dave, "Rating BORIS 2.5," pg. 78-90.  
All about the 6502-based computer programs called BORIS 2.5/Sargon 2.5.

#### 900. MICRO No. 29 (October, 1980)

Berger, Thomas R., "An OSI Cheep Print," pg. 7-12.  
Hardware and Software to interface OSI systems with a printer.

Morris, Gary A., "PRINT USING for Applesoft," pg. 14-17.  
Program permitting user-defined formatting of the output of Applesoft.

Kolbe, Werner, "Define Your Own Function Key on PET," pg. 19-20.  
Program routine to call a commonly used BASIC function from the keyboard.

DeJong, Marvin L., "An Improved Morse Code Receive Routine and Interface," pg. 23-26.  
Hardware and Software for the AIM 65.

Borton, David, "Undedicating A Dedicated Micro-computer," pg. 27-28.  
Developing a time-shared process controller for the KIM-1.

MacDonald, R., "A 'Stop-On-Address' Routine for KIM." A routine to debug more efficiently through the use of a trap to stop on a specified address.

Schultz, Robert, "Tiny Pilot Complemental (Co-Pilot)." Modification to Tiny Pilot improving the 'Match' statement—for the SYM.

Boynton, G.R., "For Multiple File Tape Backups," pg. 36-38.  
This PET utility takes the drudgery out of making multiple backup copies of cassette files.

Wright, Loren, "PET Vet," pg. 39.  
Comments on PET documentation and literature references.

Burcher, P.E., "Biorythm: An AIM BASIC Programming Exercise," pg. 51-55.  
Programs providing an interesting demonstration for using the AIM and its printer.

Moyer, LeRoy, "Hexadecimal Printer," pg. 57-58.  
A simple Apple II program permitting the user to specify the limits within which he wants the disassembler to operate.

Mulligan, John P., "Programming with Pascal," pg. 59-63.

Tutorial and Sorting routine for Apple Pascal.

Ellis, Dawn E., "Cassette Label Program," pg. 65-67.  
Let the computer do the dirty work printing labels for those tape cassettes. For the Apple.

Rowe, Mike (Staff), "The MICRO Software Catalog: XXV," pg. 73-75.

Sixteen new items of software for 6502 systems are reviewed.

Dial, Dr. William R., "6502 Bibliography: Part XXV," pg. 76-77.

Some 65 new references to the extensive 6502 literature.

#### 901. PEEK(65) Vol. 10 (October, 1980)

Williams, Jim, "Cold Start/System Crash Recovery," pg. 4-5.

Recovering from system crashes caused by errant POKE statements on OSI micros.

Lewton, Maurice P., "C1P or Superboard II GET Routine," pg. 7.

A listing for OSI micros providing a 'GET' routine.

Criscione, J.R., Jr., M.D., "More on OS-65U Password File Protection," pg. 11.

Comments and listing for program security.

#### 902. Ham Radio 13, No. 10 (October, 1980)

Skeen, W.S., "A CW Keyboard Using the Apple II Computer," pg. 60-62.

Program Listing and simple interface hardware for using the Apple II with your Amateur station.

#### 903. The G.R.A.P.E. Vine (October, 1980)

Anon., "Automatic Free Space with Catalog," pg. 3.  
Short modified routine for the booting of your disks.

Anon., "DOS Changes on Disks," pg. 4.  
How to personify your disks.

Anon., "What is Theomatics?," pg. 5-7.  
Discussion and two listings related to biblical literature.

#### 904. Creative Computing 6, No. 10 (October, 1980)

McClure, Jim, "The C2-4P Ohio Scientific Computer," pg. 17-23.

A review of a new micro.

Lubar, David, "Sound Advice," pg. 26-29.  
DAC's and Music boards for 6502 machines.

Ahl, David H., "Easy Writer," pg. 34.  
A review of a word processor for the Apple.

Platt, Charles, "Bargain-Basement Word Processing," pg. 54-55.

Review of the WP6502 word processor useful for OSI micros, Apple, PET, Atari, etc.

Carpenter, Chuck, "Apple-Cart," pg. 162-167.  
How to avoid 'extra ignored' messages, saving strings on tape, listing for AC control routine, etc.

Yob, Gregory, "Personal Electronic Transactions," pg. 168-172.

How to get lower case letters on a PET, program providing automatic repeat of keys, PET machine language tutorial and examples, etc.

Blank, George, "Outpost: Atari," pg. 174-177.  
String array demonstration, precautions for input/output, printer interface, programmer's aid, etc.

- 905. Apple/Sass (October, 1980)**  
 Burson, Dick, "Name that Tone!", pg. 9.  
 Tone generating routines for the Apple.  
 Anon., "Math Drill II," pg. 14.  
 An educational Apple program.  
 Golding, Val J., "Hidden REM Formatter."  
 Two listings for the Apple.
- 906. Softalk 1 (October, 1980)**  
 Wagner, Roger, "Assembly Lines," pg. 3-4.  
 Everyone's machine language guide.
- 907. Dr. Dobb's Journal 5, Iss. 9, No. 49 (October, 1980)**  
 Gordon, H.T., "Opcode Design: 9 or 16 Bits?,"  
 pg. 22-23.  
 Discussion of 6502 code and codes of other microprocessors.
- 908. The Harvest 2, No. 2 (October, 1980)**  
 Peterson, Todd C., "A Free Remote Control for Your Apple."  
 Use a receiver, a transmitter, and a patch cord for a remote control set-up.  
 Anon., "Parallel vs. Serial Printer Boards," pg. 7.  
 A discussion of the merits of these two options.  
 Anon., "Need to Get a Text File to a Printer in Pascal?,"  
 pg. 8.  
 A pascal starter routine for the Apple.  
 Holle, Dave, "Physical and Logical Sectors of DOS 3.3,"  
 pg. 9.  
 Some information on the new Apple DOS system.  
 Robbins, Mike, "16 Sector Patch for Dan's Disk Utility,"  
 pg. 9.  
 Just two lines added to fix this one up for 16 sectors.  
 Alexander, Leon, "Leon's Bell," pg. 10.  
 A short machine program that toggles the bell upon an INPUT or GET statement on the Apple.
- 909. The Apple Shoppe 1, No. 7 (July/August, 1980)**  
 Staff, "Pascal PEEK and POKE," pg. 7-8.  
 A short tutorial for Apple Pascal.  
 Jeske, Mark, "General Purpose Plotter Program,"  
 pg. 11-13.  
 An educational plotting program for Apple.  
 Staff, "Programming the Graphics Tablet," pg. 14-18.  
 A tutorial and a Hi-Res Labeling program for the Apple fitted with a Graphics Tablet.  
 Crouch, Bill, "Down to Business," pg. 18-20.  
 A better formatting routine and hints on developing a business application for the Apple.  
 Staff, "Spinterm Hi-Res Dump in Assembly," pg. 21-27.  
 An improved Apple program.  
 Hugard, James, "Printing in Pascal," pg. 27-29.  
 Some useful information for Pascal users.
- 910. O.S.I. Users Independent Newsletter No. 6 (October, 1980)**  
 Curley, Charles, "65D," pg. 2-4.  
 Here starts a series of articles on the innards of 65D.
- 911. KB Microcomputing No. 46 (October, 1980)**  
 Baker, Robert W., "PET-Pourri," pg. 12-14.  
 Proganal is a useful PET utility. Several other items of PET software are reviewed.
- Owens, James, "Computerized Estate Planning,"  
 pg. 31-35.  
 An OSI program to take the tedium out of this chore.  
 Perdue, William H., "PET Mini Monitor," pg. 88-91.  
 A short PET routine makes creating and saving machine language programs a snap.  
 Shawcross, William E., "OSI in the Sky," pg. 102-104.  
 A mail labeling program for the OSI family.  
 Carlson, Edward H., "Speed Up Your BASIC Programs,"  
 pg. 128-130.  
 Hints for better programs on the OSI C2-4P.  
 Phillips, Terry Edward, "Whoa, Apple," pg. 132-133.  
 Two machine language routines to tighten the reins on galloping video displays.  
 Greenberg, Gary, "Betting on Old POKEy," pg. 180.  
 A PET program using the POKE command to enter graphics.  
 Bauers, Barton M., Jr., "A Roundoff Function in Applesoft," pg. 210.  
 Keep your numbers at a manageable length with this Apple function.
- 912. Byte 5, No. 10 (October, 1980)**  
 Zimmermann, Mark, "Floptran-IV: A Tiny Compiler,"  
 pg. 196-285.  
 A utility for the PET.  
 Harrod, Dennette A., "The 6502 Gets Microprogrammable Instructions," pg. 282-285.  
 A hardware approach to adding 64 user-defined instructions to the 6502.
- 913. SoftSide 3, No. 1 (October, 1980)**  
 Laurence, Matthew, "One Liner," pg. 4.  
 Short graphics program for the Apple.  
 Clark, Terry, "IMHOTEP," pg. 18-21, 82-84.  
 A game for the Apple.  
 Pelczarski, Mark, "SoftSide Database-Part 2," pg. 22-23.  
 Program for Atari and Apple. Part 2 of a series.  
 Bohlke, David, "World Series," pg. 26-28.  
 A game for Atari.  
 Garon, James, "Octadraw," pg. 41, 68.  
 A graphics utility for the Atari.  
 Ward, Dennis, "Interna-Maze," pg. 43, 64-65.  
 A maze game for the Apple. Footprints, aerial view and all.  
 Sandy, Herb, "Moonlanding," pg. 44-45.  
 A graphics program for Apple.  
 Bohlke, David, "Double Cannon," pg. 50.  
 A game in Atari graphics.  
 Ohlund, Mark A., "Strings and Things," pg. 60-61.  
 An article dealing with Atari graphics and comparison with TRS-80 systems.  
 Bouchard, Rich and Garon, James, "Atari One-Liners,"  
 pg. 61.  
 Two shshort programs for the Atari.  
 Truckenbrod, Joan, "Computer Graphics," pg. 66-67, 80.  
 Two Apple graphics programs—easily translated to Atari.  
 Garon, James, "Hidden Colors in Graphics 8," pg. 69, 74.  
 A new Atari concept and sample programs.
- 914. Abacus II 2, Issue 10 (October, 1980)**  
 Britto, Arthur, "No DOS INIT," pg. 2.  
 This program removes the DOS from a diskette to allow more room on the diskette. For Apple.

- Anon., "IAC Application Note: Pascal Long Integer Fix," pg. 3-4.  
This program is designed to repair the library module LONG-INTEGGER in Apple Pascal.
- Anon., "Pascal Hi-Res LOAD/SAVE to Disk," pg. 4-5.  
This Apple Demo creates a Hi-Res picture in Pascal, then saves it to disk. Then it is reloaded and displayed.
- Anon., "IAC Application Note: Pascal Utility Program," pg. 8-9.  
Program in Apple Pascal which reads from REMIN and writes to disk.
- Anon., "IAC Application Note: Linefeed-Pascal Utility." Program to set or defeat Linefeeds, Apple Pascal.
- Yee, David R., "Catalog Organizer," pg. 12-13.  
Organize the catalog on Apple diskettes in alphabetical order.
- Anon., "IAC Application Note: COMCARD-Pascal Utility," pg. 13-14.  
Program in Apple Pascal to set up COMCARD parameters.
- Yee, David R., "Mass Lock and Unlock," pg. 14.  
An Applesoft to lock or unlock all the files on an Apple diskette at once.
- Anon., "IAC Application Note: Program Foreign—Pascal Utility," pg. 15-18.  
A major utility in Apple Pascal.
- 915. 73 Magazine No. 242 (November, 1980)**
- Erdei, Steven C., "PL Tones from a KIM-1," pg. 112.  
A KIM program that will generate a square wave tone anywhere in the range of 191 Hz to 66 Hz.
- 916. Personal Computing 4, No. 11 (November, 1980)**
- Gillie, Michael D., "Printing Pictures from Your PET," pg. 52-54.  
A PET program to gather the characters off of the PET screen and print them on the Commodore 2022 printer.
- Lubar, David, "Microbiocide," pg. 79-80.  
A discussion and hints for debugging programs on the Apple.
- 917. Byte 5, No. 11 (November, 1980)**
- Cesa, Louis, "Kinetic String Art for the Apple," pg. 62-63.  
High resolution program for the Apple.
- Sokol, Dan, "Three-Dimensional Graphics for the Apple II," pg. 148-154.  
A novel program for Hi-Res Apple graphics.
- Ramsdell, Robert E., "The Power of VisiCalc," pg. 190-192.  
All about this interesting piece of business related software for the Apple.
- 918. The Paper (Summer, 1980)**
- Haluza, Doug, "Cross Referenced Memory Map," pg. 4-6.  
Memory map comparing locations on old and new PET ROMs.
- Haluza, Doug, "Machine Language is Faster Than You Think," pg. 7.  
Some examples for the PET.
- Batcher, Bill, "The Evolution of a Puzzle," pg. 8-9.  
A tutorial on handling strings on the PET.
- Haluza, Doug, "Machine Language is Still Faster Than You Think," pg. 10-11.  
A machine language sort with assembly language routine and a BASIC Demo for the PET.
- Comito, JoAnn, "Stringing Your PET Along," pg. 12-15.  
Two related discussions of Strings with examples, including an expression analyzing string routine for the PET.
- Fowler, James, "Assembly Language Programming: Part 1," pg. 16-17.  
Part One of a series for the PET programmer.
- Eisner, Gerry, "POKE a Border," pg. 17-18.  
A utility for the PET, with examples.
- Bressler, Ralph, "Moving Around the Screen," pg. 19.  
A utility for the PET.
- Comito, JoAnn, "Not If's, And's or But's," pg. 20-22.  
A tutorial on the PET's If-Then statement.
- Bressler, Ralph, "BASIC Does It Better," pg. 23-25.  
Discussion of a number of details in PET BASIC.
- Haluza, Doug, "Trouble-Shooting Your PET," pg. 26-28.  
Some hints for reviving the dead PET.
- Bressler, Ralph, "Time Passes Quickly," pg. 28-29.  
A tutorial on the use of the PET timing routine.
- Comito, JoAnn, "Writing That Good Educational Program," pg. 30-33.  
Two related articles on writing PET educational programs, with examples.
- Bressler, Ralph, "PET Files," pg. 36-39.  
A tutorial for PET Tape Files and a sample listing.
- Comito, JoAnn and Bressler, Ralph, "Merging Programs," pg. 40-41.  
All about the PET merge system.
- Haluza, Doug, "An 80 by 50 Plotting Routine," pg. 42.  
A PET listing for a plotting program.
- Haluza, Doug, "PEEKing at BASIC," pg. 42-43.  
A utility for PET.
- Bressler, Ralph, "PET's Round Off Problems," pg. 43, 48.
- 919. The Harvest 2, No. 3 (November, 1980)**
- Lyle, Guy A., "Float, Float, Float Your Point," pg. 1-5.  
A tutorial on floating point representation on the Apple.
- 920. Nibble No. 6 (November, 1980)**
- Connolly, Rick, "P.I.P. II: PIP Goes Disco," pg. 9-13.  
A disk version of P.I.P. (Personal Inventory Program).
- Litwin, Larry M., "A Simplified Way For a Tiger to Eat Apple Pie," pg. 21-22.  
An Apple graphics Pascal program outputting to a Paper Tiger.
- Mottola, R.M., "Amper-Interpreter," pg. 27-44.  
Add "Print-Using" to your Apple's Instruction Set.
- Harvey, Mike, "Blocking Very Large Files," pg. 45-47.  
A technique for file management on the Apple.
- Figueras, John, "Roundoff!," pg. 47.  
Round off decimal values to a manageable format on the Apple.
- Reynolds, William III, "Finding the Slot Number," pg. 48.  
How to write programs addressing interface cards on the Apple.
- Harrell, Keith, "Pascal Pointers and Principles," pg. 51-52.  
A new column for Apple pascal programmers.

Rogan, J.A., "Four-In-A-Row," pg. 55.

A Lo-Res graphics game for the Apple.

Crossman, Craig, "An Assembly Language Tutorial," pg. 57.

This installment discusses the Screen Clear, RDKEY, and COUT in the Apple monitor.

Crossman, Craig, "Apple Tricks," pg. 59.

More Apple tricks including Fast DOS, Special Characters, and Unstable programs.

#### 921. Iridis 2 (November, 1980)

Staff, "Fontedit," pg. 2-22.

A program to allow the Atari user to design character sets. Listing and complete information on the design and use of the program.

Staff, "Knotwork," pg. 22-36.

How to design a type of manuscript illumination in Atari programs. Listing and complete description.

Staff, "Hacker's Delight," pg. 36-46.

A compendium of useful memory locations for the Atari operating system.

Staff, "Loadfont," pg. 46-49.

A utility for use in writing programs on the Atari using private fonts.

#### 922. KB Microcomputing No. 47 (November, 1980)

Smith, Wayne D., "A Mini Logic Monitor and Single-Cycler for Hardware Debugging," pg. 59-66.

Hardware for your KIM-1.

Bugg, Michael L., "Tinkering with Tiny BASIC," pg. 88-96.

Add four new and useful commands to Tiny BASIC as implemented on the KIM-1.

Brock, Thomas D., "Hard Copy for Apple Graphics," pg. 100-102.

Software for printing the high-resolution screen using a Diablo printer.

Bruely, Alfred J., "Microcomputer Hardware for the Handicapped," pg. 173-174.

Single-key data entry for the PET.

#### 923. Recreational Computing 9, No. 3, Issue 48 (November/December, 1980)

Berggren, Stephen R., "DOZO in Pascal," pg. 32-36.

A Japanese DOZO game in Apple Pascal.

#### 924. Creative Computing 6, No. 11 (November, 1980)

Guerard, Michael P., "Another Slice of Pi," pg. 8.

A way around a minor bug in arcsine and arccosine functions in Applesoft and TRS-80 Level II BASIC.

Piele, Donald T., "How To Solve It—With the Computer," pg. 66-71.

Part 3 of this series discusses Apple graphics and FOR—NEXT statements.

Kielian, Greg, "Bombproof Data Entry," pg. 102-104.

Unusual data entry methods for the Apple.

Lubar, David and Forsen, Richard, "Car Race: Anatomy of a Translation," pg. 118-119.

Translation for the Apple from a program written for a DEC PDP/11.

Yob, Gregory, "Personal Electric Transactions," pg. 164-169.

PET music programs, hardware for blinking lights with the PET, and a video car driver game.

Blank, George, "Outpost: Atari," pg. 170-171.

Atari Pascal is on the way, Atari Visicalc is available, also description of the PIA, ANTIC, CTIA, and POKEY chips for Atari.

Carpenter, Chuck, "Apple-Cart," pg. 172-180.

Absolute indexing, Indirect indexing, Interrupts, etc. on the Apple.

#### 925. MICRO No. 30 (November, 1980)

Williams, Richard, "How to Use the Hooks," pg. 7-9.

Hooks allow the user to break the normal flow of control and redirect the Apple to his own routine.

Hart, John E., "An Ultra-Fast Tape Storage System," pg. 11-14.

A simple hardware modification to the OSI Superboard and a good home tape recorder yield data-transfer rates of up to 9600 baud.

Sebra, Randy, "SYM-Bell," pg. 17-24.

Use your SYM as a telephone memory dialer.

Morse, P. Kenneth, "Self-Modifying PET Programs," pg. 29-31.

A tutorial on writing a self-modifying program.

Needleman, Ted, "General Ledger for the Apple II," pg. 33-34.

The SBCS general ledger is a major business program for the Apple II. A review.

Froelich, Jerry W., M.D., "Microprocessors in Medicine: the 6502," pg. 36.

How the 6502 microprocessor is able to perform tasks in medical education nearly as well as large computer systems.

Morris, E.D., Jr. and Finkbeiner, Tim, "Ohio Scientific Users: Stop Those S<sup>2</sup> Errors," pg. 37-39.

Correct the BASIC error message output, put out messages of your own, etc.

Allen, David P., "A Versatile Hi-Res Function Plotter for the Atari 400 and 800," pg. 47-50.

Discussion and listing of an Atari color graphics program.

Bridge, Theodore E., "John Conway's Game of Life Using Display Devices with Automatic Scrolling," pg. 53-58.

A KIM listing easily adapted to other 6502-based micros.

Peterson, Craig, "Step and Trace for the Apple II Plus," pg. 61-63.

Restore the Step and Trace functions of the original Apple II.

Flynn, Christopher J., "AIM 65 File Operations: Writing Text Files with BASIC," pg. 65-70.

The value of AIM BASIC is greatly enhanced with this technique of writing text files.

Rowe, Mike (Staff), "The MICRO Software Catalog: XXVI," pg. 72.

Review of five new 6502 software items.

Dial, William R., "6502 Bibliography: Part XXVI," pg. 76-77.

Some fifty-five new references to the 6502 literature.

# Introducing:

# SmartWare™ (LISP)

Introducing  
LISP. The language  
that can think for itself.

With SmartWare, your micro-computer possesses intelligence. Solves problems like never before. Actually can learn from its mistakes. And educates itself in much the same way your brain operates. It's a new concept in the way information is handled in microcomputers.

We appropriately called our version of LISP, SmartWare. Because it's as limitless as the human imagination, mind, memory.

An advanced, high-level language, LISP was first developed for use in artificial intelligence on large computers. And now, LISP is available from Datasoft for use on the Apple II.

Store multiple programs in memory. It can take it. Program other languages into LISP. It's no problem. Because LISP offers greater capacity and power. And, it's a faster, more streamlined language. For example, just 2 lines in LISP could equal hours of BASIC programming.

The facts: Relational data base capabilities. User and program definability. Pattern-directed

invocation language. Uses syntax and data structures upon which esoteric applications may be implemented. Remembers data along with "relationships affecting it." Offers REAL power to micros. 48K diskette \$125.00.

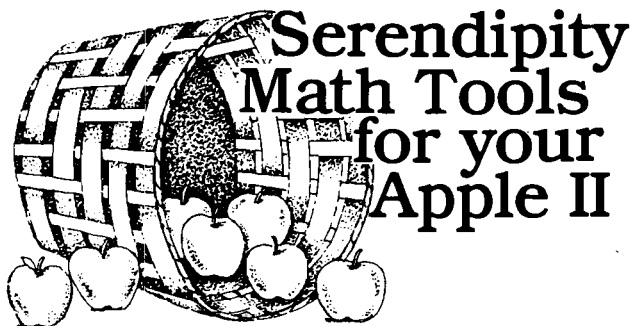
At MIT, they say LISP is the language of the future.

At Datasoft, we say, why wait. Ask your local computer dealer for SmartWare. Right now! And turn your computer on to thinking.

**SmartWare by**  
**Datasoft Inc.™**  
COMPUTER SOFTWARE

16606 Schoenborn St., Sepulveda, CA 91343  
(213) 894-9154, (800) 423-5630





# Serendipity Math Tools for your Apple II

**INTER-STAT** offers you a full range of interactive statistical analysis techniques, from averages and medians to binomial and poisson distributions, correlation coefficients and one- and two-way analysis of variance. \$169.

**ADVANCED MATH ROUTINES** is the mathematical tool kit for common, yet complex numerical problems. Routines include: linear regression, matrix operations, numerical calculus, differential equations and data set recall for iterative calculations. \$169.

Thoroughly tested, well documented and easy to master, each package includes a 30+ page self-teaching manual. Serendipity's complete line of software solutions for business, education and professional applications are available at your local Computerland or Apple dealer. For a free brochure, or to order direct contact Serendipity Systems, 225 Elmira Road, Ithaca, NY 14850. Phone 607-277-4889. Visa and MC accepted.

™Apple Computer

## SERENDIPITY SYSTEMS

### FINANCIAL MANAGEMENT SYSTEM II

A FAST, EASY-TO-USE ACCOUNTING SYSTEM  
DESIGNED FOR  
HOME AND BUSINESS ACCOUNTING

**OBJECTIVE.** Enter an entire month's checking, charge card, and cash accounts in just a few minutes using your own personalized macro lists. Instant error correction on all entries. Audit all files by Code and month. **PERFECT FOR TAX ACCOUNTING.** Powerful new **BUDGET MANAGER** for planning and comparing budget with audits. Printer routines for listing disk files, balance, reconcile, search, macro lists, audit and budget reports.

**ALL THE ORIGINAL FEATURES + NEW BUDGET MANAGER**

- \* 1-3 KEYSTROKE ENTRIES
- \* AUTOMATIC TAX CODING
- \* SINGLE OR DUAL DISK DRIVE

- ★ **ACCOUNT MANAGER:** A self-prompting, error avoiding entry system which includes disk files, balance, reconcile, edit, and sort.
- ★ **BUDGET MANAGER:** Plan, review, and balance your budget. Then generate complete reports with summation for any 1 - 12 month period.
- ★ **SYSTEM UTILITY:** Enter your own Item and tax Code Macros, up to 100 each. Configure program to match almost any printer/disk system.
- ★ **SEARCH RECORDS:** Search for any given data. Make specific and expanded searches using the Macro lists.
- ★ **ACCOUNT AUDITOR:** Totals all files by tax Code and any 1-12 month period with year-to-date totals.
- ★ 48K APPLE with ROM APPLESOFT and disk required (printer optional)

**PRICE: \$39.95** -- Check, VISA, or MASTER CHARGE accepted.

**D R JARVIS COMPUTING**  
1039 Cadiz Dr. - Simi, CA 93065  
Phone (805) 526-0151

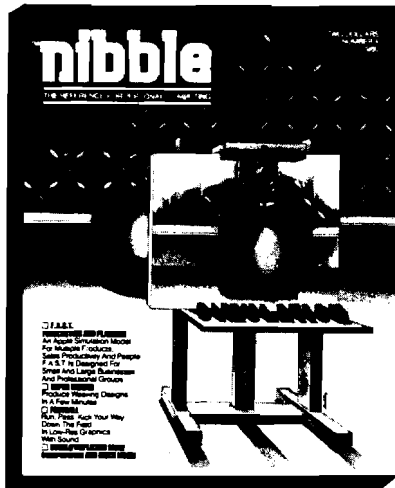
Dealer Inquiries Invited

## ADVERTISERS' INDEX

April 1981

Advertiser's Name	Page
Aardvark Technical Services	22
Abacus Software	78
Aim Supportware	36
Anderson Peripherals	71
Andromeda, Inc.	4
Applefest '81	64
Aurora Software Associates	62
Avant-Garde Creations	78
Beta Computer Devices	80
The Book	54
Broderbund Software	10
C & J Supply	76
Computer Data Service	88
The Computerist, Inc.	46
Computer Mail Order	56
Connecticut Information Services	40
Consumer Computers	42
Continental Software	50
Co-op Software	78
Datasoft, Inc.	94
Decision Systems	54
Dr. Daley	49
Dr. Dobb's Journal	82
D.R. Jarvis Computing	95
Eastern House Software	76
Forethought Products	78
Hayes Microcomputer Products, Inc.	IFC
Instant Software	86-87
Lazer Systems	11
LJK Enterprises	66
MICRO	IBC
MICRO Classifieds	60, 61, 62
Micro Interface	36
Microsoft Consumer Products	67
MicroSoftware Systems	54
Micro Technology Unlimited	2, 16
Micro Ware Distributing	71
Mittendorf Engineering	63
Nibble	96
Nikrom Technical Products	68
Ohio Scientific	BC
Ohio Scientific "Small Systems Journal"	72-75
Orion Software Associates	76
Perry Peripherals	36
Powersoft, Inc.	34
Printout	12
Programma International	1, 41
Progressive Computing	71
Rainbow Computing	85
Rosen Grandon Associates	68
Serendipity Systems, Inc.	95
Simulations Programming	76
Softside Publications	44
Softape	35
Southeastern Software	26
Southwestern Data Services	21
Strategic Simulations, Inc.	25
T.S.E. Hardside	45
Versa Computing	68
Western Micro Data Enterprises	40

# "NIBBLE® IS TERRIFIC" (For Your Apple)



**NIBBLE IS:** *The Reference for Apple computing!*

**NIBBLE IS:** One of the Fastest Growing new Magazines in the Personal Computing Field.

**NIBBLE IS:** Providing Comprehensive, Useful and Instructive Programs for the Home, Small Business, and Entertainment.

**NIBBLE IS:** A Reference to Graphics, Games, Systems Programming Tips, Product News and Reviews, Hardware Construction Projects, and a host of other features.

**NIBBLE IS:** A magazine suitable for both the Beginner and the Advanced Programmer.

Each issue of NIBBLE features significant new Programs of Commercial Quality. Here's what some of our Readers say:

- "Certainly the best magazine on the Apple II"
- "Programs remarkably easy to enter"
- "Stimulating and Informative; So much so that this is the first computer magazine I've subscribed to!"
- "Impressed with the quality and content."
- "NIBBLE IS TERRIFIC!"

*In coming issues, look for:*

- Numeric Keypad Construction Lab
- Assembly Language Programming Column
- Pascal Programming Column
- Data Base Programs for Home and Business
- Personal Investment Analysis
- Electronic Secretary for Time Management
- The GIZMO Business Simulation Game

And many many more!

NIBBLE is focused completely on the Apple Computer systems.

Buy NIBBLE through your local Apple Dealer or subscribe now with the coupon below.

**Try a NIBBLE!**

No. 4

**nibble**  
Box 325, Lincoln, MA. 01773 (617) 259-9710

**I'll try nibble!**  
**Enclosed is my \$17.50 (for one year).**

**check**       **money order**

(Please allow 4 to 6 weeks for delivery of 1st issue)  
BACK ISSUES of NIBBLE are available for \$2.00 + .50 postage and handling.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

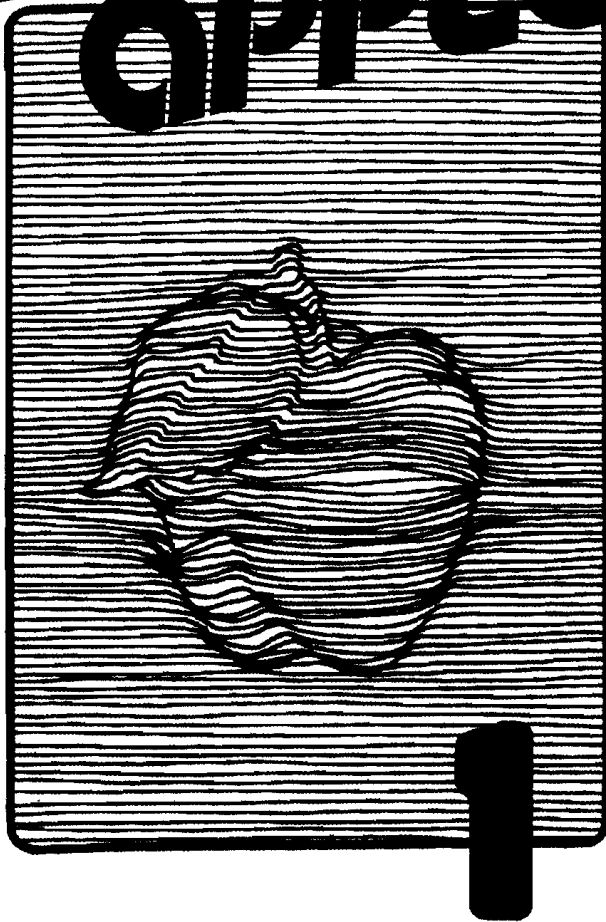
**NOTE:**

First Class or Air Mail is required for all APO, FPO and all foreign addresses with the following additional amounts.  
 — USA, Canada, Mexico, APO, FPO \$7.50  
 — Central and South America \$9.00  
 — Europe \$12.00  
 — Asia and elsewhere \$15.00

© 1980 by MICRO-SPARC, INC., Lincoln, Mass. 01773. All rights reserved.  
 \*Apple II is a registered trademark of Apple Computer Company

**\$24.95  
With  
diskette!**

# MICRO APPLE



## **MICRO/Apple 1**

This first volume in our new series contains 30 articles selected from MICRO, 1977-1980, updated by the authors or our staff. The MICRO staff has added introductory material and re-entered, listed, and tested the programs and put them on diskette.

Every user will want this highly practical work next to his Apple, with its chapters on BASIC Aids, Graphics, Education, Games, I/O Enhancements, Runtime Utilities, and References.

Get MICRO/Apple 1 at your local computer store. Includes a 224-page book and diskette.

**More Than 30 Programs on Diskette  
— For Less Than \$1.00 Apiece!**

**No Need to Type in  
Hundreds of Lines of Code!**

**MICRO™**

P.O. Box 65

# The home computer you thought was years away is here.



## C8P DF

Ohio Scientific's top of the line personal computer, the C8P DF. This system incorporates the most advanced technology now available in standard configurations and add-on options. The C8P DF has full capabilities as a personal computer, a small business computer, a home monitoring security system and an advanced process controller.

### Personal Computer Features

The C8P DF features ultra-fast program execution. The standard model is twice as fast as other personal computers such as the Apple II and PET. The computer system is available with a GT option which nearly doubles the speed again, making it comparable to high end mini-computer systems. High speed execution makes elaborate video animation possible as well as other I/O functions which until now, have not been possible. The C8P DF features Ohio Scientific's 32 x 64 character display with graphics and gaming elements for an effective resolution of 256 x 512 points and up to 16 colors. Other features for personal use include a programmable tone generator from 200 to 20KHz and an 8 bit companding digital to analog converter for music and voice output, 2-8 axis joystick interfaces, and 2-10 key pad interfaces. Hundreds of personal applications, games and educational software packages are currently available for use with the C8P DF.

### Business Applications

The C8P DF utilizes full size 8" floppy disks and is compatible with Ohio Scientific's advanced small business operating system,

OS-65U and two types of information management systems, OS-MDMS and OS-DMS. The computer system comes standard with a high-speed printer interface and a modem interface. It features a full 53-key ASCII keyboard as well as 2048 character display with upper and lower case for business and word processing applications.

### Home Control

The C8P DF has the most advanced home monitoring and control capabilities ever offered in a computer system. It incorporates a real time clock and a unique FOREGROUND/BACKGROUND operating system which allows the computer to function with normal BASIC programs at the same time it is monitoring external devices. The C8P DF comes standard with an AC remote control interface which allows it to control a wide range of AC appliances and lights remotely without wiring and an interface for home security systems which monitors fire, intrusion, car theft, water levels and freezer temperature, all without messy wiring. In addition, the C8P DF can accept Ohio Scientific's Votrax voice I/O board and/or Ohio Scientific's new universal telephone interface (UTI). The telephone interface connects the computer to any touch-tone or rotary dial telephone line. The computer system is able to answer calls, initiate calls and communicate via touch-tone signals, voice output or 300 baud modem signals. It can accept and decode touch-tone signals, 300 baud modem signals and record incoming voice messages.

These features collectively give the C8P DF capabilities to monitor and control home functions with almost human-like capabilities.

### Process Controller

The C8P DF incorporates a real time clock, FOREGROUND/BACKGROUND operation and 16 parallel I/O lines. Additionally a universal accessory BUS connector is accessible at the back of the computer to plug in additional 48 lines of parallel I/O and/or a complete analog signal I/O board with A/D and D/A and multiplexers.

Clearly, the C8P DF beats all existing small computers in conventional specifications plus it has capabilities far beyond any other computer system on the market today.

C8P DF is an 8-slot mainframe class computer with 32K static RAM, dual 8" floppies, and several open slots for expansion.

### Prices start at under \$3,000.

Computers come with keyboards and floppies where specified. Other equipment shown is optional.

For literature and the name of your local dealer, CALL 1-800-321-6850 TOLL FREE.

**OHIO SCIENTIFIC**  
a *MACOM* Company

1333 SOUTH CHILLICOTHE ROAD  
AURORA, OH 44202 • (216) 831-5600