Focus exclusively on Apple, Commodore, IBM, & Texas Instruments

Vol. 5 No. 1

$3.50 in USA
$4.50 in Canada

Thought Processing
—A New Frontier in Home Computing

Featuring a Ready-To-Use Thought Processor for:
- Organizing Your Thinking
- Structuring Written Text
- Producing Outlines
- Planning Projects

Special Apple, Commodore, IBM, & TI Software Programs in this Issue:
- Another Tool for Quiz Construction Set
- Electronic Backgammon
- Typing Fantasy Game
- Sailing Adventures in LOGO

Reviews Galore:
- Building Robots
- Ink-Jet Printing
- Biofeedback Therapy
- Computer Breakdancing
- Ham Radio Interfacing

Contains 34 Type-In Programs!
MISSING ANY VALUABLES?

If you're missing any back issues of Home Magazine, you're missing more than you'll ever know . . .

Having each issue of Home Computer Magazine readily at hand provides you with direct access to a valuable reference library of home computer knowledge — unequaled anywhere!

Back issues of HCM's program service—ON DISK™ or ON TAPE™ are also available.

Collect all the programs from each magazine issue on a ready-to-RUN quality floppy disk or cassette tape available in separate versions for Apple, Commodore, IBM, and Texas Instruments home computers.

"Safeguard" Your Home Computer Knowledge—Order Valuable Back Issues Today!

To Order, Use Bind-In Card at Center of Magazine.
FOR NEW READERS

The Plain & Simple Truth About HOME COMPUTER magazine

Chock Full of Valuable Software & How-To Articles Without Filler

Every issue is a software "horn of plenty" with dozens of type-in-and-RUN programs printed in an easy-to-read listings format. Our programs are also available on inexpensive disks or cassettes for those who prefer the convenience of ready-to-RUN software. Step-by-step tutorials round out each issue, providing the solid facts you need without fluff or filler. Thus, each issue functions as an excellent reference work, as well as a valuable software source.

No Outside Advertising

Freed from the pressures of servicing advertisers, we concentrate on serving our readers. Each issue provides uninterrupted editorial flow and graphic layouts for better comprehension—plus unbiased product reviews which focus on true strengths and weaknesses, wherever the chips may fall . . . And we don't have to worry about losing advertisers because of publishing software in the magazine that is "too good." Consequently, we can provide the best free software available anywhere.

Focused on the 4 Hot Home Brands

We are 4 system-specific magazines under one wrapper—not a sprawling, "general interest" publication which attempts to cover too wide a field, only to spread itself too thin. The other side of the coin to this focused approach is the knowledge you gain from being exposed to the many tips, ideas, and techniques we provide for 3 of the 4 systems you may not even have. You'll learn more about your Apple, Commodore, IBM, or Texas Instruments home computer from this one magazine than from a host of more limited sources.

A Balanced Mix For a Perfect Recipe

In each issue we strive for a perfect balance of productivity, entertainment, education, utilities, and computer literacy—serving the needs of novice and pro alike. Every issue is a full-course meal, with a smorgasboard of tasty dishes for all palates. Whereas other computer magazines may dish out lumps of "editorial indigestion," we serve up a satisfying blend—one digestible byte at a time.

—Welcome to Our World of Home Computing
Food for Thought! It's in our magazine—and it's in our software. Even the simplest interaction with a computer involves thinking, however random—or organized—that process may be. Yet you might say that when it comes to software, you are what you boot. At Home Computer Magazine, we try to serve a balanced, healthy meal every issue—so that you can leave the table with your thought processes functioning even more vigorously than before. With such hearty fare to power your thinking, you may even grow to reach the stars.

Think about it! Intelligence accumulates, it's additive. As humans evolve, they not only add to their collective knowledge, but they also develop new ways to solve problems—thus adding to their collective intelligence. Computers are but one hallmark of this process; though for our time, they may be the most important. They extend our powers of thought by doing some of our more mundane thinking for us, giving us the time to concentrate on other, more creative matters. They may also make us better thinkers, by teaching us to organize our thoughts.

Inside this issue of Home Computer Magazine, you will find a particularly powerful piece of mind-stretching software in The Organizer, a program that combines word-processing abilities with a built-in outline structure. Whether you are planning a project, drawing up a contract, or writing a term paper, you can place your ideas in this template and create a formidable game-plan—or even finished documents.

In future issues, we will continue to add even more powerful features to this program in a similar way to what we have done with this issue's print option for Quiz Construction Set (originally published last issue). This versatile add-on allows teachers and others to hand out their quizzes on paper. We then follow through with a Quiz-Print Tutorial: Accessing and Formatting Printer Output. This article will not only provide you with more insight into the operation of Quiz-Print, but it also fosters a general understanding of how your computer can command a printer to produce a hard copy of virtually any document in its memory or storage media.

Don't forget to take the time to relax with a few of our thought-provoking games—such challenges as Orbital Defender, a space-age thriller that will make you think fast; and Electronic Backgammon, a modernized classic in which you'll have to think hard to beat your cybernetic opponent. And to further mix thought with pleasure, the fast-paced Kors-Eif game will initiate young and old into two fascinating educational programs, Rocky's Boots and Robot Odyssey—a pair of trend-setting games that will surely break from gang violence; and King of the Castle, an assembly-language arcade game that fosters a general understanding of how your computer can command a printer to produce a hard copy of virtually any document in its memory or storage media.

Until next time, have fun reading, learning, and running. 

HCM
January's Consumer Electronics Show (CES) in Las Vegas was indeed large—with more than 100,000 attendees. It was also largely boring: Timex and Mattel are no longer players in the game. Apple and IBM did not exhibit. Texas Instruments—without a home computer line—was a skeleton of its former self. The Microsoft-sponsored MSX presence was of yawning excitement and minimal impact. And Coleco's pre-show exit from the home computer business transformed their large CES floor area into a virtual ghost town.

Stand-alone videogame hardware and software is definitely out this year. In the past, this product category dominated the shows. Former video superstars Activision and Imagic were at the show, but had metamorphosed into smaller, "respectable-looking" home computer software houses.

Judging from CES activity, it appears that educational software has finally caught up with and overtaken entertainment software as a category. CBS and Spinnaker virtually slugged it out in their large adjoining floor areas at the show. The message was clear that Spinnaker will not have an easy time keeping its early lead in the face of the CBS conglomerate's supposed $40 million media onslaught scheduled for 1985.

Productivity software also made a much stronger showing this time around, but the "new" category that made the most impact was music—both peripherals and software. 1985 will undoubtedly be the Year of Music in the home computer world, with increasing numbers of C-64's being purchased as music system components rather than as stand-alone computers. And if Atari actually delivers its new music machines (mentioned below), the growth of this product category should escalate well into 1986.

The real gambling in town didn't take place in the casinos. The millions of chips being wagered were of the silicon variety—with Commodore pitted against Jack Tramiel's new Atari Corporation. Apple and IBM were clearly in the Commodore crew's sights as they uncovered and aimed their two new "big guns": the Commodore LCD portable, and the Commodore 128 Personal Computer. Designed to sell for about $500, the LCD is a souped-up (with 8 ROM-resident application programs) Commodore Plus 4, with an 80-character by 16-line LCD viewing screen, and a built-in 300-baud modem.

The Commodore 128 is really three machines in one—with three separate microprocessors and operating systems. First, there is a C-64 compatibility mode with all of the critical chips present, so the large library of C-64 software can run unchanged. There's also an enhanced 128K mode to take advantage of the larger memory and higher-resolution (up to 640 x 200) video circuitry, through a much richer BASIC (version 7.0) and a machine language facilitated by a resident monitor. In 128K mode, the machine utilizes a faster microprocessor (the 8502), and sports 80-column capability with 16 colors.

The third operating mode is CP/M 3.0, running under a Z80A microprocessor (at 4 Mhz). Perfect Software has ported their productivity series to this machine's CP/M environment. Commodore was also actively hyping its Arktronsics connection with Jane 2.0—an integrated, icon-laden software package first introduced in the Apple world. Although Commodore's much-talked-about 16-bit Amiga machine wasn't introduced at this show, the firm is apparently counting on the Perfect/Jane products to carry its C-128 into the low-end business world until the more powerful machine is ready.

The 92-key Commodore 128 is slated to sell for about $300 (sans disk drive) and is said to be expandable to 512K of memory with a RAM disk option. Peripherals announced include a mouse, 300/1200 baud modems, and a "high-speed" double-sided/single-density disk drive (with 350K storage capacity in C-128 mode, 140K in C-64 mode, and up to 410K in CP/M formats).

Atari announced two new hardware lines at the show. At the low end is the XE series of 8-bit machines (with 6502C microprocessors). A 64K version with 256 colors (and 320 x 192 resolution) will sell for approximately $120. For $150, there's a music version with 8 voices; $200 gets you an expanded-memory machine with 128K; and $400 buys a 64K portable with built-in 5-inch monitor and 3-1/2 inch disk drive.

Atari's second new line is its ST series of 16-bit machines (with the 68000 microprocessor). The ST sports Digital Research's GEM operating system—a Macintosh-like environment with mouse and icons. The 128K version (sans disk drive) of Tramiel's ST "Jackintosh" will sell for about $400; a 256K version will be available for $500; and a 512K version for $600. Each ST machine is capable of displaying 512 colors, a 640 x 400 pixel resolution in monochrome mode, and contains a built-in MIDI interface to provide digital control of musical instruments. A 3-1/2 inch disk drive and a color monitor will be sold for about $200 each. The new Atari crew was also boasting of a forthcoming 15-megabyte hard disk drive to sell for $400!

It's clear Mr. Tramiel has caught a touch of "Iacocca Fever." In trying to resurrect the new Atari Corporation, he is squarely taking aim at "The Big 3" with a full, aggressively-priced product line that—if delivered as promised—could set off a price/performance war of mammoth proportions.
FEATURES

14 The Organizer
Here's a frame to hang your thoughts on.
by William K. Balthrop and the HCM Staff

22 Orbital Defender
Before shooting you must first decide:
friend or foe.
by Scott Williams and the HCM Staff

25 Quiz-Print
28 Quiz-Print Tutorial
Now you can format printouts of your quizzes.
by William K. Balthrop and the HCM Staff

30 Electronic Backgammon
Get back to backgammon with an
ace computer opponent.
by Dennis Webber and the HCM Staff

33 Razzle Dazzle
Pattern the screen with character graphics.
by William K. Balthrop

34 Kors-Elf
Will your typing skills free the elves
from the evil overlord?
by Shawn Blevins and the HCM Staff

36 Personal Loan Calculator
99/4A BASIC users are now figured in.
by H. W. Button and the HCM Staff

42 Apple Seedlings
Enter the Apple dating game
with this clock utility.
by Anders Nereim and the HCM Staff

53 IBMpressions
Learn how to create a beautiful pie chart.
by William K. Balthrop

55 Build a LOGO Adventure
In part 2 we map out our adventure world.
by Andrew Keith and the HCM Staff

58 LOGO Sailing
Turtles face the wind
in the premier yachting event.
by Ted Barnicoat and the HCM Staff

66 Simon Sez
Simon Sez composing music is simple.
by William K. Balthrop
PRODUCT REVIEWS

38 Rocky's Boots/Robot Odyssey I
Build robots and machines while learning about electronics. A Review

43 Computer Links to Amateur Radio
Many ways to send bits through the ether. A Review

46 The Biofeedback/Stress Reduction Connection
A Review of Calmpute and Relax
Can you use a computer to mellow out? A Review

49 Break Street
Street kids sizzle in this dance-simulation game. A Review

52 The HP Thinkjet Printer
A noiseless printer ushers in a new technology. A Review

54 King of the Castle
It's a Viking army against one Norman king. A Review

DEPARTMENTS

3 Welcome to HCM
4 Inside/Outside HCM
5 On Screen
9 Letters to the Editor
37 HCM Review Criteria
50 Industry Watch
64 Group Grapevine
67 HCM Product News
73 Program Listings Contents
74 Program Typing Guide
137 DeBugs on Display

Home Computer Tech Notes:
60 Apple
61 Commodore
62 IBM
63 TI
A Giant Home Computer Compendium™
for the Texas Instruments 99/4A

The largest, most comprehensive collection of programs and articles ever assembled for the TI Home Computer

- Over 200 thoroughly tested key-in-and-RUN programs and sub-programs typeset in a grid format for maximum clarity.
- Programming instruction in 4 languages—learn to use BASIC, Extended BASIC, LOGO and Assembly Language—for everything from record keeping and money management to arcade-quality action games.
- A selection of sensational game software featuring full-color graphics, animation, and sound effects.
- Beyond the owner’s manual—tips and techniques for getting the most out of your computer system.
- Computer-Assisted Instruction—The home computer becomes your private tutor.

Page after page of innovative applications—transforming your computer into a home productivity center.

SPECIAL OFFER

Buy the Tape Set for ONLY $35.
And Get the Book FREE + FREE SHIPPING

THE BEST OF 99'er ON TAPE
A Choice Selection of 37 Full-length Programs
On 5 Quality Cassette Tapes

- Save Typing Time and Frustrating Key-in Errors.
- Own the Most Comprehensive Software Library for the TI-99/4A
- Enjoy Hundreds of Hours of Exciting Computer Activity.

Regular (Pre-Close-out) Prices:
Best Of 99'er
(Book alone)
$19.95 + $3.00 shipping
Best Of 99'er
(Tape Set alone)
$35.00 + $2.50 shipping

ORDER THE BOOK & TAPE PACKAGE
AND RECEIVE A Simon’s Saucer
AND A 99'er Programmer’s Guide
ABSOLUTELY FREE!
This Additional
$18 GIFT IS YOURS
IF YOU ACT TODAY!

TO ORDER—USE BIND-IN CARD
AT CENTER OF MAGAZINE

HISTORICAL NOTE
99'er Magazine (founded in December, 1980) was the forerunner of Home Computer Magazine.
Letters to the Editor

Keeping Your Head Clean
Dear Sir:
I read several months ago that one manufacturer of disk head-cleaning kits had a program that caused the disk head to stay in contact with the disk cleaning pad for 30 seconds, but I was not able to find one of the kits. Since then I have been trying to figure out a program that accomplished this and believe that the following program does just that.

10 ON ERROR 30
20 RUN "DSK1 LOAD"
30 ON ERROR 40
40 RETURN

This program will run the disk drive for 30 seconds, although the head may not be in contact with the cleaning pad for that long. I hope this information may be of some use. I like your new format. Keep up the good work.

Steve Lisonbee
Orem, UT 84057

There are many ways, Steve, to get the disk to turn for 30 seconds while cleaning the heads. Probably the simplest way is to try to load something from that particular drive and count the number of seconds that the drive turns, subtract that from 30, and repeat the load procedure until you have actually reached the 30 seconds. It is easy to tell when the head is in contact with the cleaning disk because you will hear a definite rasping sound as the rough surface passes over the disk head. We have noted that in cases where a disk drive is used extensively and is not cleaned regularly, the disk cleaning kit must be used much longer than just 30 seconds to remove the deposits from the head. This seems to be a trial and error situation. If your drive is actually producing errors, then we suggest that you run the head cleaner for 30 seconds, and see whether the errors have gone away. If not, run it for another 30 seconds and repeat this until the errors have cleared up. If after a collective period of five minutes the errors persist, have the drive checked by a service center.

Companion Review Reviewed
Dear Sir:
I would certainly like to commend you upon several aspects of the Companion word processor review. I was indeed pleased to see Companion so favorably reviewed in the August [Vol. 4, No. 3] issue of Home Computer Magazine and I congratulate the reviewer on accurately portraying the philosophy of Companion’s design.

However, I would certainly have preferred that she do a more careful reading of the documentation before launching into the review. For example, Companion does have a “handy reference card.” It happens to be two of the four sample text files included on the Companion diskette. We felt that this was the best possible way to provide such reference material, because the user may easily reproduce it in unlimited quantities and also edit it to personal preference.

Regarding the operation of the [FCTN][3] key, it is clearly stated both in the manual and in the reference sheets that its purpose is to toggle the visibility of the typed spaces. It is, of course, its own “oops” key.

I was with some disappointment that we saw TI-Writer called the “de facto standard” [word processor in the 99/4A community], and it came as quite a shock to see TI described as “generous” in the middle of a review of Companion. I will leave it to your readers to decide whether this editorial comment was either appropriate or accurate.

Allan Swett
Intelpro
Brossard, Quebec, Canada

Thank you for your comments, Allan. We still feel, however, that the review was accurate and a fair assessment of your product’s strengths and weaknesses. As for our statement that “TI has generously provided the ‘hooks’ for third-party add-on products,” we feel that it was both appropriate and present. See our review of a third-party spelling checker for TI-Writer in Vol. 4, No. 5.

Word From the Board Room
Dear Sir:
I recently purchased a copy of the Vol. 4, No. 3 issue of Home Computer Magazine and was very impressed. I think the editorial style is easy to read, but unlike many other magazines of its kind, it wasn’t filled with “computer fluff.” As the in-house list manager for Boardroom Reports, I get to see a lot of computer magazines (since most of the “non-technical” ones use our lists) and yours is among the best.

Brian Kurtz
Board Room Reports
New York, NY 10036

It is nice to get an expert opinion, Brian. Thank you for taking time to write.

Innovation Is Not Without Problems
Dear Sir:
I would first of all like to compliment you on HCM. I have an Apple IIe and a TI-99/4A and HCM is unique in the usefulness of the material you present. I especially appreciate the availability of low-cost software in the form of your ON DISK and ON TAPE service. I also appreciate some of the innovative approaches you take to marketing, formatting, and editorial.

However, I have a concern. I have received issues at a slower rate than one per month since subscribing to HCM. While I can appreciate the chaos and re-planning that was undoubtedly necessitated by Texas Instruments’ discontinuation of the 99/4A last year, and delays in publishing due to some of the revisions of policy you have recently undertaken, I would hope that your issues can be regularly counted on in the future.

Fred K. Rehl
Sedalia, OH 43151

As announced in our last issue, Fred, you can count on HCM being published ten times each calendar year—with approximately 5 to 6 weeks between issues. Both existing and new subscriptions are being fulfilled on an issue basis (instead of by months) so that everyone will receive the correct number of issues they are entitled to. This reduction to a more realistic frequency was necessitated by the comprehensive software content of each HCM issue.

Where Did All the Memory Go, Junior?
Dear Sir:
I recently acquired the IBM Writing Assistant word processor for my IBM PCjr. While it works fine, I find that I can only store about 1600 words in the “working copy” before the program memory is full. This is only about 12K bytes of RAM. I’ve got 128K RAM installed in my Junior, so I expected to be able to write a much larger document. What do you think?

James McCloskey
Reidsville, NC 27320

The IBM Writing Assistant word processor is a very large program, James. It was originally designed to run on the IBM PC with a minimum of 256K of RAM. In that configuration, it allows space for about 140K of storage for the “working copy.” If you need more space to work with larger documents, you have two options: (1) select a word processor that takes up less space and memory, or (2) buy a memory expansion unit (from IBM or third-party firms such as Tecmar, Legacy, Microsoft, etc.) that will be compatible with the IBM Writing Assistant package.

Junior’s Math & Memory Questions
Dear Sir:
I have two questions about the IBM PCjr. My first question has to do with mathematical accuracy. After reading Microprocessor Accuracy (Vol. 4, No. 1) I decided to try a few of the tests mentioned in the article. All but one yielded the right results. I typed in:

10 A# = 4*ATN(1)
20 PRINT A#

The answer I got was 3.14192979441152, nowhere near pi after the seventh digit. Amazed at how far off it was, I tried:

10 A# = 4*ATN(1.000000000)
20 PRINT A#

This yielded the correct answer of 3.141592653589793. Why does it do this? Does this mean if I want accuracy past seven digits I must put zeros at the end of each operation?

My last question is about additional memory. In your review of Tecmar’s jr. Captain you state that “Unfortunately, the additional memory doesn’t mean a PC application that was memory-bound on the Junior will now work just fine.” This is a seeming contradiction to what is said in “Home Computer Product News,” which says, “The IBM PCjr 128KB Memory Expansion Attachment adds 131,072 characters of user memory to a PCjr, and can be used to run thousands of IBM PC programs.” Which is correct?

Thank you for your time.

Sean Hillyard
Oakhurst, CA 93644

Continued
There’s a paradoxical situation concerning memory expansion for the Junior: The Tecmar Junior Captain came with software that did not allow the use of the memory expansion with larger PC packages that needed contiguous memory space (it may have been corrected in a later version of Tecmar’s software, but we’re not aware of it). The IBM PCjr 128Kbyte memory expansion comes with software to configure the Junior so that it looks like an IBM PC with contiguous memory, thus allowing most PC programs to operate correctly. Your discovery about accuracy, Sean, boils down to the election of “double precision.” Unless you specifically declare double precision numbers—which you did in the second case—your Junior will default to single precision. An easier way to declare double precision in your formula would be:

\[ A^2 = 4 \times \text{ATN}(100) \]

HCM Helps Make Buy Decision

Dear Sir:

I have enjoyed your magazine immensely since it was 99'er Home Computer. It was a great magazine then and is an even better magazine now. I have been cravin more computing power and better software lately. I think that (from your informative coverage of the IBM, Commodore, Apple, and TI machines) a Commodore 64 would fill the slot nicely. It is a good machine at a good price. I was wondering if another Commodore, the Plus/4, is compatible with the C-64. And thanks again for the best computer magazine on the market.

Ashley Jacobs

At the present, Ashley, the Commodore Plus/4 is not software compatible with the C-64. There were rumors circulating, however, that Commodore would soon introduce an add-on to make the two machines compatible. In light of the just-announced C-128 machine that is C-64 compatible (see On Screen in this issue), it doesn’t appear to be likely. We’re glad that you find Home Computer Magazine to be beneficial in aiding you to make a wise purchasing decision.

TI Game Cartridge Trick

Dear Sir:

I found a trick for most of the games made by Texas Instruments for the 99/4A. This trick allows one to change the starting level. To do this, simply select the game (after inserting the cartridge) and when the title screen of the game appears, quickly type (holding down the shift key) 836. I know this works on the games Moonmine, Alpiner, Munchman, Hopper, and Moonmobile, but there are only the ones I know of, so try and see what other games this works for.

David L. Whitlock

You’re right, David. This trick seems to work on most of the TI game cartridges (the ones actually produced by Texas Instruments). This trick can be used to change the level of difficulty and some other conditions of a game at the very beginning. This is ideal for advanced players who wish to skip over the simple lower levels of an arcade game. It is also useful to those less skilled who have never been able to reach the upper levels of these arcade games, and want to satisfy their curiosity.

Texas Decisions Italian-Style

Dear Sir:

About a year ago (when I bought my TI-99/4A) I was greatly surprised at seeing how many peripherals and accessories this computer can have. But just out of production, my hopes can have these peripherals soon vanished, and I haven’t made up my mind yet whether to buy another computer or not. That is the reason why I ask you if in America someone is still selling the Extended BASIC module, the Editor/Assembler module, etc. at possibly a reasonable price, in case you have an address.

Principally, I’m not asking you where to buy my accessories, but if it is worthwhile, I would not spend my money on a computer which has no possibility to evolve.

Add the probability that I can’t have my computer repaired because there are no TI assistance centers in my city. Draw your conclusions and write them (and the addresses) to me.

I wait hopefully for your answer.

Pietro Patrotta

Atlasses, Italy

Pietro, it is difficult to say what you should do because you are located in Italy. Peripherals and software such as Extended BASIC, etc. are available in the United States as is support from the TI service centers. There are (or were) two TI facilities in Italy—at Aversa and Reiti. TI-99/4A computers bound for Europe used to go to Reiti for final assembly, so personnel at that facility may be able to guide you in your repair concerns. If you haven’t already made a large investment in TI peripherals and software, we suggest you seriously consider purchasing one of the other computer systems we cover in this magazine.

Printer Switched to IBM Confirmation

Dear Sir:

I have been reading 99'er a long time and was pleased in its change of format to HCM after I purchased an IBM PC portable. I would like to know if you could help me in properly using my Axiom GP-100T II (which you reviewed in HCM Vol. 4, No. 4) with my IBM. I had no problems using it with my TI. I purchased a parallel interface cable for my IBM and got the printer to work, but when using Wordstar I cannot set line spacing, even with the [Ctrl] KS command, although the dot commands work in setting page length. Also, there is any software that will allow my printer to perform graph screen dumps (the Prtsc key doesn’t work), or is there any IBM software that will give this printer any new fonts. I would greatly appreciate your assistance.

Sam Ousta

Your information concerning the compatibility and incompatibility of the Axiom and IBM machines is interesting, Sam. That particular Axiom version was produced for the TI-99/4A only, and the compatibility you’ve noticed stems from similar methods of handling the text of both IBM and TI printer routines. However, many differences exist—line spacing and dot-addressable graphics are just two of these. The Axiom’s line spacing cannot be modified through software as it can with many IBM-compatible printers, which explains your Wordstar problem. The [PrtSc] function, which is accessible through the GRAPHICS command in DOS (see this issue’s IBM “Home Computer Tech Note” for details), is not compatible with the unique graphic methods used by the Axiom. You can access these unique graphic commands (as detailed on pages 24-26 of the Axiom User Guide) from Microsoft BASIC, however, if you use the LPRINT command in place of the OPEN #1:”Axiom” and PRINT #1 in TI BASIC. Here’s a one-line IBM program that does the same thing as the demo program on page 25 of the Axiom manual:

```
100 LPRINT CHR$(8): FOR I=1 TO 4: LPRINT CHR$(129); CHRS(137); CHR$(145); CHR$(161); LPRINT CHR$(255): NEXT I: LPRINT CHR$(15)
```

We hope this gives you some insight into how you might make the most of using the Axiom printer with your IBM PC portable.

A Worm in Apple 3-D Graphics?

Dear Sir:

I know the frustration that B. Matthews spoke of in her letter to you (Vol. 4, No. 4) concerning the 3-D graphics program. I experienced some of the same problems that she outlined. However, I solved the load problem by first making a DOS 3.3 copy of all related 3-D programs and then loading the HELLO program on the disk. My major frustration was in not being able to reload a saved, newly-created 3-D object. After reviewing the Applesoft 3-D program several times and experimenting with changes, I finally changed “size” in lines 1140-1160 to a value of 100. Also, I deleted the % symbol in lines 1760, 1770, and 1920. The program now runs smoothly and it is quite enjoyable to manipulate the axial rotation of various objects.

The latest format of HCM (Vol. 4, No. 4) arrived today and it appears that you may have finally found the magazine style and format that you have been searching for. HCM readers should be pleased with the quality of the magazine.

Paul E. Pennebaker

Sedlief, LA 70461

You’ve done the right thing, Paul, moving the 3-D Graphics system to its own disk—it will get plenty of room on a disk to save objects. The problem you described is a problem only for readers who typed in the program (rather than loaded it from ON DISK) might have experienced. Chances are you didn’t notice that not only do you add the listing on the right side of page 41 from Home Computer Magazine, Vol. 4, No. 2, to the listing from Vol. 4, No. 1, but you also must change line 770 of that listing. The line should read:
Continued

S. Schoenfeldt
Las Vegas, NV 89115

East Long Meadow, MA 01028

I have had previous kit-building experience. Last week I turned bold and decided to install a Commodore 64. Could you please provide me with the resetswitch that you featured in your C-64 “Tech Notes” (Vol. 4, No. 4) for use in the article in your magazine (HCM, Vol. 4, No. 4, page 81). I still have yet to figure out how it can save a program. If I load a program by POKEing (44, 64), it will stay in memory, but there is no way to transfer it back to (44, 8). Could you please let me know? Write in to the Group Grapevine editor and tell us about your activities and how we can better serve you.

Barbara Giersch
Washington, DC 20426

We are aware of several software packages for the PC, Barbara, that specifically reference (no pun intended) maintaining library files. These include: MDB III (Micro Data Base, Inc.), The Data Factory (Micro Lab), Fastfile (Gryphon Systems), and Clarian (Eagle Enterprises). For an overview of these (and other) packages, we suggest that you consult two directories: IBM Personal Computer & XT Software Guide (from MicroInformation Publishing, 15420 Eagle Creek, Prior Lake, MN 55372), and PC Clearinghouse Software Directory (from PC Clearinghouse, 11781 Lee Jackson Hwy, Fairfax, VA 22033).

PCjr Serial Port—Not For Printers
Dear Sir:

This letter was written on a PCjr using POKE 44, 64 and printed on a TI 99/4A Impact Printer. The printer is hooked up to the extended model PCjr serial (S) jack using the 1 through 8 and 20 leads. Pins 2 and 3 are reversed between the two units. This only works for OPEN #n and PRINT #n output. PRN from DOS, LIST from BASIC and LPT1: just hang the system, as does an attempt to use PR from PC-Write. How about a “how to do it” article on this? It should include enough data to set up all functions to work correctly. Perhaps a new ROM would be needed in the printer.

Jack Ryan
Talley MT160 L printer with a CARD/PRINT interface card from the TI-99/4 impact printer, and connect everything together.

Making C-64 Listings Easier to Read
Dear Sir:

Typewritten letters are not the only things which are easier to read when double-spaced. Program listings are easier to read too if they are double-spaced. I thought that your readers might like to know one way that this can be done.

I have a Commodore 64 and Mannesmann Tally MT160L printer with a CARD/PRINT interface. The interface provides several alternative “modes” for printing out a listing, depending on the “secondary address” given in the OPEN statement. For instance, using a secondary address of 2 in OPEN 4, 4, 2:CMD4:LIST puts the printer and interface in a mode which prints out a program in upper case only and provides a “line feed.” A line feed makes the printer advance the paper (by one line with each carriage return (each time a new line is started). The statement OPEN 4, 4, 6:CMD4:LIST will result in the program being listed in upper and lower case, with a line feed. If the printer has also been set up to provide a line feed with each carriage return, then either of these listing modes will give double-spaced listings. A double-spaced listing is easier to read and provides space for inserting notes when editing a program.

For my combination of printer and interface, and perhaps for others, there is an additional advantage. The CARD/PRINT interface translates any control characters to readable abbreviations in the printer version of the listing. This can result in some program lines ending up with over 80 characters. For some reason, with single-spaced listings, these interfere with the line-feed, and overprinting of the preceding line results. Double-spacing prevents this overprinting.

Although I am not familiar with other interfaces, I would guess that they must provide various modes much like the CARD/PRINT interface. Most, if not all, printers enable the user to turn on or off their line-feed function. So, I am reasonably sure that most readers would be able to use this technique to obtain double-spaced listings.

Jack Ryan
El Dorado, AR 71730

C-64 Reset Button Problem
Dear Sir:

I have recently installed the reset switch that you featured in your C-64 “Tech Note” (Vol. 4, No. 4). I still have yet to figure out how it can save a program. If I load a program by POKEing (44, 64) it will stay in memory, but there is no way to transfer it back to (44, 8) to RUN it.

I have a Commodore 64. Could you please give me some advice on this?

Thank you.
S. Schoenfeldt
East Long Meadow, MA 01028

Note: See answer after the following question.

Another C-64 Button Reset
Dear Sir:

Last week I turned bold and decided to install a reset switch in my C-64. I am referring to the article in your magazine (HCM, Vol. 4, No. 4, page 81). I have had previous kit-building experience and I used my mini-soldering iron. I was told....
I should mention that I started off buying...
**Special Announcement:**

Home Computer Magazine is looking for “One-Liners.” If you have written a 1-line program in any language that is available on the computers we cover, send it in addressed to Letters to the Editor. It may win a $50 prize! By press-time, we had not yet received enough worthy candidates for publication in this issue, so keep those entries coming. On page 34 of our last issue, Vol. 4, No. 5, we published the top 4 entries—one for each brand of machine—and awarded $50 to the best one-liner of the four. It can happen to you, too!
I've just got to get organized! How many times have you said that to yourself? Each time you take on a new project or tackle a new assignment, it's a whole new ballgame, with a new set of rules and contrary elements that seem to defy organization. You know that if you just stopped and planned it all out, the actual job would be so much easier—but at the start, it seems less trouble to jump right in and wing it than to develop a real plan: an outline to guide you through this complicated activity. What if you could just sit down at your computer and freely type in your thoughts—a ready-made framework to hang your ideas on? Then you could jump around on this structure, filling it in as you go, until all the elements of your plan sit in their proper places, and your scheme takes its final shape. This sounds like a job for The Organizer!

Quite simply, The Organizer is a program that allows you to formulate thoughts and place them into an outline-like structure. You may also use the program's word processing functions to edit text or expand in detail any item in the outline—and then print the finished product on paper.

Organize It Yourself

The best way to learn about The Organizer program is to use it. When you first start the program Organize, you will see the title screen, and the main menu:

Main Menu
1. Outline Editor
2. Reports
3. File Manager
4. Quit

To begin, select 3. File Manager, for the next menu:

First select number 2. A new screen will prompt you to enter a new file name. In Figure 1, we show a short example of an outline covering a kitchen remodeling project. For this example, enter REMODEL as the file name. You will also be asked to specify how many records you expect to use, up to a limit determined by your machine. A record corresponds to one item in your outline; about 200 is a good place to start. (The process of creating this file can take your computer from a few seconds to a few minutes depending on the file size and the machine brand you are using.) After this entry, you are taken back to the File Manager menu. Now select option 5 to return to the Main Menu, and select option 1, Outline Editor. After entering the name of the file you wish to work with, the file and the first screen will be loaded. When this new screen appears, you may begin your outline.

All thoughts are not created equal. Every idea potentially has subordinate ideas to support it. In an outline structure, an idea is represented by a "heading," and each supporting idea as a "subheading." In The Organizer, a "generation" is simply one heading (which we will call a "parent") and its sub-headings (which we will call "children"). Usually, as you move from one generation to the next, you go from the general to the specific. The Organizer causes you to look at only one generation—one parent and its children—at a time. But, at the same time, it keeps each generation in its proper place as part of a larger structure.
On the Outline Editor screen, you will see several numbers displayed, showing the: generation (Gen); number of records used; number of records free; and the row and column of the pointer. The second line displays the name of the current parent, or the current child (if using the text editor). On the third line, you will see the line pointer, which is a greater-than (>) sign.

**Generation Gap**

Understanding the role of the line pointer is crucial to using The Organizer. This pointer is the key to moving between generations in the outline, and to performing all the editing functions, including adding new children. Equally important is to understand that, as you work on your outline, what you see on screen is only one small part of the entire document—a generation of children under one parent.

On this Outline Editor screen, you are usually in one of two modes: Edit Line or Outline Entry. You are in Outline Entry mode when your cursor is on the line pointer. When you move off the line pointer onto a new line, you are automatically transferred to Edit Line mode—as you do on this first new line of the Outline Editor screen. Here you enter the first child of the primary parent. Each outline record (child) is limited to one screen-line. (With the Text Editor, you will be able to add any number of text lines to a child, as explained later.) Starting with the two most general categories, "Owner supplies" and "Contractor supplies," we would enter these as children to the main parent, "Remodel." Here we are at Generation 0.

First type in the name of the first child, "Contractor Supplies" and press [RETURN]. You will automatically jump back to the line pointer. Now move the pointer down to the next line and enter the next child, "Owner supplies."

As mentioned, the line pointer is depicted by the greater-than (>) sign. This sign serves as more than just a pointer, however. Greater-than (>) and less-than (<) command keys are also used to change generations. When you return to the line pointer, press (>). A new, blank screen will appear with the Generation number increased from 0 to 1, and the name “Contractor supplies”—now the current parent—on the second line. The line pointer is again on the third line, which is blank—awaiting a new entry. Here you may add new children under this parent or return to Generation 0 by pressing the less-than (<) sign. It doesn’t matter which line you are on when you press <, it will still take you back to the preceding parent with its list of children. Remember: > takes you forward a generation and < takes you back a generation.

Now try entering the 4 items under “Contractor supplies” as its children. Move the line pointer back to the “Contractor supplies” and press >. On this new screen, with "Contractor supplies" named as the current parent, type in one child, go to the next line and type in the second child, and so on. In Figure 3, we show an expanded version of Figure 1. How did we expand it? Simply by adding generations to each item as we thought about them, one at a time, until—by the fourth generation in some cases—we had "thought it all through." One of 3 other characters may appear to the left of a child’s name, each one telling something about that child. The pound sign (#) means that the child has children of its own. The ampersand (&) means that there is text associated with that child, and the asterisk (*) means that both text and children accompany the child. Notice that the less-than sign (<) also appears on the screen’s second line, to the left of the current parent name. This simply means that—unless you are at Generation 0—you may return to the previous generation to see this parent displayed under its parent by pressing <.

An outline can take many forms and can include as many generations—branching off into as much detail—as you need to cover the subject. Figure 2 shows the general structure of the outline in Figure 1, and demonstrates how items branch off of other items to create new generations. And as you can see in Figure 3, the example in Figure 1 can expand into great detail just by branching off each item—eventually creating a complete document containing all relevant information on the main heading.

You can use The Organizer to build the same sort of outline—creating your own headings and adding to
"All thoughts are not created equal.
Every idea potentially has subordinate ideas to support it."

Outline Entry Mode
As you type-in an entry, you are in Edit Line mode. Every time you finish typing an entry or "child" and press [RETURN], you will jump back to a spot one space to the left of your entered line, where the line pointer sits. Here you automatically return to Outline Entry mode. In this mode, you can make use of a large number of functions, as explained in Table 1. These functions correspond to the proper keys designated in your machine’s Control Capsule. Experiment with each of these functions using the sample outline in Figure 2, or one of your own.

Entering Text
From the Outline Entry Mode, you can select Text Editor mode to add text under any item in the outline. (See Table 1.) This is the word-processing aspect of The Organizer. When you make this selection, a new screen will appear with the cursor on the third line. The first line contains the same information as the first line of the Outline Entry screen. The second line contains the name of the child to which you are adding text. Our sample in Figure 1 contains text (color-keyed) with which you can experiment using all of the text-editing functions—or you may just wish to dive into your own outline right away. These editing functions include: Moving the cursor up, down, left, or right; inserting characters; deleting characters; backspacing; and formatting.

Automatic word-wrap is always in effect while typing. If a line becomes too long either from simply typing characters, or inserting them, the last word in the line will be removed and placed on a new line below the one you are working on. When you’ve completed your entry, press the [FORMAT] key and the program will go back and check the end of each line for spaces, then check the first word of the next line to see if it will fit on the line above. If it does fit, the word gets moved up. This packs the document so that there are not a lot of empty lines. Usually a formatted document requires

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Move Pointer</strong>—The pointer indicates which child of the current parent is to be worked on. The pointer cannot move above the third line on the Outline Entry screen; but if the number of children more than fill the screen, you can scroll up or down by attempting to move the pointer off the top or bottom of the screen.</td>
</tr>
<tr>
<td><strong>Change Generation</strong>—At the line pointer, press &lt; to go back a generation, and &gt; to go forward a generation.</td>
</tr>
<tr>
<td><strong>Edit</strong>—To modify an existing child, move the pointer to that line and press the Edit key. Moving the pointer to a new line will automatically put you in Edit mode. The insert function will also put you into Edit mode. Several editing functions are available in this mode: (1) type over, (2) insert character, (3) delete character, (4) erase line, and (5) backspace. Erasing the entire line erases all characters on the line, but will leave the blank line as a child. While editing a child, the other Outline Entry functions are not available—you must press [RETURN] or [ENTER] to return to the line pointer before you can exercise these functions.</td>
</tr>
<tr>
<td><strong>Insert</strong>—Move the line pointer to where you want to insert a line and press your Insert key. The lines on and below the pointer will move down, opening a blank space for the new line.</td>
</tr>
<tr>
<td><strong>Grab</strong>—Use this function to move one or more children around in the outline. Grabbing removes the selected children from the current parent and places them in the hold buffer, where they remain until pasted elsewhere, or until other children are placed in the buffer. When a child is grabbed, its children are grabbed with it. Move the pointer to the first line to be grabbed and press the Grab key. The line pointer will be replaced with the (@) symbol. If grabbing one line, press [RETURN]. For more than one line, move the line pointer down by pressing the [down arrow] key so that a second (@) symbol appears beside the last child to be grabbed, and press [RETURN]. Items in the hold buffer are kept on disk, and will not be lost at the end of your current work session with the computer.</td>
</tr>
<tr>
<td><strong>Copy</strong>—Use this function to make a copy of one or more children. Copies are stored in the hold buffer until pasted or replaced. Copying a child also copies its children. Move the pointer to the first line that you wish copied and press the Copy key. Copy multiple children in the same way you do with the Grab-Line function.</td>
</tr>
<tr>
<td><strong>Paste</strong>—Use this function to insert the contents of the hold buffer into the outline. Move the line pointer to the point of paste, and press the Paste key. If the hold buffer contains a copy and not a grab, the items will be physically copied at this time. If you make any changes in the original items before pasting their copy, these changes will show up in the copy. Once a grab is pasted, it is removed from the hold buffer. A copy remains in the hold buffer to be used over and over until it is replaced.</td>
</tr>
<tr>
<td><strong>Hold Buffer Display</strong>—You may view the contents of the buffer at any time, to prevent deleting the contents before grabbing or copying material. You cannot alter any records in the buffer, or view their children. Simply press the Hold Buffer Display key.</td>
</tr>
<tr>
<td><strong>Delete Record</strong>—Move the pointer to a child and press the Delete Record key. Deleting a record also deletes its descendents and adds to the records-free count.</td>
</tr>
<tr>
<td><strong>Sort Outline Mode</strong>—You can have the program sort all or part of the records in the outline numerically or alphabetically (or strictly speaking, by ASCII code). Press the Sort Outline Mode key, and a menu screen will appear with 3 options: (1) Sort children of current parent, (2) Sort a generation (enter a generation to sort), and (3) Sort entire outline.</td>
</tr>
<tr>
<td><strong>Text Editor Mode</strong>—Move the pointer to the child to which you want to add text, and press the Text Editor key. This mode has its own set of editing functions, which are explained in the main article under the subhead, &quot;Entering Text,&quot; and for which the proper keys are designated in your Control Capsule.</td>
</tr>
</tbody>
</table>
fewer lines. The unused lines dropped by the formatter are returned to the free stack of available records. The Format command nicely formats the entire text under the current child.

To mark paragraphs, type *P at the beginning of a blank line above the new paragraph. When you print your outline with the Reports option from the Main Menu, it will indent 3 spaces at each paragraph—not printing the blank line or the *P marking. For an intentional blank line—one that you want printed—type *B at the beginning of your blank line. Using *P and *B will prevent the formatter from wrapping these lines on the screen display. Instead, they will remain as you entered them.

Text Editor can also use Grab, Copy, Paste, Display Hold Buffer, Delete Line, and Insert Line. Hold Buffer is for text only when you're in Text Editor mode. There are actually 2 buffers—one for outline, one for text. (These functions are also detailed in Table 1.)

Reports Mode

From the Main Menu, you can select the Reports option to print a hard copy of your outline. Here a new menu will ask you if you want it indented. If you answer yes, the printer will print your outline with indents for each generation, as formatted in Figure 1. The second option will print the outline showing no indents, but with the children in order under their respective parents. Under both options, a minus sign in front of each child will differentiate children from text. Text will appear under the child with which it is associated, and—with indentation—will be indented to the same generation.

Additional Options

The File Manager menu contains 3 more options which we have not yet discussed. From this menu, you can: list all the files on disk (Option 1); delete a specified file (Option 3); or increase the size of any file by redefining the number of records (Option 4). From the Main Menu, Option 4, Quit, will halt the program, returning you to BASIC. Appropriate screen prompts will guide you through each of these options.

Use It!

Now that we have given you the skeleton, you may dress him as you please. You will find that this program is a very handy rack to hang your thoughts on. So when important projects loom ahead—and you get that queasy, unorganized feeling in the pit of your stomach—don't panic! Just turn to The Organizer.

The Program

The Organizer uses random-access type files to link its records together two-dimensionally. Most data file programs link records sequentially—in one direction. When these programs search for or add records, they go from one end of the file to the other until they find what they're looking for. A two-dimensional file links its records not only top-to-bottom but side-to-side. Figure 4 charts the file structure of The Organizer and shows how this two-dimensional linking system works. This structure reflects the user-interface of the program itself. It may be useful to compare Figure 2 with Figure 4 as you follow this explanation.

Figure 4 shows how one record links to others. On the left side are 2 boxes which represent the Outline Linkage Blocks. The upper box contains the links for the screen's current parent. The second box contains the links for the first child. Each box is divided into 5 "compartments," numbered 0 through 4, each representing a link to another record. The first link (starting at the top) of the upper box goes back to the parents.
The next link is to the first child of the screen. Link 2 of the second box normally goes to a previous child (a “sibling”) under the current parent here. However, the link will have a value of zero because it is the first child under the current parent. Link 3 goes to the next sibling. This leaves Link 4, which links the record to the box (the third box), which is the text associated with this record.

In the text record, the program uses only 2 out of the 5 possible links. Links 2 and 3 are used to connect together all the text records in the entire file serially. Link 2 goes to the previous text record; and link 4 goes to the next text record in the file.

If a one-dimensional file links its records like a string of beads, this two-dimensional file structure is more like an intricate weave—with the final pattern too complicated to represent here. In fact, this “pattern” created by all the records linked in this fashion is invisible to the user, who in The Organizer looks at only one selected portion (a generation) of the file at a time.

This same two-dimensional linking system is used by all the machine-specific versions of The Organizer. Each computer, however, has its own way of keeping track of the linking algorithm. Disk access and loading times vary considerably between machines.

For your key-in listing see HCM PROGRAM LISTINGS Contents.
The Organizer (Apple II Family)

Main Menu
Explanation of the Program.
Line Nos.
100-200  Program header.
210-230  Set ProDOS flag and initialize.
240-300  Main program loop.
310-440  Initialization of variables.
450-580  Main menu screen.
590-700  Get Choice.
710-820  Branch to next program.

FileManager
Explanation of the Program.
Line Nos.
100-200  Program header.
210  Set ProDOS flag and initialize.
220-370  Catalog disk.
380-410  Create-file routine.
420-470  Delete-file routine.
480-520  Expand-file routine.
530-590  File-name-entry routine.
600-650  File-management routines.
660-720  Encode link parameters.
730-760  Link to main menu.
770-830  Error-handling routines.

Outline Editor
Explanation of the Program.
Line Nos.
100-200  Program header.
210  Set ProDOS flag and initialize.
220-410  Main program loop.
420-770  Get number choice.
780-1270  Catalog-disk routine.
1280-1470  Create-disk routine.
1480-1690  Delete-file routine.
1700-2480  Expand-file routine.
2490-2800  File-name-entry routine.
2810-3080  Encode link parameters.
3090-3460  Link to main menu.
3470-4850  Error-handling routines.

Reports
Explanation of the Program.
Line Nos.
100-230  Program header.
240  Start error-handling.
250-390  Load file line.
400-440  Option prompt routine.
450-530  Error-handling.
540-590  Load file line.
600-640  Option prompt routine.
650-690  Error-handling.
700-740  Load file line.
**The Organizer (IBM PC and PCjr)**

**Main Menu**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240</td>
<td>Program header.</td>
</tr>
<tr>
<td>250</td>
<td>Start error-trapping.</td>
</tr>
<tr>
<td>260-330</td>
<td>Display main menu.</td>
</tr>
<tr>
<td>340-430</td>
<td>Error routine.</td>
</tr>
<tr>
<td>440-510</td>
<td>Routine to display program options.</td>
</tr>
<tr>
<td>520-580</td>
<td>Program option data.</td>
</tr>
</tbody>
</table>

**File Manager**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-230</td>
<td>Program header.</td>
</tr>
<tr>
<td>240</td>
<td>Start error-trapping.</td>
</tr>
<tr>
<td>250-290</td>
<td>Display main menu.</td>
</tr>
<tr>
<td>300-350</td>
<td>Display a catalog of the disk.</td>
</tr>
<tr>
<td>360-430</td>
<td>Create a file.</td>
</tr>
<tr>
<td>440-480</td>
<td>Delete a file.</td>
</tr>
<tr>
<td>490-520</td>
<td>Exit back to the main menu.</td>
</tr>
<tr>
<td>530-550</td>
<td>Display title.</td>
</tr>
<tr>
<td>560</td>
<td>Option data.</td>
</tr>
<tr>
<td>570-640</td>
<td>Error-trapping routine.</td>
</tr>
<tr>
<td>650-830</td>
<td>Expand-the-file-size routine.</td>
</tr>
</tbody>
</table>

**Outline Editor**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240</td>
<td>Program header.</td>
</tr>
<tr>
<td>250</td>
<td>Start error-trapping.</td>
</tr>
<tr>
<td>260-290</td>
<td>Display main menu.</td>
</tr>
<tr>
<td>300-330</td>
<td>Sort the outline.</td>
</tr>
<tr>
<td>340-430</td>
<td>Format text for the Text Editor.</td>
</tr>
<tr>
<td>440-480</td>
<td>Delete a file.</td>
</tr>
<tr>
<td>490-520</td>
<td>Exit back to the main menu.</td>
</tr>
<tr>
<td>530-550</td>
<td>Display title.</td>
</tr>
<tr>
<td>560</td>
<td>Option data.</td>
</tr>
<tr>
<td>570-640</td>
<td>Error-trapping routine.</td>
</tr>
<tr>
<td>650-830</td>
<td>Expand-the-file-size routine.</td>
</tr>
</tbody>
</table>

**Reports**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240</td>
<td>Program header.</td>
</tr>
<tr>
<td>250</td>
<td>Start error-trapping.</td>
</tr>
<tr>
<td>260-370</td>
<td>Load file links.</td>
</tr>
<tr>
<td>380-430</td>
<td>Option header data report.</td>
</tr>
<tr>
<td>440-490</td>
<td>Error routine.</td>
</tr>
<tr>
<td>500-580</td>
<td>Load and display Outline screen.</td>
</tr>
</tbody>
</table>

---

**The Organizer (TI-99/4A)**

*All Organizer programs require TI Extended BASIC.*

**Main Menu**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240</td>
<td>Program header.</td>
</tr>
<tr>
<td>250</td>
<td>Display main menu.</td>
</tr>
<tr>
<td>260-340</td>
<td>Run program from main menu.</td>
</tr>
</tbody>
</table>

**File Manager**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-250</td>
<td>Program header.</td>
</tr>
<tr>
<td>260-290</td>
<td>Main menu.</td>
</tr>
<tr>
<td>300-370</td>
<td>Display catalog of the disk.</td>
</tr>
<tr>
<td>380-450</td>
<td>Create a new file.</td>
</tr>
<tr>
<td>460-490</td>
<td>Delete a file.</td>
</tr>
<tr>
<td>500-590</td>
<td>Expand a file.</td>
</tr>
<tr>
<td>600</td>
<td>Exit to main menu.</td>
</tr>
<tr>
<td>610</td>
<td>Routine to display title header.</td>
</tr>
</tbody>
</table>

**Outline Editor**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-250</td>
<td>Program header.</td>
</tr>
<tr>
<td>260-290</td>
<td>Initialize program.</td>
</tr>
<tr>
<td>300-370</td>
<td>Load file links.</td>
</tr>
<tr>
<td>380-450</td>
<td>Main control routine for the Outline Editor.</td>
</tr>
<tr>
<td>460-490</td>
<td>Delete-line routine.</td>
</tr>
<tr>
<td>500-590</td>
<td>Insert-line routine.</td>
</tr>
<tr>
<td>600-630</td>
<td>Paste-line routine.</td>
</tr>
<tr>
<td>640-690</td>
<td>Sort outline.</td>
</tr>
<tr>
<td>700-1110</td>
<td>Format text for the Text Editor.</td>
</tr>
<tr>
<td>1120-1220</td>
<td>Grab and Copy line routine.</td>
</tr>
<tr>
<td>1230-1630</td>
<td>Display Hold Buffer.</td>
</tr>
<tr>
<td>1640-1720</td>
<td>Edit line control routine.</td>
</tr>
<tr>
<td>1730-1910</td>
<td>Text Editor screen loader.</td>
</tr>
<tr>
<td>1920-2180</td>
<td>Text Editor screen saver.</td>
</tr>
<tr>
<td>2190-2470</td>
<td>Delete a line from the file.</td>
</tr>
<tr>
<td>2480-2590</td>
<td>Sort the outline.</td>
</tr>
<tr>
<td>2600-2750</td>
<td>Format text for the Text Editor.</td>
</tr>
<tr>
<td>2760-2790</td>
<td>Get next record from the empty list.</td>
</tr>
<tr>
<td>2800-2880</td>
<td>Get next text record.</td>
</tr>
<tr>
<td>2890-3010</td>
<td>Load and display Outline screen.</td>
</tr>
<tr>
<td>3020-3540</td>
<td>Line Entry routines.</td>
</tr>
<tr>
<td>3550-3620</td>
<td>Change level routines.</td>
</tr>
<tr>
<td>3630-3680</td>
<td>File field routines.</td>
</tr>
<tr>
<td>3690-3990</td>
<td>Error trapping routine.</td>
</tr>
<tr>
<td>3910-3940</td>
<td>Load task routine.</td>
</tr>
</tbody>
</table>

**Reports**

*Explanation of the Program.*

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-250</td>
<td>Program header.</td>
</tr>
<tr>
<td>260-290</td>
<td>Load file links.</td>
</tr>
<tr>
<td>300-370</td>
<td>Option header data report.</td>
</tr>
<tr>
<td>380-430</td>
<td>Error routine.</td>
</tr>
<tr>
<td>440-490</td>
<td>Load Outline screen.</td>
</tr>
<tr>
<td>500-590</td>
<td>Get next outline record.</td>
</tr>
<tr>
<td>600-630</td>
<td>Get next text record.</td>
</tr>
<tr>
<td>640-660</td>
<td>GL subroutine to get link value.</td>
</tr>
</tbody>
</table>

---

*Due to space limitations, the key-in listings for the Reports Routine will be published in HCM Vol. 5, No. 2.*

© Home Computer Magazine Volume 5, No. 1
Orbital Defender

by Scott Williams
and the HCM Staff

As you seem to hang in the heavens, Earth hangs its hopes on you. With only a split-second's warning, will you recognize the enemy?

Friend or Foe? As a lonely guard stands ready, this is always the bottom line. True of sentries everywhere, at all times, this question now presses on the entire planet—and you are all that stands between Mother Earth and the invading hordes from outer space. Orbital Defender is a game based on reflexes and hand-eye coordination—placing you in command of a patrol ship orbiting Earth. Your mission is to recognize and destroy any hostile ship approaching the planet, but to let friendly ships pass unharmed. Your enemies are the Sandian hordes, and the space pirates from Alpha II. Traffic is heavy, and you have to make instant decisions; or, you may unwittingly miss a target, destroy an ally, or possibly be shot down yourself!

Think Fast
As Planet Earth slides slowly beneath, and the stars appear to rise over a curved horizon, you fly a lonely and dangerous vigil. Your ship is armed with a short-range particle-beam discharge cannon. A radar scope in your control panel homes in on any passing spacecraft and displays its shape. It is your decision to fire or not—and it must be a split-second judgement: friendly or hostile? Before you see the craft on the screen, a warning light and alarm brings you to attention. If you recognize the ship as an enemy, press the [SPACE BAR] to fire. Your ship's computer locks in the target, but you must decide who's who. Earth law declares that only a human being—not a computer—will decide whether life is to be taken in defense of the planet. You'll be awarded points for every enemy you shoot, but docked for each Earth ship that you mistakenly destroy.

Your ship's instrument panel is an active one, displaying several factors important to your survival and success. Three sliding scales indicate thrust, your shield strength (if an attack catches you with your shields down, you're dead), and dock time—the time left before your ship reaches an Earth base satellite. Three information displays show the class, type, and firing range of any ship on the radar screen, and a fourth sliding scale shows the level of energy remaining in your ship.

Energy and Skill
Your thruster, shields, and cannon all consume energy—running out of energy makes you a perfect target for the Sandians or Alpha II pirates. The only way to get more energy is to dock with an Earth base, which is easy—as long as you don't blow it out of the universe. If your itchy trigger finger destroys the base before you get there, you'll have to conserve energy until the next dock. You can, for example, turn off your shields to conserve, but you will have to shoot perfectly to survive until you can reach the next base. If you shoot more than 6 Earth ships though, you will not be allowed to dock with an Earth base for the rest of the game.

From the first menu, you can choose 10 different skill levels, ranging from Rookie Cadet to Commander. Skill levels vary according to how much time you have to react before firing or taking a blow. The program keeps track
"Earth law declares that only a human being—not a computer—will decide whether life is to be taken..."

The Apple version of this program uses four assembly language routines. These routines control sound effects, character graphics, and two other very interesting functions: shape expansion and page switching. In the shape-expansion routine, the program takes a small shape from the shape table and enlarges it on the screen. The page-switching routine rapidly switches between two screens stored separately on high-resolution graphics Pages 1 and 2. (For more on these graphics pages, see the Apple "Tech Note" in this issue, on page 60.) The list below shows the line number where the data statements for each routine are located:

<table>
<thead>
<tr>
<th>Routine</th>
<th>Data Line Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Char. Graphics</td>
<td>1230-1240</td>
</tr>
<tr>
<td>2. Sound</td>
<td>1240</td>
</tr>
<tr>
<td>3. Page Move</td>
<td>1240-1250</td>
</tr>
<tr>
<td>4. Shape Expansion</td>
<td>1250-1280</td>
</tr>
</tbody>
</table>

The call addresses for each routine are all listed in lines 250 and 260 of the program:

250 PAUSE = 30:NS = 25:P1 = 32:P2 = 64:BASE = 2048:DMIN X$(NS), Y$(NS):FX(1) = 39:FX(2) = 139:FX(3) = 239:C(1) = 2:C(2) = 5:C(3) = 6:C(4) = 0


Although the Commodore 64 provides 8 different sprites, all of which can be used simultaneously, this program uses only one sprite—which it redefines to get all 9 different shapes of the hostile and friendly crafts displayed on the radar screen. Because it displays only one shape at a time, the program avoids having to redefine more than one sprite. Line 1430 sets an offset that determines which shape will be POKEd to the sprite. Line 1440 POKEs the shape data to the sprite from a shape table stored in memory. Data for the shapes are in separate data statements at the end of the program.
This version uses IBM's GET and PUT commands to generate changes in the graphics screen. The GET command allows the program to grab a rectangular section of the screen and save it to an array. (Two parameters define the rectangle by the position of its upper left- and lower right-hand corners.) The PUT command allows you to place graphics stored with the GET command back on the screen.

The use of GET and PUT allows simple animation. Several options can be used with the PUT command to determine how the image will be placed on the screen. In this program, we use the PSET when displaying ships on the radar, which will place the entire image back just as it was when we grabbed it with GET. Then we use the LINE command to erase the radar image. The BF (Box Fill) option is used with a black background color—a very fast and effective way to erase controlled areas of the screen.

Key: Space Bar = Fire
Cursor Up = Increase Thrust
Cursor Down = Decrease Thrust
Cursor Left = Lower Shields
Cursor Right = Raise Shields

This version uses IBM's GET and PUT commands to generate changes in the graphics screen. The GET command allows the program to grab a rectangular section of the screen and save it to an array. (Two parameters define the rectangle by the position of its upper left- and lower right-hand corners.) The PUT command allows you to place graphics stored with the GET command back on the screen.

The use of GET and PUT allows simple animation. Several options can be used with the PUT command to determine how the image will be placed on the screen. In this program, we use the PSET when displaying ships on the radar, which will place the entire image back just as it was when we grabbed it with GET. Then we use the LINE command to erase the radar image. The BF (Box Fill) option is used with a black background color—a very fast and effective way to erase controlled areas of the screen.

Key: Space Bar = Fire
Cursor Up = Increase Thrust
Cursor Down = Decrease Thrust
Cursor Left = Lower Shields
Cursor Right = Raise Shields

[Note: This program has been converted from the original in Extended BASIC to a BASIC version. To conserve space, we are publishing only the BASIC version in this issue of the magazine. However, the Extended BASIC program will be included with the BASIC program on our disk and cassette media service (ON DISK and ON TAPE) for Vol. 5, No. 1.]

The most significant aspect of the TI version of Orbital Defender is its use of the CALL COLOR command to enhance graphics. With CALL COLOR, the program can "hide" parts of the graphics screen until they are needed to create certain effects. This is very helpful in creating the illusion that extensive graphics are being rapidly and simultaneously written to the screen when, in fact, they were there all the time.

Key: Space Bar = Fire
E = Increase Thrust
X = Decrease Thrust
D = Raise Shields
S = Lower Shields

[Note: This program has been converted from the original in Extended BASIC to a BASIC version. To conserve space, we are publishing only the BASIC version in this issue of the magazine. However, the Extended BASIC program will be included with the BASIC program on our disk and cassette media service (ON DISK and ON TAPE) for Vol. 5, No. 1.]

The most significant aspect of the TI version of Orbital Defender is its use of the CALL COLOR command to enhance graphics. With CALL COLOR, the program can "hide" parts of the graphics screen until they are needed to create certain effects. This is very helpful in creating the illusion that extensive graphics are being rapidly and simultaneously written to the screen when, in fact, they were there all the time.

Key: Space Bar = Fire
E = Increase Thrust
X = Decrease Thrust
D = Raise Shields
S = Lower Shields

[Note: This program has been converted from the original in Extended BASIC to a BASIC version. To conserve space, we are publishing only the BASIC version in this issue of the magazine. However, the Extended BASIC program will be included with the BASIC program on our disk and cassette media service (ON DISK and ON TAPE) for Vol. 5, No. 1.]

The most significant aspect of the TI version of Orbital Defender is its use of the CALL COLOR command to enhance graphics. With CALL COLOR, the program can "hide" parts of the graphics screen until they are needed to create certain effects. This is very helpful in creating the illusion that extensive graphics are being rapidly and simultaneously written to the screen when, in fact, they were there all the time.

Key: Space Bar = Fire
E = Increase Thrust
X = Decrease Thrust
D = Raise Shields
S = Lower Shields
QUIZ-PRINT

A Finishing Tool for your Quiz Construction Set*

by William K. Balthrop
and the HCM Staff

Calling all teachers, students, trivia and non-trivia buffs—now you can create a custom-organized printout of all your self-made quizzes with this do-it-all program!

Mary is studying for her history exam of next week, and as she reads her textbooks she devises questions and answers on her computer and later prints them out so that she may quiz herself and her study group, as well as highlight information presented. Jim is getting ready for a dinner party, and after shoving a roast in the oven, he sits down at his computer to create a set of trivia questions and answers for a little fun after dinner. And Karen types up and prints out a multiple choice test (and an answer sheet) that she will distribute for her second grade class’ spelling test tomorrow.

All of these people are using Quiz-Print, a helpful, easy-to-use program designed to be a supplement to the Quiz Construction Set programs, Quiz-Make and Quiz-Take, published in the previous issue, Vol. 4, No. 5. Quiz-Print is a reporting utility which is capable of producing hard-copy quizzes from a quiz database created with Quiz-Make.

A number of options make this more than just a reporting program. You can reorganize the quiz, use multiple-choice formats, or blind-answer questions.

Before using Quiz-Print, you must create a quiz using the Quiz-Make program. To start, select the Setup routine and insert a disk or cassette containing a Quiz-Make file into the drive or recorder. After selecting 1) SETUP, you will be asked to enter the quiz file name that was created using Quiz-Make. That file will then be loaded into memory. Do not use LOAD to load this file—it is used only to load your quiz report once you have set it up and saved it.

Option 1, Setup, is used to define the parameters of the hard-copy quiz that you wish to produce. This option first helps you select a format for your answers, and then lets you choose the questions to be asked if you do not want the computer to randomly choose them.

Format The Answers

The next question you will be asked is whether you would like to print multiple-choice style questions:

PRINT MULTIPLE CHOICE (Y/N)?

If you press N, then the program will skip down to the menu described under “Choosing Questions.” When you choose not to have your questions arranged in a multiple-choice format, the printout simply includes the question alone, and a blank line for the answer.

If you press Y, you will be prompted for the following information in reference to a multiple-choice quiz. First enter the number of answers you would like to have appear below each question:

HOW MANY CHOICES (2 to 10)?

Next, you can either have the computer randomly select answers from within the quiz to fill in the incorrect multiple choices, or you can enter your own wrong answers to each question:
Select the first option if you want the computer to select multiple-choice answers for you after you have finished choosing your questions. It will display its selections for the first question and ask if it’s OK. If you press Y for yes, then it will select a different set of random answers for your inspection. No answer will ever be repeated twice within one multiple-choice question. For this reason, you should have at least as many questions in the file as there are number of choices per question, or else choose to enter the answers yourself for each question.

If you elect to enter your own answers for your questions (option 2), you will need to enter one answer for each choice, determined by the number of choices per question that you indicated in an earlier option. The number of answers that you will enter for a question is actually one less than its total number of possible answers, because one of them will be the correct answer—which you cannot change.

Pick The Proper Place

In the next option, you can either let the computer place the correct answers within the proper fields of multiple answers randomly, or select the position that the answers will appear in for each question yourself:

If the computer randomly picks the position of the correct answer within each multiple choice selection, it will do so and then ask you if it’s OK. If it is not, it will keep selecting different positions until the is satisfactory. If you want to enter the position of the correct answer, the computer will display all of the wrong answers for a question, each next to a letter. The last letter is on a blank line, and the question’s correct answer will be displayed below it. Press the keyboard letter corresponding to where you would like to place the correct answer. The answer on the chosen letter—if there is one—will be bumped down, and the correct answer will be inserted.

Choose The Questions

This next menu will always appear next when you set up a quiz, regardless of whether you selected the multiple choice option:

In the above menu you are given three choices. In choice 1, the questions in the quiz will be printed in the same order in which they appear in the original Quiz-Make file. If you are working on a multiple choice quiz, you are then shown the first question, some answer choices, and the correct answer and asked:

If you press Y, then the program will continue to show you answer choices until you press Y. If you press Y, then the program will tell you how many records (questions) you have selected, and inquire whether you want to add another. If you are not working with multiple choice questions, then you are simply shown each question and asked whether you want to add it to the file.

In both cases, you are taken back to the main menu when you decide to stop adding questions.

In the second choice, the computer will mix up the order in which the questions will be printed. You will be shown each question that the computer has selected and asked to accept or reject it. From here on, choice 2 operates just like choice 1 above.

You can reorganize the quiz, use multiple choice formats or blind answer questions.

In the third option, you will be able to scan through the quiz file and pick the questions that you would like to include in the quiz; they will be printed in the order in which you select them. Each question can be selected only once. Once you select a question, it will be removed from the list of questions from which selections can be made. Use the arrow keys to scroll through the selections. Enter the number of the question you would like and press [ENTER] or [RETURN]. If you already have a list of the questions printed out or written down, you can simply enter the numbers of the questions desired in the order that you want them, without scrolling the screen. The question does not need to be on the screen to be selected. If you are required to enter more information for a question after selecting a selection (such as your own wrong answers for the multiple choice option), you will be asked for that information before making your next selection.

Once you have selected your questions in any of these options, you will not be able to view them again until you obtain a printout of your report file.

Now For The Cheatsheet!

The final prompt you will need to answer to set up your quiz will give you the option of printing an answer sheet at the end of the quiz to be used in grading papers.

Print Answers at End of Report (Y/N)?

The answer sheet includes the report title, a second heading of your choice, and the date, in addition to the number of each question and its correct answer.

The other 4 options on the main menu are fairly self-explanatory: Option 2, Print, will neatly generate the quiz that you set up in option 1. Like the answer sheet, it includes the report title, second header, and date. Option 3, Save, will save the quiz report parameters to disk or tape. By doing this you will need to design your quiz only once, loading the quiz from disk or tape to get another copy. Option 4, Load, will allow you to load the quiz report parameters previously saved with option 3. Option 5, Exit, allows you to gracefully exit the program. Each option except 5) EXIT automatically returns you to the main menu when you are done working in it.

We think you’ll find that with the flexibility in print formatting that Quiz-Print offers, the spectrum of applications for the Quiz programs is extremely broad. Now take a look at Quiz-Print Tutorial on the next two pages for some technical insight into print formatting.

For your key-in listing see HCM Program Listings Contents.
**Quiz-Print (Apple II Family)**

**Explanation of the Program**

- **Line Nos.**
  - 100-200: Program header.
  - 200-290: Initialize program.
  - 300-350: Main menu selection screen.
  - 370-380: Control loop to set up initial report.
  - 370-500: Prompt for multiple choice.
  - 530-540: Number of choices.
  - 550-560: Location of answers.
  - 570-590: Answer position.
  - 600-610: Order of questions.
  - 620-650: Select answer sheet at end of report.
  - 660-800: Control routine for building a quiz report.
  - 810-890: Is question OK? Add another?
  - 900-1130: Select questions.
  - 1140-1200: Select question at random.
  - 1210-1260: Select random answers for multiple choice.
  - 1270-1320: Enter multiple choice answers.
  - 1330-1380: Random position for answers.
  - 1390-1440: Choose position of right answer.
  - 1450-1610: Save quiz report.
  - 1620-1750: Load a quiz report.
  - 1760-1920: Print quiz report.
  - 1930-2050: Print answer sheet.
  - 2060-2330: Key-scan routines.
  - 2340-2490: Error routine.
  - 2500-2570: Exit program routine.

**Quiz-Print (IBM PC and PCjr)**

**Explanation of the Program**

- **Line Nos.**
  - 100-180: Program header.
  - 190-240: Initialization.
  - 250-290: Main menu. Input user's selection.
  - 300-490: Get user's report options.
  - 300-360: Load Quiz-Make file.
  - 370: Select multiple choice.
  - 380: Number of choices.
  - 390-400: Location of answers.
  - 410-440: Select answer position.
  - 450-460: Order of questions.
  - 470-490: Select answer sheet at end of report.
  - 500-610: Control the construction of the quiz report.
  - 620-780: Pick and choose questions.
  - 790-840: Select questions at random.
  - 850-900: Random multiple-choice answers.
  - 970-1020: Select random position for multiple-choice answers.
  - 1030-1060: User selects position for multiple-choice answers.
  - 1100-1110: Save quiz report.
  - 1120-1160: Load quiz report.
  - 1170-1270: Print quiz report.
  - 1280-1350: Print answer sheet.
  - 1370-1420: Key-scan subroutines.
  - 1430-1500: Error-trapping routine.
  - 1510-1540: Exit the program.
Accessing the Printer

There are primarily two types of DOS (Disk Operating System) currently being used on the Apple: DOS 3.3, and ProDOS. DOS is responsible for interfacing the computer to the outside world. ProDOS has fixed several bugs that existed in the earlier DOS 3.3. One such bug affects the way we initiate communications with a printer.

Both DOS manuals tell you to use the following command to start communications with a printer:

```
PRINT D$;"PR#";SL
```

But many DOS 3.3 programmers prefer to use a shortcut around DOS with the following command:

```
PR#1
```

This command will not work at all with ProDOS. If you attempt to use it, your program will not function properly. Use the following command to redirect information back to your screen:

```
PRINT D$; "PR#0"
```

Output Algorithm

The basic algorithm for figuring out the number of questions that will appear on a page is identical to the one used on all the other machines. The formula is located in lines 1860. See the IBM explanation for formulas and details.

Formatting

The Quiz-Print program is written to output to the 40-column Apple screen, but printers can normally also output in 80-column format. In order to have the printouts take advantage of this 80-column format without requiring an 80-column card in your Apple II+ or Ile, line 1840 contains a command that turns off the screen display while printing, and sets the width to 80 columns:

```
1840 PRINT D$; "PR#";SL: PRINT CHR$(9); "80N"
```

The commands VTAB, HTAB, INVERSE and NORMAL have no affect on output to the printer. If you wish to format your document across the paper, you will need to use the TAB(col) command, where col is the column you want to TAB up to.

Accessing the Printer

Quiz-Print on the Commodore 64 uses the standard printer which attaches to the special serial port (the same port which connects the disk drive). The command format to turn on the printer is OPEN ln, dn. The ln is the logical file number—and we use 4. The dn is then used in all the PRINT# statements in the program to output to the printer. The dn is the device number. We again use 4 because this is the default value on Commodore printers. Selecting a logical file number that is the same as the device number helps avoid confusion in reading the program's code.

Each time something is sent to the printer, we use the PRINT#4, var command—where var is the name of the variable or string to be printed. Always place the # symbol immediately after PRINT—including a space causes a syntax error. To terminate output to the printer, the buffer must first be cleared with a PRINT#4 command and is not followed by a variable. The channel is closed with a CLOSE4 command.

Output Algorithm

The basic algorithm for figuring out the number of questions that will appear on a page is identical to the one used on the other machine brands. Its formula is located in lines 2440. See the IBM explanation for formulas and details.

Formatting

The major formatting consideration here stems from a lack of a form feed on Commodore printers. To approximate this function, the program keeps track of the number of lines that have been printed on any page by using the NL variable. This value is then subtracted from 66 to determine how many blank lines are to be printed to reach the top of the next page.

Another important formatting consideration is the answer sheet. The TAB function does not work the same way on a printer as it does when printing to the screen. Thus, when multiple-choice questions are selected, a special function is used in lines 2630 through 2650 to space the answers with five answers in each row. By taking the two rightmost characters from the STRS of the number of the answer, a one-digit number lines up in the same column as a two-digit number.
One of the main arguments in favor of purchasing a computer is that it will reduce the amount of paperwork a task involves. Occasionally though, we need computers to produce paperwork for us. The computer is capable of taking a lump sum of information, mixing it around, and spitting it out in a formatted, easy-to-read report. Quiz-Print is just such a program.

This article serves a dual purpose: It will further enhance your understanding of the Quiz Construction Set of programs, especially Quiz-Print; and it will also increase your general understanding of how to get a printer to do what you intend—by translating your specific format requirements into simple BASIC commands. With this new knowledge, you should be off to a great start at developing your own custom programs to generate reports.

We have placed all the explanations for each machine brand directly beside each other so that they will be easy to compare—both in their differences, and in their similarities.

### Accessing the Printer

The IBM computer makes communication with the printer a breeze—with such easy-to-use commands as LPRINT. You don't need to worry about opening a printer port. The system automatically outputs to the default printer device. If you wish to use a device other than the normal [default] printer channel, you will need to use the OPEN "COM command (which is beyond the scope of this article).

### Output Algorithm

Quite often a report needs to span more than one page. One formatting rule which we have adhered to in Quiz-Print is that no question is cut in half by a page break. Some printers have the ability to automatically skip the page breaks, but this, in itself, is not satisfactory for our application.

Each question in the printed quiz uses several lines on the printer. If the number of lines used by a question were always the same, it would be a simple matter of limiting each page to a fixed number of questions. However, the number of lines used by each question varies depending on whether the questions are multiple choice, and on the number of choices supplied with each question.

By dividing the number of lines per page by the number of lines used for each question, we arrive at the number of questions per page. To find the number of lines used for each question, you add the number of multiple choices, if any, to a fixed overhead number of lines. In this program, the minimum number of lines needed is seven. Line 1220 does all of this:

\[
1220 \text{NPP} = \text{INT}(60/(7+\text{NC})
\]

\[
\text{NC} = \text{the number of multiple choices selected}
\]

### Formatting

For the program to properly format your quizzes, you must have a printer capable of performing a form feed that is implemented by the program. After printing the specified number of questions, a form feed (ASCII 12) is sent to the printer. This is done in lines 1210, 1230, 1250 and 1340.

© Home Computer Magazine Volume 5, No. 1
When it comes to making a logical move in Backgammon, the Ur of Chaldes didn't have anything on your home computer.

Precursors of the classic game Backgammon have been found to exist in several ancient civilizations, including those of the early Greeks and Romans. But the earliest version of the game is believed to have been created in 3000 B.C. by the Ur of Chaldes. (A land called Chaldea was a region of South Babylonia along the Euphrates and the Persian Gulf.) Perhaps you are already an old hand at this old game, or maybe you're one of those who has always wondered "What's this strange design on the back of my checkerboard?" Anyone familiar with Backgammon, however, knows that it can challenge Checkers or even Chess in its ability to involve and interest players from all around the world. In this version of the game, the computer is your opponent—and a darn good one at that.

Know the Rules

The Backgammon board contains 24 positions—12 on each side. Players move their checkers (commonly called pips) around the board on these locations through rolls of 2 dice. (See title picture.) The computer plays black and moves clockwise, while the user plays white and moves counterclockwise. The game board is set up in the following manner:

<table>
<thead>
<tr>
<th>POSITION</th>
<th>PLAYER</th>
<th># OF PIPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>computer</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>user</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>user</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>computer</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>user</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>computer</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>computer</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>user</td>
<td>2</td>
</tr>
</tbody>
</table>

The computer's "inner table" is positions 19 through 24, and the user's inner table is positions 1 through 6. The object of the game is to first move all of your pips to your own inner table, and then off the board. The computer rolls the dice for you; on the first roll, the one with the highest number will begin the game first. Your computer opponent will tell you to press any key to roll the dice. After the roll is determined, you may move one or two of your pips, using both dice (one at a time) to move one pip, or moving two pips—one with each die.

Once the computer has rolled the dice, it will ask you to enter a move. Numbers less than 10 must be entered with a leading zero: 01, 04, 07, etc. The prompt FROM—indicates that the computer expects you to enter the current location of the pip you would like to move. After entering a legal location, it will then add to the prompt. For example, if your first entry was 13, the display would look like this: FROM—13 TO— You would now need to enter the location where you would like to move the pip. If the move is legal, the graphics display of the board is updated to show the pip at its new location. With each move, all versions except the IBM actually redraw the entire board.

You can land only on an empty position, on a position occupied by your own pips, or on top of a single pip of your opponent. When this happens, the computer's piece is placed on the Bar, which is in the center of the board. If one of your pips is relegated to the Bar, you must place it back on the board before you can move any other pips. To get back on the board, you must roll a value that can move the pip onto the board without landing on a position occupied by 2 or more opponent's pips. You move onto the board at position 24. You could place your pip on position 24 if you rolled a 1.
if you rolled a 2, on 22 if you rolled a 3, and so on, depending on how many pips occupied those positions. The computer must do the same if you knock its pips onto the Bar. The computer re-enters the board at position 1.

Once all of your pips are on your inner table, you can start moving them off the board. The first player to get all of his or her pips off the board is the winner. Imagine now that there is a position 0; you must move your pips to position 0 to get off the board. You can do this by using an exact roll of the dice, or you can use exact values of the dice to move your pips closer to the board's exit. Using a value larger than what is needed to get your innermost pips off the board is also legal. For example, if you have only two pips left on the board at locations 3 and 5, and you roll a 2 and a 6, you would do the following:

FROM-05 TO 00
FROM-03 TO 01

You would then have 1 pip left on the board. Notice that the exact value needed to move off the board was entered, even though the value on one die was greater than this value. This is important because the computer keeps score of the remaining number of moves each player will have to make to get all pips off of the board. When one player moves all of his or her pips off of the board, that player's score is 0. The other player loses by the number of moves remaining in his or her score.

The Program’s Logic

As an opponent, the computer is very aggressive—placing a higher priority on offense than on defense.

Electronic Backgammon uses the same basic algorithm for all of the machine versions. When a move is indicated, the computer goes through a series of logic steps, searching for the optimum place to move. After rolling its dice, the computer checks each pip on the board; if it determines that there are no legal moves, it displays a move-blocked message and the opponent gets to move. The computer begins this move sequence by first locating all of the pips that are the farthest from its inner circle. If there are no pips in its home territory, then the program checks each quadrant of the board, looking for the best possible move it can make while protecting its other pips as well as possible. If there is a legal move, the computer first determines whether it can move into the inner circle. It then checks to see whether there is a pip that is open (unprotected) and whether it can move to protect the pip. Next, the program locates the enemy pips on the board and determines whether there is an open pip among them. If there is, it checks whether it can bump the pip from the board to the Bar. If there isn't an open pip, it makes its first move, then rechecks the board and determines whether the pip it just moved is open. If the pip is open and the computer can protect the pip, it will do so on its next move. If all of the pips are in the home territory, the computer goes through another sequence of loops to determine which pip it can remove from the board.

The program checks for all legal moves. It will not let you move from a position you do not occupy. It will not let you move to a position other than forward, toward your inner table; you could not move from 13 to 18 because this would be going away from your inner table. The program will also prevent you from moving off the board if you do not have all of your pips in the inner table. It will also stop you from placing your pip on top of a position that contains two or more computer pips. Likewise, the computer will always make a legal move.

Because of limited memory space, the program cannot have a large set of different moves to choose from, so it chooses the first move that satisfies the conditions that it is working under. The program always does this checking in a fixed pattern, not randomly.

The Apple version of Electronic Backgammon uses the DRAW command with shape tables to create the pips, and the numbers which indicate the positions of the pips. After a move is registered, the XDRAW command removes the number and redraws the line. With each move, all 24 positions on the board are redrawn with an updated count on each position.

In the Apple version, the computer’s pips are open circles, while the user’s pips are solid white circles.

The C-64 version of Electronic Backgammon uses standard character graphics to create the backgammon board design. When the computer moves one pip, it erases and redraws all 24 pips in their proper positions.
### Electronic Backgammon (Apple II Family) Explanation of the Program.

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-190</td>
<td>Program header.</td>
</tr>
<tr>
<td>200-220</td>
<td>Protect hi-res page.</td>
</tr>
<tr>
<td>230-290</td>
<td>Initialization and title screen.</td>
</tr>
<tr>
<td>300-370</td>
<td>Determine who is first.</td>
</tr>
<tr>
<td>380-440</td>
<td>Roll dice and branch.</td>
</tr>
<tr>
<td>450-750</td>
<td>Player's move.</td>
</tr>
<tr>
<td>760-780</td>
<td>Computer blocked?</td>
</tr>
<tr>
<td>790-840</td>
<td>Must computer move from Bar?</td>
</tr>
<tr>
<td>850-1770</td>
<td>Computer move logic.</td>
</tr>
<tr>
<td>1980-2140</td>
<td>Update computer's pip location.</td>
</tr>
<tr>
<td>2150-2210</td>
<td>End-of-game options.</td>
</tr>
<tr>
<td>2220-2230</td>
<td>Blocked- and invalid-move messages.</td>
</tr>
<tr>
<td>2240-2390</td>
<td>Get player's input.</td>
</tr>
<tr>
<td>2400-2910</td>
<td>POKE shape table and set hi-res.</td>
</tr>
<tr>
<td>2920-3290</td>
<td>Draw board and move pips.</td>
</tr>
<tr>
<td>3300-3310</td>
<td>Display dice roll.</td>
</tr>
</tbody>
</table>

The computer's pips in this version are black, open circles while the user's pips are solid white circles. When stacked, the black open pips become blue open circles, and the user's white pips become solid blue.

In the IBM version of Electronic Backgammon, the algorithm for moving the pips is comparatively simple—and thus very efficient. Instead of redrawing all 24 pips each time one is moved, the program simply erases the pip being moved and redraws it at its new location on the board.

In the IBM version, the computer's pips are red open circles, and the user's pips are brown. When stacked, the computer's and the user's pips become solid shaded. The IBM computers create the pips using the CIRCLE command. When they stack a pip, they draw the shape of the pip with the CIRCLE command, and then fill the circle with the PAINT command.

### Electronic Backgammon (IBM PC and IBM PCjr) Explanation of the Program.

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-230</td>
<td>Program header.</td>
</tr>
<tr>
<td>240-260</td>
<td>Initialization and title screen.</td>
</tr>
<tr>
<td>270-310</td>
<td>Display playing screen.</td>
</tr>
<tr>
<td>320-380</td>
<td>Determine first player.</td>
</tr>
<tr>
<td>390-590</td>
<td>Player's turn.</td>
</tr>
<tr>
<td>600-870</td>
<td>Computer blocked?</td>
</tr>
<tr>
<td>880-980</td>
<td>Complete computer's choice.</td>
</tr>
<tr>
<td>990-920</td>
<td>End-of-game routine.</td>
</tr>
<tr>
<td>930-1020</td>
<td>Routine to display dice on the board.</td>
</tr>
<tr>
<td>1030-1080</td>
<td>Time-delay routine.</td>
</tr>
<tr>
<td>1090-1140</td>
<td>Display routines.</td>
</tr>
<tr>
<td>1150-1310</td>
<td>Calculate pip positions.</td>
</tr>
<tr>
<td>1320-1330</td>
<td>Display pipes routine.</td>
</tr>
<tr>
<td>1330-1340</td>
<td>Scan keyboard.</td>
</tr>
<tr>
<td>1350</td>
<td>Program data.</td>
</tr>
</tbody>
</table>

### Electronic Backgammon (C-64) Explanation of the Program.

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-190</td>
<td>Program header.</td>
</tr>
<tr>
<td>200-300</td>
<td>Initialization and title screen.</td>
</tr>
<tr>
<td>310-560</td>
<td>Draw board routine.</td>
</tr>
<tr>
<td>570-670</td>
<td>Determine who is first.</td>
</tr>
<tr>
<td>680-750</td>
<td>Get player's input.</td>
</tr>
<tr>
<td>760-1530</td>
<td>Check movement from Bar.</td>
</tr>
<tr>
<td>1540-1770</td>
<td>Main logic to determine computer's moves.</td>
</tr>
<tr>
<td>1780-1940</td>
<td>Update computer's pip variables and move.</td>
</tr>
<tr>
<td>1980-2010</td>
<td>POKE inputs to screen.</td>
</tr>
<tr>
<td>2020-2080</td>
<td>Keyboard-input routines.</td>
</tr>
<tr>
<td>2090-2150</td>
<td>Move pieces.</td>
</tr>
<tr>
<td>2160-2190</td>
<td>Invalid-move message.</td>
</tr>
<tr>
<td>2190-2250</td>
<td>End of game options.</td>
</tr>
<tr>
<td>2260-2280</td>
<td>Computer's move control loop.</td>
</tr>
<tr>
<td>2290-2310</td>
<td>Can't-move routine.</td>
</tr>
</tbody>
</table>

Electronic Backgammon requires TI Extended BASIC.

### Electronic Backgammon (TI-99/4A) Explanation of the Program.

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-180</td>
<td>Program header.</td>
</tr>
<tr>
<td>190-290</td>
<td>Initialization and title screen.</td>
</tr>
<tr>
<td>300-340</td>
<td>Determine who is first.</td>
</tr>
<tr>
<td>350-390</td>
<td>Roll dice and branch.</td>
</tr>
<tr>
<td>400-460</td>
<td>Draw pieces on board.</td>
</tr>
<tr>
<td>460-520</td>
<td>Player's turn.</td>
</tr>
<tr>
<td>530-570</td>
<td>Is computer blocked?</td>
</tr>
<tr>
<td>580-680</td>
<td>Complete computer's choice.</td>
</tr>
<tr>
<td>690-780</td>
<td>Update computer's pip location.</td>
</tr>
<tr>
<td>790-840</td>
<td>End-of-game routine.</td>
</tr>
<tr>
<td>850-860</td>
<td>Make move.</td>
</tr>
<tr>
<td>870-880</td>
<td>End-of-game routine.</td>
</tr>
<tr>
<td>890-900</td>
<td>Make move.</td>
</tr>
<tr>
<td>910-940</td>
<td>Complete computer's choice.</td>
</tr>
<tr>
<td>950-1660</td>
<td>Update computer's pip location.</td>
</tr>
<tr>
<td>1670-1740</td>
<td>Time-delay subroutine.</td>
</tr>
<tr>
<td>1750-1770</td>
<td>Can't-move subroutine.</td>
</tr>
<tr>
<td>1780-1790</td>
<td>Inner-table-blocked subroutine.</td>
</tr>
</tbody>
</table>

Electronic Backgammon requires TI Extended BASIC.

MOVING?
Don't Miss Out On Any Issues Of
Home Computer Magazine

Send us a Change-of-Address Card (available at any Post Office) 6-8 weeks prior to the move. Be sure to include both the old & new address, plus the alphanumeric code above your name on the mailing label.

Home Computer Magazine P.O. Box 70288 Eugene, OR 97401

Please send this information to:

The TI version of Electronic Backgammon is written in Extended BASIC only. It uses only character graphics.
Worm your way into character graphics with this hypnotizing—but easy—BASIC routine.

The design team at Texas Instruments went to great pains to build a computer which is versatile, yet easy to use. The BASIC graphics commands are a case in point. They allow you to build graphics characters, and then place those characters anywhere on the screen. Each character can be placed repeatedly on the screen as many times as you wish. And when you change the graphics pattern for that character, its shape is automatically changed on the screen at each location where the character appears.

By placing characters in a fixed pattern throughout the screen, it is possible to play with their individual graphics patterns to create seemingly random, yet symmetrical, screen patterns. In this program, we have designed several characters with squiggly lines. When placed on the screen, they appear to resemble the inside of an old log which has been half-eaten by worms. Hence the title of our program: Worm Wood.

Painting With Characters
You could paint the screen with graphics characters in a number of ways. Perhaps the simplest is just to print them on the screen. This presents a problem, however. In Worm Wood, we need to print each line of characters slightly offset from the previous line. The print statement doesn’t really do the trick, for even if we place a semicolon after the last item printed, any item longer than the rest of the line will automatically print onto the next line. To avoid this, it is necessary to print one character at a time. We could have placed the characters on the screen with the CALL HCHAR statement, but this would have required an additional loop. Instead, we use just one loop to print 672 characters.

By changing the patterns of the characters on the screen, we can now make the entire screen change. This can often have a hypnotizing effect, as you can see with Worm Wood. Let’s take a look at the letter A, which appears on the screen quite a few times during this program, though you may not recognize it. This is because the shape of the character you know as A has been changed. Whenever A is placed on the screen, the new shape is used. Now for the best part: If you change the shape of A again, you will see every character A on the screen change to the new shape at the same time. Because of this effect, we are able to change large parts of the screen in a very short time.

After you have watched the screen wriggle around for awhile, press [ENTER] to advance to the next screen—which is just like the previous one except that the characters are placed at random, with no predetermined order. After each screen begins to change, you can press [ENTER] at any time to restart a new screen.

The TI-99/4A home computer is capable of taking you into a graphics wonderland. With only a few basic principles and a little imagination, you’ll be able to create your own dazzling displays. Experiment with the program below by changing the patterns used for the graphics characters. Discover the magic that is literally at your fingertips, and have fun.

For your key-in listing see HCM PROGRAM LISTINGS Contents.

<table>
<thead>
<tr>
<th>Line Nos.</th>
<th>Explanation of the Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-190</td>
<td>Program header.</td>
</tr>
<tr>
<td>200-240</td>
<td>Set up the WORM50 array which contains the graphics shapes.</td>
</tr>
<tr>
<td>250-270</td>
<td>Assign graphics patterns to characters.</td>
</tr>
<tr>
<td>280-340</td>
<td>Paint the first screen of graphics—symmetrical pattern.</td>
</tr>
<tr>
<td>350-400</td>
<td>Constantly change the shapes of the characters—scan keyboard to exit.</td>
</tr>
<tr>
<td>410-450</td>
<td>Paint second screen of characters—random patterns.</td>
</tr>
<tr>
<td>460-470</td>
<td>Graphics shape data.</td>
</tr>
</tbody>
</table>
Work a little magic with the keyboard as you try to free the Kors-Elfs from the evil Overlord by waking up the letters.

All to you, mighty hero of the Kors-Elfs! Only you can save us—and our fallen friends, the Letters—from the spell of the evil Overlord! Our fate is placed in your nimble fingers as you attempt to end the Overlord’s domination of our people.

Hordes of letters with glazed alphabet eyes suddenly advance single-file upon you. They’ve been drained of their will to spell because the evil Overlord has broken their syntactic order. As defender of the elven race, you must act quickly, or else the wicked prince of letter darkness will ex-spell all words—and eventually elfs—from the land of Kor.

You are the new leader of the Kor-Elfs (not Kors-Elves, this is before the modern plural of the word elf), a race of creatures in a fantasy land whose survival is threatened by the cruel Overlord of Kor. He rules this land from his castle with the aid of a mystic sword. With this sword, the Overlord has hypnotized and enslaved the long-time friends of the Kors-Elfs, the Letters, and now uses them as guards in his castle. His dispatchers stand ready to release the Letters to attack anyone who invades the castle.

Break the Spell

You have only one weapon—a spell you learned from another race of small, blue creatures (to remain unnamed) many years ago. This spell will awaken the Letters and send them to another world from which you can bring them back once your mission is accomplished. As you might have guessed by now, that mission entails entering the castle, fighting the Letters all the way, in order to steal the mystic sword. Once the sword is stolen, you can use its powers to defeat the Overlord, thereby freeing the Letters and saving your people.

You can stop this character assault if you can type, even if you’re a “hunt-n-peck” keyboard whiz. When you correctly type the randomly-displayed Letters that march two-by-two across the screen toward you, you can accomplish your worthy task—awaken the letters from their trance and gain entrance to the inner chamber where the mystic sword is hidden. You, the Kors-Elf, advance from the right side of the screen; and the letters (coming in pairs) advance from the left side. As you get closer to the entrance of the castle, the letters have less distance to travel—which makes it more difficult to type them before they make contact with you. But beware: if you are not fast enough at typing the right letter before it touches you, it will zap you, and you will have to start all over again.

An Eight-Fingered Success Story

Kors-Elf is not just an adventure game; it is a true test of your keyboard mastery—an exciting typing tutor for young children and on the upper levels, a challenging keyboard drill for the experienced typist. There are three levels of difficulty: beginner, intermediate, and expert. On the beginner level, you have five chances to get past the letter guards and find the sword. The two upper levels allow you only three tries, and each one requires considerably more typing speed: the letters are cast upon the walkway more quickly, and typing them to squelch them is more difficult. Once you successfully get past the letter guards and steal the sword, you are given the option to continue on at the same level, or begin again and change the level of difficulty.

For your key-in listing see HCM PROGRAM LISTINGS Contents.

The Apple version uses a shape table to define the letters with the DRAW and XDRAW commands. The shape table numbers correspond to all the letters in the alphabet—A is 1, B is 2, etc. The ASCII of the keyboard code is translated into the number of the shape of the letter you enter by subtracting 64 from it. The XDRAW command is used to move the letters and the elf. To determine whether the elf and the letters are touching, the values of the variables (which determine the position of the elf and the letters) are compared. If they are the same, the elf is sent back; if not, he advances.
“Kors-Elf is not just an adventure game, it is a true test of your keyboard mastery—an exciting typing tutor for young children and on the upper levels, a challenging keyboard drill for the experienced typist.”

In the Commodore version of Kors-Elf, the letters are placed on the screen with character graphics, and the elf is a sprite. The C-64 uses coincidence checking to determine whether the elf is touched by one of the advancing letters. This is done by checking the sprite-to-foreground collision register at memory location 53279 inline 370. If a blank is the only character in contact with the elf, the coincidence flag is not set and the elf continues advancing on the castle. But if the elf comes in contact with one of the letters, he is sent back to the beginning and the number of tries is incremented by 1. When the number of tries completed equals the number of tries for that level, then the game is over.

The IBM version of Kors-Elf uses three variables to keep track of the position of the elf and the letters. The variables refer to the screen location of the elf and the two letters that are attacking it. The program compares the location of the elf with the location of the letters to determine whether they are touching. It also checks the letter that you key-in to free the “zombied” letter. A 16-key buffer is cleared after each key press.

The TI version is written in BASIC and character graphics are used for the elf and the advancing letters. Each character used for the letters and the elf is a variable which is checked to determine whether the letter is touching the elf (both variables are the same). If they are, the elf is sent back; if they are not the same, the elf continues on his quest. Because of this, the motion of the letters and the elf will be a little jerky, but the action is still fun. Because there is no keyboard buffer, you have to hold down the key for the character that you want to wake up until you hear a beep. This will tend to make the program respond more slowly.
Personal Loan Calculator

in BASIC for the TI-99/4A

by H. W. Button
and the HCM Staff

Personal Loan Calculator originally appeared in Vol. 4, No. 5 for Apple, Commodore 64, IBM PC and PCjr, and TI-99/4A (Extended BASIC) systems. Here we present a BASIC version for 99/4A computer users with "bare bones" or minimal systems. This is a handy companion program to the Savings program published for the TI-99/4A in Vol. 2, No. 6. The two programs together form a comprehensive software package for everyday personal financial decisions. For additional information, please refer to these previous issues.

To the uninitiated, borrowing money can be an intimidating experience. But if you know how much you can afford to borrow by computing the amount and frequency of your payments—toward both the principal and interest—you can feel more confident when taking the loan plunge. And you can compute the relevant figures with our Loan Calculator program.

The main menu of the Loan Calculator contains 5 options, which may be selected in any order. They are:

1. Payment amount
2. Number of payments
3. Loan amount
   (How much you can afford to borrow.)
4. Amortization Schedule
5. Exit the program

Two questions are initially asked of you in options 1, 2, or 3: the first inquires whether your payments will be made monthly or annually, and the second asks whether the length of the loan period is expressed in months or years. Input from options 1 and 2 will help determine how often interest is compounded. According to the amount of principal still owed on a loan and the way the interest is compounded, the amount of interest due for each payment will change.

Option 1 also asks for your:

Interest rate?
Months (years) of loan?
Amount of Loan?

Option 2 requests your:

Interest rate?
Monthly (annual) payment?
Amount of loan?

Here the program will test to make sure that the payment amount you indicated in option 2 is higher than the interest generated during each payment period. If it is not, you will receive an error message and be returned to the main menu.

Answering any of the questions in option 3 will generate a report consisting of the following information—the data that you have already entered, and the data you wish to know:

Interest rate
Compounded (monthly or annually)

Loan Amount
Payment Amount
Number of payments
Term of the loan
Total interest
Total cost (principal + interest)

Option 4. Amortization Schedule, provides your monthly and final payment amounts and your payment schedule after you enter data for the following:

Loan amount?
Number of monthly payments?
Interest rate?

You will be prompted to enter the starting and ending payments that you want included in the report, which will display:

Payment #
Interest for this payment
Principal for this payment
Loan balance for this payment

When you finish scrolling through the report, the program will return you to the main menu. Pressing (ENTER) when you finish any of the main options will also return you to the main menu.

This Loan Calculator program is a handy, flexible tool for anyone who is either considering or already paying off a loan. If you are in one of these positions, this program is "just what the banker ordered."

For your key-in listings see HCM PROGRAM LISTINGS Contents.

Loan Calculator (TI-99/4A BASIC)
Explanation of the Program

Line Nos.
100-190 Program headers.
200-330 Initialize program and display title screen.
340-440 Input term and expression of loan payments.
450-760 Solve for the amount of the payment.
770-1090 Solve for how much you can borrow.
1100-1600 Solve for number of payments.
1610-1700 Calculate and display report screen.
1710 Halt program.
1720-2160 Routine to calculate and display amortization schedule.
**HCM Review Criteria**

Each month, *Home Computer Magazine* (HCM) reviews products designed for the Apple II Family, Commodore 64 and VIC-20, IBM PC and PCjr, and Texas Instruments 99/4A computers. *HCM* reviews take a detailed look at the quality, utility, and value of commercially available packages for these machines. Because our publishing charter forbids accepting outside advertising, we strive to make the scope and content of our review pages shine with a unique blend of humanistic frankness and objectivity.

Not only will you find all relevant information for making a wise purchase decision, but in some special cases we also provide nuggets of compu-prestidigitation. For example, we frequently include essential documentation not furnished by the manufacturer. Additionally, each issue of *HCM* tries to review at least one outstanding product—a "Diamond in the Rough"—which, because of company size, marketing clout, or for some other reason, has not received the attention it deserves.

At the beginning of each review, a review-at-a-glance box provides the user with an instant assessment of the product. Each item will be evaluated, where relevant, with the criteria below.

### HCM Review

**Name:** Old Art  
**Program Type:** Recycled Graphics  
**Machine:** Apple II Family, C-64 & VIC-20, IBM PC & PCjr, TI-99/4A  
**Distributor:** Hit 'n' RUN Software, Inc.  
**Price:** $99.99 (or trade for 72 Pinto)  
**System Requirements:** Disk Drive, Joystick, Trash Can optional

<table>
<thead>
<tr>
<th>Performance</th>
<th>Engrossment</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Fair</td>
<td>Good</td>
</tr>
</tbody>
</table>

### Flexibility—
Can the product be adapted to the specific needs of the users?

### Originality—
Is it unique in concept, or simply a "me too" product?

### Longevity—
The "Boredom Factor." Does the program sustain interest?

### Rewards—
Are the audio-visual rewards motivating and appropriate?

### Concept Presentation—
Are the concepts presented clearly, logically, and in depth?

### Special Effects—
How does quality of sound and visual effects rate? Do they enhance or detract from the product or learning process?

### Ease of Use—
The degree to which a user can interact with the product without outside help: the ease and effectiveness of error-handling features; whether the actual reading level of the activity is appropriate for the suggested audience.

### Ease of Set-up—
How well the product design facilitates easy installation.

### Documentation—
The quality of the printed matter that comes with the product, whether the instructions are clear and comprehensive, whether the machine configuration requirements are spelled out. Information such as how to load a program, use the keyboard, and restart an activity contributes to the documentation rating, as do tips on performance peculiarities.

### Attention Software Authors & Peripheral Inventors:
**WANT TO BE DISCOVERED?**

Home Computer Magazine Wants To Give You A Chance!

We are looking for home computer products that have not received the attention they deserve. Each month, we will be singling out one such package for special review. If you have a unique commercial product of exceptional quality—but your advertising and promotion budget has not allowed you to capture major media attention—we want to see it. We will consider reviewing any product that meets our high standards.

We are an Equal Opportunity Reviewer!

In order to qualify for possible review, your product must:

1. Currently be available for purchase to readers of this magazine.
2. Make a unique and important contribution to the home computer industry.
3. Be of outstanding merit, quality, and value.
4. Be consistent with the type of machines and products we normally cover.

If you feel that your product qualifies, mail it to:  
Home Computer Magazine  
Attn: Editorial Submissions  
1500 Valley River Drive, Suite 250  
Eugene, OR 97401

We reserve the right not to reply to each inquiry, so please do not contact us except to request return of your product. If you want your product to be returned, please include sufficient return postage.

*Compu-prestidigitation (kəm*pü*prəst'ı*tehn*ē*jeht*ē*shən*)—n 1. The magical quality of unexpected comprehension that results from presenting technical information about computers in a lively, entertaining, visually attractive and easy-to-understand format. 2. The magical tricks that make a computer sing, dance, and do all sorts of wonderfully useful things.
Explore the world of electricity and machines.
Program your own robots, and even design your own microworlds and games with these two trend-setting programs.

Each of us exists in a world that is different from the world of the person standing next to us in line at the grocery store—or wherever we may be at a given moment in time. Yet, at the same time, our individual worlds also conform to a larger, more common world. Once you grasp this concept, then you also realize that there are worlds within worlds within worlds. A drop of water in a pond is a tiny microcosm boiling with frantic life. A yard square section of desert is a unique world separate from its counterpart in the rain forests of New Guinea. Each world has a logical and unyielding structure by which the creatures living in them must follow in order to exist. If you are born into this world, you either arrive preprogrammed by nature to survive, or you have a support system—a family that protects you and teaches you until you can function on your own.

This concept of worlds within worlds applies nicely to the microworlds you enter with The Learning Company's two educational games, Rocky's Boots and Robot Odyssey I.

Microworlds
Your guide to these magical worlds is the cursor—it has the fantastic ability to become several different things. It is how you travel around inside the tutorials, discover Rocky's machines, check out the Innovation Lab, and finally, enter Robotropolis. With it you can explore the wondrous inner workings of machines and robots while learning about all of their different gadgets and gizmos. The cursor can also become many other things, as you will see in the tutorials.

In Rocky's Boots, you must learn the basics of machine design. The game has 6 sections: 4 of these are tutorials explaining the basics of circuitry, how electricity works, and how logic gates function. The other 2 have to do with the games Rocky's Boots and Rocky's Challenge. In this program you must build a machine with the parts supplied on the screen—one that directs a "boot" to kick specific objects as detected by sensors.

Rocky's Boots begins by teaching you how to move in this new world. You are the cursor, a white square which you can move, left, right, up, or down. You travel through a series of rooms, pausing to read instructions and practice the new skills you are learning.

The first tutorial shows you how to construct simple machines using parts supplied on screen. Here you will learn about inputs and outputs, and how to connect them. In both games, the flow of electricity is easily observed because the wires connecting the circuits to the machines glow orange when on, and white when off. Both games require a color monitor.

Logic Gates
In the second tutorial, you are shown the differences between an AND gate, a NOT gate, and an OR gate. These logic gates, which act just like the circuits in your computer, help you control the electricity flow to the machines. A secret room in the logic gates tutorial conceals an alligator. This alligator will attack your cursor as you try to build your machine. Fortunately, you can hook up an alligator sensor to a boxing glove and use it to punch out the alligator—effectively keeping it at bay while you obtain the parts you need.

You are now ready for Rocky's Boots. This part of the package is actually the third tutorial. Here you can put everything you have learned into the actual building of a machine that will complete a specific task. The task you must complete here is to design a machine that uses Rocky's boot (literally a blue boot) that can be connected to "kick" specific objects that pass in front of a sensor. The objective of this tutorial is to teach you how the machine in Rocky's Boots operates, and to give you practice-time building machines. If you successfully kick out all of the objects and score 24 points, Rocky comes out and does a little dance for you.

The final tutorial is on flip-flops, clocks, and delays—all devices that you will need in order to solve some of the more complicated problems in the final section of the game, Rocky's Challenge. Here you put all the new information that you have learned to the test. There are 32 games for you to play, and you even have the option to create your own game based on the above format.

Rocky's Boots was created for ages 9 and up—but I don't think that it would keep a teenager interested very long. It's true that some of the 32 games are
Robot Construction

Robot Odyssey I is an extension of the principles taught in Rocky's Boots. The same elements are used (flip-flops, gates, inputs and outputs) along with several new ones, but they are used on much more complicated and interesting machines—robots. Your job is not only to figure out how to make them operate, but you will also have to program them to work in such a manner as to retrieve objects, avoid dangers, and even ride the subway!

Robot Odyssey I teaches you how to design and program robots to perform specific tasks that will let you escape from the underground city of Robotropolis. In doing so, you learn some of the basic fundamentals of engineering, digital logic, and circuit design. You also learn some useful problem-solving skills, such as breaking one large task into smaller individual tasks, or visualizing a solution to a problem and then generating a hypothesis and testing it to see if it works.

Within this world there is really two worlds: Robotropolis, and a place called Innovation Lab—a place where you can design, program, and test your own robots. In addition, there are three tutorials that teach you the basics of how these robots work.

"Your guide to these magical worlds is the cursor—it has the fantastic ability to become several different things."

Basically, each robot consists of a little cube (kind of like a small dirigible) carrying special internal sensors or other tools which, when the sensors are stimulated, will activate tools or thrusters according to the design of the robot's circuits. Sensors are of several types, and can detect objects on contact, in the same room, or in other special situations. A robot's tools include a mechanical arm that can be used to grip objects, an antenna for communicating with other robots, and a periscope-like device that lets you see where the robot is going while you are riding inside of it. You can wire the circuits in any configuration that you like in order to make the robot move in the direction you wish or react appropriately to certain stimuli.

Robotropolis, like the rooms in the lab and the tutorials, is a labyrinth through which you must maneuver using a cursor or a robot. For example, when a robot's contact sensor—which is wired to a thruster—touches a wall, it sends electricity to the thruster, causing the robot to move. The trick is to wire the thrusters to the sensors in such a way as to cause the robot to move in the direction that you want.

Back to School

Odyssey's three tutorials take you step-by-step through the inner workings of robots, and they do it in a unique fashion. As the cursor, you are able to lock onto a robot or a part of a robot and carry it around with you. Or, you can take your cursor inside a robot and actually manipulate the parts that make it go. (You can even take robots inside other robots!)

The first tutorial is called Robot Anatomy. Here you are taught how robots behave, what makes them react in certain ways, and how to change their behavior. Outwardly, each robot is essentially the same as the next. But inwardly, you can design the robot to do different things like pick up objects, maneuver through mazes, or even dance with a partner. Through this process of discovering how robots work, you will be laying the foundation for future explorations in Robotropolis. What you learn here in Robot Anatomy, and in other tutorials as well, is crucial to your success in Robotropolis.

The second tutorial is called Toolkit. As I mentioned earlier, the cursor can be changed into the toolkit when needed for quick programming changes or experimentation in the Innovation Lab. In this tutorial, you learn about simple circuits, gates, flip-flops, and
Building a Machine

This series of screen photos from Rocky's Boot's shows the step-by-step construction of a machine designed to kick out non-green triangles.

The basic machine in Rocky's Boots before modification.

Adding a NOT gate which prevents the sensor from indicating a green triangle.

Adding an AND gate which allows the machine to detect non-green triangles.

Adding two wires completes the circuit connecting the sensors.

Attaching Rocky's Boot finishes the machine. It is now ready to play the game.

nodes, and about how they affect the performance of a robot. The toolkit actually carries around with it a complete set of circuits, logic gates, nodes, flip-flops, and other equipment necessary for robot programming. This makes it possible to do reprogramming in the field.

The final tutorial is called Chip Design. Here you can learn how to wire-up chips to perform different tasks that help you find your way through Robotropolis. It will take a little experimentation before you will figure out this section, but it will be useful to know before you go to town—wiring together all the doodads and gizmos inside the robot can get pretty confusing. You can make things a lot easier if you pre-program a chip to instruct the robot to do the same thing. This tutorial will teach you how to design a chip to make a robot perform a specific task. As chips are much smaller than robots, you will be working with an enlarged chip, actually going inside of one with the cursor, bringing with you the circuits, gates, and other items necessary to complete the job.

"These games emphasize thinking for yourself—reasoning out and understanding a problem before you tackle it."

If you've tried all of the tutorials, you are now ready to investigate Innovation Lab. This is a complete world all its own. Inside it, you can practice designing and programming robots and polish your skills before attempting to find your way out of Robotropolis. A chip facility is also located here and when you get a chip programmed the way you want it, you can take it to the burner room (a special room where your large prototype chip is transferred to a smaller chip) where a copy can be made which you can save to a separate disk and use later in Robotropolis.

City Sewer

Robotropolis is a separate world from the tutorials and the lab. It is a real "microworld" with its own logic and set of rules which—in order to succeed or even survive—you must discover and follow. You begin your journey after dreaming (or were you awake?) that you fell out of bed and landed in Robotropolis' city sewer. From here, you must negotiate 5 levels of the city and avoid ampere 'bots, ride the subway, find your way through the town maze, free the master robot, and ride a giant disk drive (among other things) in order to escape. The only way you can do all this is to use robots to help. Three robots are in the sewer, and you can use them to help you find your way out. Each one is programmed to do different tasks, but they won't be able to help you escape unless you reprogram them as you find new dangers to avoid. Sounds pretty complicated doesn't it? Well it can get to be a real head-scratcher before you finally get out—if you ever do...

What is notable about Rocky's Boots and Robot Odyssey 1 is the way they use tutorials to build up your skills before you travel into Robotropolis or play Rocky's Challenge. In these worlds, you must find out what the rules are before you can play the game. Fortunately, the tutorials are interesting and grow in difficulty as you progress through them. Both programs require the persons playing them to follow a structured path in order to gain the skills needed to successfully complete the game. In doing this, they learn deductive reasoning, how to plan out a problem beforehand.
and how to debug their solutions. Some of the more complicated games require extensive wiring, and even the best plans may not work the first time through.

**Problem-Solving Skills**

These games emphasize thinking for yourself—reasoning out and understanding a problem before you tackle it. Lots of puzzles wait to be solved in Robotropolis and most of them come with no explanation, leaving it up to you to figure out the best way to handle them. The tutorials teach you the skills you need to solve these puzzles, but they don't show you how. This can become quite frustrating until you actually do figure out the solution. This technique of giving you problems to solve with little if any explanation is an important part of *Robot Odyssey I* (I didn't run into this very often while playing *Rocky's Boots*). To add to the mystery, there are several little creatures that you will notice as you travel through Robotropolis that don't seem to have any function at all, except to bounce up and down or flutter about as you travel past them.

Response to either the keyboard or a joystick is excellent in both games. You have total control of cursor movement with no delays or problems. The machines and robots respond particularly well to your programmed input. And, as you get more skilled at designing circuits for the machines and robots, you can make them as complex as possible.

*Rocky's Boots* and *Robot Odyssey I* are available for the Apple II family of computers including the Apple IIc. *Rocky's Boots* is also available for the IBM PC and PCjr with no appreciable difference between versions.

Both programs come with good documentation which gives you a general understanding of how each part of the program works. In both cases, the tutorials take up the bulk of teaching you about the microworlds you will be traveling through and how to handle various problems you will be facing. However, in *Robot Odyssey I*, there are several things that aren't explained in the manual and that I didn't have time to investigate thoroughly. Believe me, it could take months to travel through the entire city of Robotropolis.

In general, my reaction to these packages is very positive. *Rocky's Boots* is a good starter package that may be useful in preparing younger children for the more sophisticated *Robot Odyssey I*, but it is fairly limited in complexity—and if your child is quick to learn, he or she will probably become bored with it relatively soon. *Robot Odyssey I* is simple enough in the beginning for younger children (even smart 9 year olds), but it can become as complicated as you want it to be. The beauty of both of these programs is that you are allowed to progress at your own pace. If you don’t understand something, you can always go back and review it. Even while deep inside Robotropolis you can save the game on disk and return to the Innovation Lab or the tutorials.

I find it very encouraging to see educational games like these that stress basic learning skills and that are presented in non-violent and positive learning situations. *Rocky's Boots* and *Robot Odyssey I* are both excellent examples of educational games parents can purchase with confidence, knowing that their children will indeed learn useful skills and be entertained at the same time. The worlds they explore here are limited only by a child's imagination and experiences, both of which will grow and benefit from interacting with these games.
Want to date your ProDOS files, but don't have a calendar/clock card?
Enter the Apple Dating Game with this BASIC utility.

When I received ProDOS in a bundle with the Apple IIc, I found little information describing its advantages over DOS 3.3. It was quite a while before I discovered some of the most useful features of ProDOS. For instance, the Date function which dates files as they are modified is just what we in the business world are looking for.

As an architect, I had bought the IIc mainly because of its trim appearance. I couldn't believe that I really needed clock hardware in order to date a file, and the thought of yet another peripheral besides the power supply offended my desire for a tidy workplace. So I wrote this BASIC utility that sets the ProDOS date. If you have a clock/calendar card, this utility will not reset the time; you need to use the software included with your own card. However, if you don't want to buy a clock/calendar card, but still want to be able to set the date for ProDOS, this program is all you need.

It Wasn't Provided—So I Wrote It

When I realized that none of the programs on my UTILITIES disk that came with the Apple IIc accessed the Date function, I decided to write my own BASIC utility. The location and configuration of the date is contained in two bytes of the ProDOS global variable page: $BF90 and $BF91. To conserve memory, the Apple engineers divided these two bytes into three groups of 7, 4, and 5 bits, holding the year, month, and day respectively. I could see that setting the date would require some decimal-to-binary conversion. Undaunted, I went ahead and found that I could even make it friendly to an inexperienced user.

From Keyboard Input to POKE Values

The input routine is compact and has enough error checking to keep totally-bogus dates from being entered. After you type in two-digit numbers for each month, day, and year, you're given the opportunity to accept or reject what has been typed by entering either a Y or an N. If you do make an error, just type in any date and press N to try again.

Once the program places the date in the variables MNTH, DAY, and YR, the actual number-crunching begins. Lines 420-460 divide the decimal month by decreasing decimal powers of 2. A FOR-NEXT loop stores the results of each division in the integer array MNTH%(). Lines 470-490 begin to manipulate the day and part of the month into a “byte” size piece. Lines 500-530 convert the decimal year to binary in the array YEAR%(), using the same kind of backstepping FOR-NEXT loop that you used in lines 420-460.

Key in the program as shown in the listing, and save it on a disk by typing SAVE SET.DATE. Type RUN and you will get the date-entry template on the screen. Enter six numerals corresponding to the month, day, and year without any slashes or dashes, because these are supplied by the program.

If you set the date with this program and then open a new file, the system date will appear in both the DATE MODIFIED and DATE CREATED columns when you use the CATALOG command. If you write to an existing file, the DATE MODIFIED column will contain the system date at the time the file was changed.

For your key-in listing see HCM PROGRAM LISTINGS Contents.
A Dash Of History

Amateur radio operators have been around since Marconi discovered the wireless. As radio grew, hundreds of private citizens began experimenting with sending messages. These early amateur radio operators (affectionately referred to as hams) first started sending messages locally, but as they experimented, they were soon able to send and receive messages at greater distances. At first, operators had to relay messages in order to send them over large distances because the range of the early short-wave radios was limited.

By 1914, when a man named Hiram Maxim founded the American Radio Relay League (ARRL), amateur radio had grown into a popular hobby. The purpose of the ARRL was to unify and organize amateur radio operators and regulate the distribution of the airwaves. But, in 1917, the United States went to war. Most of the amateur radio operators served in the armed forces, and the ones that didn't were out of luck because the government soon banned amateur radio on the airways.

When World War I ended, the ban on amateur radio continued until the ARRL convinced the government to drop it in 1919. After the war, the ranks of the amateurs swelled, and the distances that messages were transmitted increased. By 1924, amateur radio operators were sending and receiving messages across the Atlantic and around the world. Ham radio operators even have their own satellite—OSCAR for “Orbital Satellite Carrying Amateur Radio.”

There are now more than 250,000 amateur radio operators in the United States, and many more around the world. These hobbyists perform valuable services in times of disaster or national emergency, working hand in hand with the authorities to keep vital communication lines open.

Although computer hobbyists didn’t really increase to significant numbers until about ten years ago, private use of two-way radio communications has been around since before 1914, when the American Radio Relay League was first formed by Hiram Maxim. Radio hobbyists, as some of you may know, are called amateur radio operators (or hams) and must be licensed by the Federal Communications Commission to transmit in this country, and by other government agencies to transmit in foreign countries. To obtain an amateur radio license, each one has had to pass exhaustive technical tests, and demonstrate proficiency in Morse code. Currently, there are just under a million amateur radio operators world-wide.

"With this new equipment connecting the computer to the amateur radio station, the old brass Morse code key is truly obsolete!"

The Old and the New

Modern electronic technology in the United States and elsewhere has been boosted over the years by these amateur tinkerers. Ham radio enthusiasts, like computer hackers, are always fiddling with their equipment, trying new things—inventing, innovating and patching new gadgets into their systems.

An interesting combination of these two stable forms of electronic technology is now taking place. This new combination (home computers and amateur radio) is opening the doors to a new frontier—that of instantaneous, world-wide, low-cost computer networking. This union is made possible by a radio transceiver-to-computer terminal which, with appropriate software, allows you to turn your CW station into a completely “CW/RTTY/ASCII” station.

Continued

© Home Computer Magazine Volume 5, No. 1 43
Low-Cost Data Transmission

Error-free transmission of computer-generated signals is another unique area in the computer/ham connection. While experimenting with their computers, amateur radio operators have devised various methods of transmitting information during poor broadcasting conditions so that an error-free message is received on the other end. Obviously this is important if you are trying to send someone a computer program. (Have you ever tried to run a program that had a crucial comma out of place?) One of these methods of transmission is entitled AMTOR (Amateur Teleprinting Over Radio), which is a microprocessor-controlled, error-correcting data communications protocol. Another method is packet radio, where data is transmitted using ASCII or baudot codes on a point-to-point basis, similar to a telephone modem. The transmission is broken into pieces called packets, which are checked for errors by the computer.

If you want to experiment with ham data transmission, there is one possibility we have not yet mentioned: phone patching. Those of you who already “network” over the telephone lines probably pay the price in higher phone bills. But a connection can be made from your computer over a modem to a ham transceiver with just a local call. Then, whatever you send to this local ham can be transmitted to a distant ham station and — through another phone patch — relayed to another computer in your network, thus saving you a long distance phone call.

Electronic Mail

Imagine, if you will, sitting down at your “rig,” typing in a letter on your computer, giving a couple of commands, and in a few moments receiving acknowledgement of your letter’s receipt from the other side of the world. What we are imagining is not yet taking place on a minute-to-minute basis — perhaps at this time only once or twice a week. But messages are flying around in text form in the airwaves over shorter distances — say across the United States — many hundreds of times per day. So, you might ask, what is the application to me? With just one willing ham operator, your club now becomes a node in this potential network of clubs across the country — even the world. With preset operation of your club’s computer radio station you will be able to communicate and pass messages, club newsletters, or programs that are in the public domain, all for just the cost of the amateur radio operator’s time, the electrical power, and the initial cost of some special hardware and software to link the computer to the amateur radio transmitter/receiver. Just as with “land line” communication networks, your computer can be left on in the receive mode while you are away, and as other computer/radio systems transmit to your station, it will receive and record automatically.

To help get you started in your own club, or if you are an amateur radio operator and a computer hobbyist, we have included a chart that shows a few of the hardware “computer link” packages available for all of the computers that we cover in *Home Computer Magazine* — along with a summary of their capabilities and the costs involved. Bear in mind, of course, that the cost of the radio equipment is not included in this chart. Also be aware that before this equipment can be used to transmit information on the air, either you, a member of your club, or a willing friend must be an amateur operator duly licensed by the Federal Communications Commission (in the United States). Please note that a license is not required to receive information from amateur radio airwaves. This means anyone can buy a shortwave receiver that covers the proper frequencies, one of the interfaces to the computer, and the supporting software and receive text right out of the air — without a modem, without a telephone.

What kind of text, you ask? How about the Reuter’s News Service; or perhaps you’d like to receive the news coming out of Iran in print form. Radio Iran sends out radio teletype signals with their news, as does Great Britain, Russia, and many other foreign countries (wire services in the United States, such as the Associated Press, encode their signals because they charge their customers for receipt; therefore, amateur stations are not able to pick up the text and unscramble it).

The ARRL sends a news bulletin over the airwaves 3 times a day, Monday through Friday, reporting on FCC actions, ham-fests, satellite positions, and other information of general interest to amateur radio operators.

We feel this area of computer/amateur radio has a great deal of potential. Let’s hear from those out there who have experience in this field. Send in some letters to the editor that we can share with the rest of our readers — or send us a review of one of these products for possible publication.
A Partial List of the Available Hardware and Software Computer Links for your Amateur Radio

Advanced Electronic Applications
P.O. Box C-2160
Lynnwood, WA. 98036
(206) 775-7737

IBM/Computer Patch Interface
Requires RS232-2 option for CP-1, cost $39.95. Requires RS232 cable to IBM serial port.
Hardware needed: The Advanced Electronics Applications model CP-1 computer interface priced at $239.95.
Software needed: CP-1/IBM-PC by Hamcom, cost $59.95.
Capabilities: Send/receive Morse code from any speed up to 100 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 or any other baud rate allowed by PC-DOS.

Apple/Computer Patch Interface
Hardware needed: The Advanced Electronics Applications model CP-1 priced at $239.95.
Software needed: CP-1/Apple-1, cost $39.95.
Capabilities: Send/receive Morse code at variable words per minute; send/receive radio teletype at variable words per minute; send/receive ASCII at 110 and 300 baud.

VIC-20/Computer Patch Interface
Hardware needed: The Advanced Electronics Applications model CP-1 priced at $239.95.
Software needed: MBA-TOR/20, cost $119.95.
Capabilities: Send/receive Morse code up to 99 words per minute; send/receive radio teletype from 60-100 words per minute; send/receive AMTOR (Amateur Teleprinting Over Radio).

C-64/Micropatch MAP-64
Hardware needed: The Advanced Electronics Applications model CP-1 priced at $239.95.
Capabilities: Send/receive Morse code up to 99 words per minute; send/receive radio teletype from 60-100 words per minute; send/receive AMTOR (Amateur Teleprinting Over Radio).

C-64/Micropatch MAP-64
Hardware needed: The Advanced Electronics Applications model CP-1 priced at $239.95.
Capabilities: Send/receive Morse code up to 99 words per minute; send/receive radio teletype from 60-100 words per minute; send/receive AMTOR (Amateur Teleprinting Over Radio).

C-64 Kantronics
1202 E. 23rd st.
Lawrence, Kansas 66044
(913) 842-7745

TI/Kantronics
Hardware needed: The Kantronics interface priced at $269.95.
Software needed: The Hamsoft for the TI-99 from Kantronics priced at $99.95.
Capabilities: Send/receive Morse code, 5-99 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 baud; parallel printer interface accessible from TI BASIC.

C-64/Apple
Hardware needed: The Apple C-64 priced at $119.95.
Software needed: Hamsoft for the Apple C-64, priced at $89.95.
Capabilities: Send/receive Morse code, 5-99 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 baud; VIC serial printer compatibility.

C-64/Apple
Hardware needed: The Apple C-64 priced at $119.95.
Software needed: Hamsoft for the Apple C-64, priced at $89.95.
Capabilities: Send/receive Morse code, 5-99 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 baud; VIC serial printer compatibility.

VIC-20/Apple
Hardware needed: The Palomar VIC-20 priced at $139.95.
Software needed: Hamsoft for the Apple VIC-20 priced at $49.95.
Capabilities: Send/receive Morse code, 5-99 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 baud; parallel printer support.

VIC-20/Apple
Hardware needed: The Palomar VIC-20 priced at $139.95.
Software needed: Hamsoft for the Apple VIC-20 priced at $49.95.
Capabilities: Send/receive Morse code, 5-99 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 baud; parallel printer support.

Apple/Palomar
Hardware needed: The Palomar Apple (disk) priced at $29.95.
Capabilities: Send/receive Morse code, 5-99 words per minute; send/receive radio teletype, 60-100 words per minute; send/receive ASCII, 110-300 baud; support for parallel printer.
Psychiatrists and masseurs beware—these two stress-reducing programs are moving in on your tension-untightening turf.

Sitting cross-legged with intense concentration, you strive to take control of your body's reactions to the pressures of everyday life. One by one, the muscles in your shoulders, neck, and head relax as you become peaceful and calm. The headache that no amount of aspirin could dispel is now magically gone, thanks to ... yoga? TM? No, it's biofeedback—the self-help aid of the '80's souped-up with home computer technology.

Much of the media attention recently given to the importance stress factors play in a person's life—such as job pressures, physical and lifestyle changes, interpersonal relationships, etc.—is now shifting toward stress management. At the same time, biofeedback training as a way of coping with stress has undergone a shift from the halls of medicine and academia to the home. According to some, the home computer can now handle the stress measurement and reduction functions that doctors together with large, complicated machines once performed. The Relax and Calmpute stress-reduction programs demonstrate two very different methods of home-brewed biofeedback. The question is, do they work?

**An Electromyograph**

Relax employs an electromyograph as its "stress-measuring" device. Three small metal sensors imbedded in a headband press against your forehead and measure the amount of electrical discharge in the skeletal muscle fibers. When facial muscles contract, they produce electrical activity that the sensors pick up and transmit to the EMG unit, which then translates this information for the computer. Like Calmpute, Relax's objective is to make you aware of your physiological expressions of stress and teach you how to recognize and control them.

Relax offers three options in its program for achieving this goal, and numerous others in its comprehensive guidebook. The first program option, the Relax Graph, displays a needle-like trace on a graph numbered from 350 to 500 units along the left side. This is the upper portion of a scale that measures relative muscle tension and relaxation. The number of electrical discharge readings taken off the headband per second determine how many interval marks are created along the top and bottom of the graph. Sample rates range from .25 to 60 readings per second—the lower the rate, the longer the period of time your tension level is measured for each sample.

Continued observance of the immediate effects that your tension level has on the needle is supposed to increase your awareness of body tension, which then makes it possible to concentrate on relaxing and lowering the needle on the scale. This scale is the only quantitative way offered here to measure how much you can relax during a session with the program.

The Sensoral Kaleidoscope is a series of symmetrical patterns that slowly change colors, merge, and separate according to your tension level. As you become relaxed, the bright patterns slowly turn more muted, and the patterns generate closer to each other and to the center of the screen, continuing to calm you. The gently pulsating designs are entrancing to the point of being hypnotic, and offer a pleasant alternative to the coldness of the graph.

The Balloon Game is the third option, and it is a test of your newly-acquired relaxation control. You must control the flight of a hot-air balloon solely through the headband and your tension level—no joysticks or keyboards allowed. By moving the balloon up and down across the screen, you can avoid the arrows that will pop your balloon, and catch bubbles for extra points. However, I found that the best way to control the balloon is to wiggle your eyebrows up and down. You can choose varying skill levels, as well as whether you would like the game to be
determined by the number of hits or misses. The novelty of using the headband as a game peripheral in this way clearly adds to the challenge and enjoyment of the game, and the headband concept presents many exciting possibilities for future applications.

An Introductory Guided Relaxation Exercise on an audio cassette tape accompanies the package, and in fact, is one of the best, most effective parts of the package—it brought me to the threshold of sleep. It is meant to accompany the Relax Graph and features a soothing monotone male voice that provides suggestions for relaxing while calming sounds can be heard in the background—such as the rolling waves of the ocean or soft music.

**Galvanic Skin Response**

The **Calmpute** hardware measures Galvanic Skin Resistance (GSR)—the conductivity or electrical resistance of the skin, and the opening and closing of its pores, both of which are controlled by the sympathetic nervous system. The Calmpute Biosensor that you hold in your hand sends a minute, electrical current through the skin. Increases in tension produce increases in current flow, which is then interpreted and displayed by the computer.

The main menu offers 8 options, including Instructions and an Introduction to Biofeedback, which simply repeat information stated in the manual. The Calm-Scope option is the equivalent of the Relax Graph, charting your tension level with a graph and needle that tracks across the screen. Calm-Bar mode is virtually the same as the Calm-Scope except that a bar chart is created, with the bar heights varying with your tension level. It is better when used for measuring over longer time periods. The Relax Graph's time setting reflects the number of readings per second, but the Calm-Scope and Calm-Bar time indicates the number of minutes it takes the computer to fill the screen with data.

```
"The humor comes in when your supposed response seems quite unreasonable and illogical—or at the least, out of proportion."
```

The Relaxation/Stress Management option is comparable to Relax's Sensoral Kaleidoscope, but less sophisticated. Different geometric designs appear one at a time and you try to reduce the size of the image and/or the pitch of the feedback tone. It's a pretty dull exercise that fails to hold the attention that Relax's Kaleidoscope captures.

Calm-Prix is a game also controlled by the biofeedback device. In this case you are a race car driver avoiding pot holes and curves on an ever-narrowing track. You control the car with the GSR, and the more you relax, the faster the car moves, increasing the game's difficulty and the stress involved. Obviously, the idea is to keep cool under pressure. I didn't.

The Physical and Psychological Stress Test options were the most enjoyable and the most revealing of the options. The Physical Stress Test has 4 suboptions which alternate in making you stressful and then relaxed. Exercise 1 displays some empty boxes, and when one randomly turns color you are supposed to hit the space bar as fast as possible. Your response change and percent of GSR change is then computed and displayed. In the second exercise you practice tensing your arm and inhaling, and then releasing your arm and exhaling following the peaks and valleys of the waves moving on the screen. The third exercise has you practicing relaxing and deep breathing following screen instructions, and the final exercise again has you reducing the size of a screen image by relaxing.

I found Calmpute's Psychological Stress Test to be both intriguing and humorous. The mental-stressors angle is not part of the Relax program itself, although the workbook addresses it. In the first subsection of this test, you complete a list of your most- and least-favorite male, female, place, activity, sport, food, music, and movie or television program. The second subsection is a simple word-association test where 16 words (including a few from your new list) are presented, and your GSR response is measured for 5 seconds per word. You can save your list on the disk if desired. Horizontal bars then chart your stress reaction to each item when displayed. The humor comes in when your supposed response seems quite unreasonable and illogical—or at the least, out of proportion. I had to question the validity of the test when I received a high response to "neutral" words like "wood" and "door" and a low response to a couple of things I strongly dislike. Of course, a psychologist would probably say that there is a reason for all such seemingly incongruous responses buried deep within the psyche, but I say it's either a gliche in the whole concept or in the device.

**Not Just A User Manual**

Good, complete documentation is provided for the Relax program. The user is informed on how to start implementing a total stress-reduction program into his/her life, with and without the software. Most importantly, explanations on how to use the program are easy to understand, concise, and logically organized. The one exception is the manual's treatment of the Kaleidoscope option. Adjusting the EMG to the proper setting is only described in vague terms, so you can never be quite sure whether it is set correctly.

Explanations of how to use each of the options of the Calmpute program are adequate and complete, but the guide's treatment of the background of stress and the workings of biofeedback is rather cursory. In addition, the text seems to have been oversimplified—so much so that it comes off as being condescending.

However, the Relax manual is so much larger than the Calmpute guide (200 pages compared to 25), it is necessarily much more thorough in its coverage of stress and its related factors. Where the Calmpute manual provides hit-and-run coverage of a few
individual suggestions for stress management, including sample journal sheets, a "living lab" program, meditation, and yogic awareness, the Relax book traces the sources and effects of stress, discusses body maintenance and relaxation skills, and covers thought, time, and job-stress management.

In addition, Relax's extensive self-evaluation workbook allows you to compile a personal "stress profile" of physical, mental, and other stressors and stabilizing influences in your life. This helps in identifying areas that are troubling or comforting, and in setting goals for your stress-management program. The only problem with this whole profile is that I wasn't sure what to do with the stress identification lists; sure I could fill them out, but what was I to do with that information? Its significance is never explained.

"... muscle feedback and GSR monitoring are not the same as stress reduction, in spite of what the packages...uh, stress."

Is This The Answer?

Speaking of problems, it's time to address a few important points. First, muscle feedback and GSR monitoring are not the same as stress reduction, in spite of what the packages...uh, stress. Physical manifestations of stress also include increased blood pressure, oxygen consumption, blood sugar production, and perspiration, among other things. Muscle relaxation takes care of only one component of the body's stress response, so don't overestimate the power of these packages. Although the Relax Workbook discusses this angle and attempts to help compensate with its lifestyle analysis and stress-reducing profile, the Calmpute manual glosses over it rather quickly, and its total stress-reducing program is brief and a bit lightweight.

Second, continued muscle tension and/or changes in the skin's moisture level may be a symptom of something besides stress. While these programs do seem to reach their objective of relieving muscle tension (and even headaches in a few), the biofeedback equipment is not up to professional standards, and should not be used as a cure-all to ignore the symptoms of other possible mental and bodily ills.

Third, there remains some doubt in my mind that what is being measured is what the manufacturers say it is, and if it is, whether the measurement is an accurate account of what is occurring. The EMG must be sensitive enough to measure the amount of electrical discharge from the skeletal muscle fibers, amplify it, filter out irrelevant signals, and display the results. I found, however, that even when the headband rested on the table, the Relax Graph's needle continued to move on the screen exactly as if I were wearing it. It was apparently picking up signals in the environment, or perhaps even from a nearby elevator—who can say? Shaking the wires attaching the EMG to the headband produced similar erratic, then smooth results on the screen. Perhaps the machine is too sensitive, or the filter is inadequate. It also seemed as though the electrodes were more pressure-sensitive than anything else, which would also explain why the slightest touch or movement of the wires triggered a jump of the needle.

As I mentioned earlier, this feedback from the Calmpute device appeared inappropriate much of the time. We've all heard of people who can trick lie-detector tests, which is part of the reason why their use is still controversial. There were times when myself and others used these machines and were, in fact, extremely relaxed—but the machines indicated an increase in tension or GSR. Thus, these feedback signals and their significance are questionable. My recommendation is try before you buy.

© Home Computer Magazine  Volume 5, No. 1
Creative Software seems to have devised a novel solution to an ugly problem—gang warfare. Rather than resort to the violence inherent in the combat, attack-and-destroy genre of video games, their new release, *Break Street*, proposes resolving a confrontation between street gangs by having a dance-off: a contest of style, if you will. Just as break dancing quickly caught on from the inner-city ghettos and spread across the country, this program is also catchy and works wonderfully—I hope this game's creators tackle world peace with their next program.

Of course, *Break Street*’s real premise does not focus on social problems, but on the dance contest itself. The new gang in town, the Stingrays, is challenging your turf, and the only alternative available is to use your best moves and breakdance them back to their old neighborhood.

You can choose from among 4 cool, toe-tapping breakers to execute your moves. Or, 4 players may compete in one game. Each dancer is dressed in the latest street styles, and the game’s bright, bold colors and the details of the alleyway hangout make this game especially attractive to watch.

The other captivating element of this game is the actual movements of the dancers—incridibly intricate and precise. A joystick controls all movement, so it is important to have one that is extremely responsive in all 8 directions. There are 2 basic modes that can be selected with the joystick, each with 8 separate options (dance steps). Uprock is the stand-up dance mode, and includes the Wave; the Tut left and right; Poppin; the Moon to left and right; Check!, which stylishly ends your dance; and Footwork, which takes you to the ground-level mode. Footwork enables your dancer to do the 1990 (handspin); a Headspin; the Windmill; a Kneespin; the Scorpion; a Backspin; Freeze!, which also stops the dance; and Uprock, which stands you up again.

The Commodore’s fine sound chip must be given some credit for adding another lively aspect to *Break Street*: its upbeat, sassy music. Even those who usually have trouble following rhythm will have no trouble choreographing a bouncy dance in tune to the beat. One drawback though: too much of a good thing can drive ya nuts! There is little variation in the tunes, and over time the constant, endless beat will bore you. If not grind on your nerves.

**Flying High**

The game begins in Warmup mode, where it serves as a demonstration of the dance steps and as a chance to practice routines. You can also slow down or stop the dancer to study certain moves. And you really can learn some breakdance moves by watching and copying the characters while in Warmup mode, but I wouldn’t recommend trying everything you see on the screen—this program holds a few surprises. For all of the little touches of reality injected into this program, there are a couple of moves that will make your head spin (pardon the pun). For instance, holding down the fire button and circling the joystick around while in Footwork mode will put you into a Backspin until you spin in helicopter fashion right off the top of the screen!

**The Fatigue Factor**

In Competition Play, a fatigue factor is introduced. While the Uprock moves are less demanding and increase your energy level, the Footwork moves get progressively more difficult as you tire. However, they’re worth more points and allow you to generate bonus time. A color bar indicates the amount of energy you have left. Unfortunately, you cannot save favorite dance routines on the disk.

It is also unfortunate that the documentation is unclear in places. An outright error occurs in the Summary of Function Keys, where it says the (RUN/STOP) key restarts the game. The proper key for this is actually the (RESTORE) key. In addition, “bonus time” is mentioned, as is “extra time,” and “bonus points,” but none of them are adequately defined, so it is easy to confuse them. The problem may be just a matter of inconsistency.

**A Form of Expression**

This program will probably hold more appeal for adolescents than for adults, who may grow tired of the repetition of the game and its music after one or two sessions with it.

Overall though, I enjoyed *Break Street* and appreciated the opportunity it offers to participate in a new kind of performance video game. Like ballet, where the art form is simply the body itself, the only action occurring on screen is that in which you choreograph the little figures to perform. It is an exciting new form of expression that breaks away from old shoot-em-up arcade tradition—possibly fostering a new, upbeat video trend.
GAMES THAT BOTH ENTERTAIN AND EDUCATE—GUARANTEED

Officials at Springboard Software, Inc., a Minneapolis-based educational software company, are so concerned that many buyers of learning games are disappointed (because many games' educational value is questionable), that they are offering parents a unique, money-back guarantee. A refund of the full purchase price of one of its learning games will be given to any customer who feels that the software is not helping to improve the designated skills of a child using the product. The designated skills vary according to the individual game programs. To date, no consumers have returned a Springboard product under the guarantee.

LAP-SIZE IS NICE, BUT DOES IT HAVE A MARKET?

Texas Instruments has introduced a lap computer with a full 24-line flat screen that may provide some stiff competition for the Data General One, the first full-size flat-screen lap computer. TI's Pro-Lite is a 10-1/2 pound computer that fits in a briefcase, and comes with a single 3-1/2 inch floppy disk drive and 256K RAM, expandable to 720K. Selling for a cool $2,995, the Pro-Lite supposedly does not suffer as badly from a dim, low-contrast screen display, which is characteristic of the 128K Data General One selling for $2,895. The Pro-Lite can also exchange files with other TI Professional Computers and IBM PC products when an interface cable is connected. However, the success of either machine is anybody's guess. According to a Yankee Group survey, portability is at the bottom of the list of criteria of general computer buyers for judging personal computers.

EXPERT SYSTEMS ARE FINDING THEIR NICHEs

Expert-system software is carving its way into more and more daily office applications, and may be quite the mass-market product for the home by the 1990's, predicts DM Data Inc., an Arizona research firm. Whereas conventional programs contain large data bases and allow the computer to retrieve whatever information the user wants to see, expert systems do the same and then draw conclusions from the information according to the same analytic methods specialists use. Expert systems are widely used in the medical field to analyze patient symptoms and then suggest possible diagnoses and treatments, and by bankers to assess risks in loans and policies. Home users may soon be able to get disks that, for example, advise them on how to fix household or car problems.

THE HOUSE KEY, THE CAR KEYS, AND THE COMPUTER KEY?

Software protection devices are taking a turn in two directions: booby traps, and hardware-based devices. Vault Corp. and Defendisk have reportedly offered (and later retracted—under pressure) software publishers the option to protect their products from being illicitly copied by putting booby-traps in their programs that could plant a "worm" in the unauthorized copier's disk operating system, or cause other havoc. Already the legalities of such a strategy are being decried and questioned, while other manufacturers in the industry say the traps could cause more problems than they're worth. Meanwhile, Lotus Development Corp. is taking another tack. They have developed an inexpensive box that plugs into some of the lines in a system's RS-232 port, accessible only with a key containing a protection code. This alternative does not "lock out" those who need to make legitimate backup copies.
IS ANOTHER TI HOME COMPUTER ON THE HORIZON?
Rumor has it that an East Coast third-party company is presently working on a new Texas Instruments-compatible computer that will be released sometime in the spring of 1985. The machine (supposedly a clone of the never-released TI-99/8 computer), is said to contain 64K RAM and 16K video RAM, and will sport the newer, 16-bit TMS9995 microprocessor. It is expected to be upwardly-compatible with existing TI software. The success of such a computer may depend on its price, its support, and the number of existing TI users that would opt for this higher-performance machine. The machine is expected to sell primarily to a residual user base already locked into a high investment in TI software and peripherals.

LISA LOSES TOP BILLING AS POWER MACHINE; NAME MIGHT CHANGE
No, the Lisa is not the most powerful computer Apple makes, according to Big Red's latest pitch to national accounts. This claim to fame is said to belong to Apple's new laser printer, which has 1.5 megabytes of RAM, 512K of ROM, and a 12-megahertz clock speed. It produces 7 pages per minute. Speaking of the Lisa, an Apple insider reports that it is not the "machine" that Apple plans to drop, but its "name." Lisa's third upgrade will supposedly unify Apple's 32-bit family, and rather than name this prima-donna Mac something like Lisa III, Apple will probably drop the "Lisa" name altogether.

IBM STRIKES OUT TO INCREASE BOTH DIRECT AND RETAIL SALES.
IBM retail dealers are receiving mixed signals from Big Blue. The November mailing of IBM's 36-page, personal-computer sales catalog to hundreds of thousands of IBM customers and others in an effort to increase direct sales is seen by many dealers to be "a direct assault on the retailer." However, prices in the catalog of hardware, software, and supplies were reportedly not aggressive enough to seriously damage retail sales. At the same time, IBM launched a multimillion dollar software inventory financing program that will provide each participating dealer with a kiosk of IBM-labeled software worth up to $15,800. Most companies require dealers to finance their own software inventory, but IBM's dealers will not pay for the program's packages until they are sold. While helping dealers get their cash flow under control, the move may spell trouble for smaller software distributors vying for shelf space, who cannot afford to follow IBM's lead.

APPLE & IBM SWITCH TACTICS TO GAIN EACH OTHER'S MARKET
Not satisfied with the market segments they do own, the leaders of the business and home computer markets are now attempting to overtake each other's turf—and are sparing no expense to do it. Apple is using the 512K Macintosh to finally forge its way into the corporate market, and IBM has done exactly what it said it would always avoid—"mass merchandised" its PCjr. Apple is counting on the Fat Mac's easy-to-use environment and on Lotus Development Corp.'s Jazz integrated program to spur sales in the Fortune 2000 market. A low-cost networking product to be introduced by mid-1985 also figures into their plans. The company has reportedly allocated nearly $200 million for its advertising efforts. IBM, on the other hand, is seeking to break Apple's stranglehold on the home and school market with its PCjr. IBM has spent $40 million to advertise the PCjr during 1984, and has arranged a promotional coupon tie-in with marketing giant Procter & Gamble. This, coupled with its extensive price reductions and direct mail campaign for PCjr system/equipment packages, has sent the retail takeaway of the once-floundering PCjr soaring.
The HP Thinkjet Printer

A review by Steve Nelson
HCM Staff

If you think the noise of a printer will drive your household crazy, the Thinkjet may be able to help—it's a peaceful dream come true.

One of the most annoying sounds to me is the noise of a line printer screeching across the page as it generates text. In the offices where I work, there are often 3 or 4 of these printers going at the same time. The din from all this can make even the toughest veteran of office work chuck it all and join the granola crowd living in a tepee in Northern California. If you feel the same way I do about noisy printers, you will undoubtedly appreciate Hewlett Packard's new offering—the Thinkjet printer.

The Thinkjet printer utilizes a disposable drop-in cartridge that incorporates both the print head and the ink supply. It is extremely easy to install and lasts for about 500 pages. Like a dot-matrix printer, the Thinkjet printer uses tiny dots to print a character. The difference between them is in the method used to transfer the ink to the paper. The Thinkjet printer actually squirts tiny drops of ink onto the paper from the print head. Since the head doesn't strike the paper, the only noise you hear is the sound of the print head sliding on the carriage. It's very quiet.

The print head is also much lighter than a conventional impact head, which makes the Thinkjet operate faster—it prints about 150 words per minute.

Special Features

The HP Thinkjet printer has 4 different print pitches: Normal (80 characters per line), Expanded (40 characters per line), Compressed (142 character per line), and Expanded-Compressed (71 characters per line), allowing you to have some flexibility in printing.

You also have two other special functions available: Underline, and Bold print. Both of these features can be used to affect a single word or entire lines with no loss of speed. You can even mix all of the modes together, printing an expanded, underlined, bold word for instance. Changing the print pitch or adding bold or underlines is a simple process.

The print head is set to print in both directions, but you can specify one direction if you wish—it gives you slightly better alignment between lines. You can also adjust the line spacing for either 8 lines per inch or 6 lines per inch.

"The graphics modes are fully programmable and work with most popular software packages."

Graphics

The Thinkjet printer uses a form of graphics called "dot image," where the paper consists of a grid of dot positions. Graphics data specifies which dot positions are printed and which are left blank. This printer has two graphics modes: Default (96 by 96 dots per inch) and High Density (192 by 96 dots per inch). The graphics modes are fully programmable and work with most popular software packages.

What impressed me the most about this printer—besides its quiet operation—is its friendly nature. It is very easy to set up, and print-head changes are fast—you don't get your fingers or the paper all covered with ink. The mode-select switches are conveniently located on the back of the machine.

Loading the paper into the printer is easy, but setting the paper where you want it is a nuisance as there is no platen knob. You must use the line-feed button to position the print head at the top of the page.

Although the printer works best when using the special paper designed for it, it also works with any other computer paper, but the print quality is poor, and the print head clogs up—needing cleaning every few days. With the special paper, the print is crystal clear—almost letter quality. Unfortunately, this paper is much more expensive ($50 for a box of 2500 sheets) than regular paper (averaging $22 per box of 2500).

After using the Thinkjet printer for a few days, I really got to appreciate its small "footprint" on my typically cluttered desktop, and its ultra-quiet printing. The only real drawback I can see is its price: $495. For that much money, there are several printers that will give you letter-quality output on regular paper and that provide more features than the Thinkjet. You'll have to decide whether the added expense of both paper and printer is worth the silent, compact advantage.

Personally, I don't see too many home users opting for this little trend-setting peripheral at its current price/performance ratio. Hewlett Packard will soon be shipping a new Unix-based portable computer that has the Thinkjet printer built-in. Being incorporated into this kind of "luggable" computer may ultimately prove to be Thinkjet's best application.
Ready for a taste of easy graphics the Big Blue way? 
Try this handy recipe for a beautiful pie chart . . .

Join us as we explore the world of the IBM PC and PCjr. Unleash the power behind these work horses while you unlock the secrets you thought inaccessible only to professional programmers.

Within their price range, the IBM PC (equipped with color board) and PCjr are without a doubt two of the most versatile color graphics computers you can buy today. This is evident by the ease with which business graphics can be created—as the simple pie chart program provided here will illustrate.

We're starting off this new mini-column with a pie chart because it ably demonstrates the powerful concept of using easy-to-implement graphics for a purpose other than "just playing games." Pie charts can take complex lists of hard-to-understand numeric values and convert them into simple, colorful representations—forms which have great meaning at a glance.

How To Create The Pie
The CIRCLE command is the first item in our pie chart recipe. This command is used only once in the construction of the pie chart. Only the radius and the aspect ratio are specified—all other parameters are left to their defaults. The radius is set to 90 pixels with an aspect ratio of 1.

The LINE command draws a line from the center of the circle to a point on the perimeter of the circle. The B() array contains a decimal value between 0 and 1 which indicates the position of the line on the circle where it meets the perimeter.

The PAINT Command
We use this command to fill in the areas of the pie with color. We made 10 different colors or combinations of color to fill different sections of the pie chart. The tiling characters are contained in the C$() array, which is used in place of the attribute parameter. The hexadecimal characters assigned to the array determine which color or pattern of colors will appear when used with the PAINT command. (See Figure 1.)

The program provided here can be greatly expanded in several directions. You could connect a data base to it for information storage; add a report feature which dumps the pie chart to the printer; or incorporate the chart into a spreadsheet or analysis program. The possibilities are unlimited. Experiment with what we have provided here, and see where it takes you.

<table>
<thead>
<tr>
<th>Hex</th>
<th>Binary Code</th>
<th>First Pixel</th>
<th>Second Pixel</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0000</td>
<td>BG</td>
<td>BG</td>
</tr>
<tr>
<td>1</td>
<td>0001</td>
<td>BG</td>
<td>GREEN</td>
</tr>
<tr>
<td>2</td>
<td>0010</td>
<td>BG</td>
<td>RED</td>
</tr>
<tr>
<td>3</td>
<td>0011</td>
<td>BG</td>
<td>BROWN</td>
</tr>
<tr>
<td>4</td>
<td>0100</td>
<td>GREEN</td>
<td>BG</td>
</tr>
<tr>
<td>5</td>
<td>0101</td>
<td>GREEN</td>
<td>GREEN</td>
</tr>
<tr>
<td>6</td>
<td>0110</td>
<td>GREEN</td>
<td>RED</td>
</tr>
<tr>
<td>7</td>
<td>0111</td>
<td>GREEN</td>
<td>BROWN</td>
</tr>
<tr>
<td>8</td>
<td>1000</td>
<td>RED</td>
<td>BG</td>
</tr>
<tr>
<td>9</td>
<td>1001</td>
<td>RED</td>
<td>GREEN</td>
</tr>
<tr>
<td>A</td>
<td>1010</td>
<td>RED</td>
<td>RED</td>
</tr>
<tr>
<td>B</td>
<td>1011</td>
<td>RED</td>
<td>BROWN</td>
</tr>
<tr>
<td>C</td>
<td>1100</td>
<td>BROWN</td>
<td>BG</td>
</tr>
<tr>
<td>D</td>
<td>1101</td>
<td>BROWN</td>
<td>GREEN</td>
</tr>
<tr>
<td>E</td>
<td>1110</td>
<td>BROWN</td>
<td>RED</td>
</tr>
<tr>
<td>F</td>
<td>1111</td>
<td>BROWN</td>
<td>BROWN</td>
</tr>
</tbody>
</table>

Figure 1: This chart illustrates the 16 combinations of color possible with hexadecimal digits. Two such digits are used to specify each character in the tiling string. Thus, each character defines four pixels. BG refers to the current background color.
Vikings are rapidly taking over the castle... but all is not yet lost! The King has a few tricks up his sleeve—tricks borrowed from a star-studded Oriental cast.

Startled awake from the sound of horns blown by Viking invaders as they storm your castle, you, a Norman king, rush downstairs to defend what is left of your home. Unfortunately, your servants and guards confirm your long-standing suspicion that they are all spineless cowards who flee at the first sign of trouble. This leaves you there all alone to battle the army of intruders.

But you are no ordinary king of medieval times—facing the onslaught with only sword in hand. No, you wield some deadly Ninja throwing stars and land mines, weapons recently acquired in your travels through the Orient. What a lucky break . . .

Okay. So the premise of King of the Castle is a bit hokey. But that doesn't prevent it from being a good, entertaining, fast-moving game for the TI-99/4A. In fact, the first thing one notices about this game is its speed. The program is written in TMS9900 assembly language, which accounts for its speed of execution and keeps the action at a high level.

and outside (or back upstairs if you're already outside).

The floor plans hardly, if ever, change between the two floors or between the 8 difficulty levels—which is a shame. A little more variety and challenge might be added with the doorways and stairwells appearing in different places. While I'm at it, let me add that in general, the game's graphics are strictly geometric in shape, and the screen as a whole is pretty simple. It could use some dressing-up.

Shooting Stars

Your job is to run around setting land mines for the Vikings and felling them with stars, while avoiding running into them. Contact with Vikings (which look like little spiders) is not only unsavory, it will result in damage points being counted against the king, and the destruction of the Viking contacted. With each higher difficulty level, the attackers get quicker and smarter, using more direct routes to track down the king.

King of the Castle offers nothing for those with lazy, passive strategies; you've got to work to earn any points, or even to make the game proceed. You must actively seek out the Viking warriors on the lower floor and chase them down. Hanging back on the first floor waiting for them to storm the upper floor is a waste of time, for only a couple will come up if you remain stationary. Ditto on the semi-crowded lower floor if you hide out in a corner and wait for them to approach you. These tricky Vikings prefer to cool their heels behind a nearby wall and wait for you to approach them.

Pursuing them is not always easy either. Often it is difficult to bring the king to a complete stop and move him through the doors or onto the stairs. This can be quite frustrating, especially when you try to get the king facing the right direction to fling a star, and he starts moving in that direction, walking right into his target!

The documentation for this game is quite brief, but complete. It just happens that everything you need in order to understand and set up the game—whether you're using cassette tape or a disk drive—can be stated on one sheet of paper.

The only suggestion I would make for this Diamond-in-the-Rough is to have it display the current difficulty level throughout the course of each game. With 8 levels and little variation between them, it's easy to forget which one you picked when you began your game. And if you play extra well or poorly, you'd want to know the game's level for later reference.

So, if you're a TI-99/4A user tired of the slowness of BASIC programs, pick up King of the Castle. It's a fast-playing game that puts up quite a challenge and will keep you engrossed for hours.
In Part 1 of this tutorial, we began to construct an Adventure Game using LOGO. We started off by writing a procedure, GETCOMMAND, to get a typed-in command (like N to go north) and pass it to another procedure, PASSER, which analyzes the words in that command. These procedures all appear in Home Computer Magazine Vol. 4, No. 5. But the essence of an Adventure is to go somewhere. Even though we wanted to go north in the previous segment, we hadn’t yet given it a map to use. We need to create that map now and translate it into LOGO, so that the computer will be able to respond to our moves. We must first decide where our Adventure is to take place. It can be set anywhere—from an African jungle to a space station in the year 2199 A.D. For our game, we chose a medieval-style fantasy land populated by witches, dragons, and the like.

You’ll find that once you have established a setting, your adventure will take on a life of its own. Our next step is to think up what the locations (or "rooms" as they are called) will be in our
Walk Through a World of Your Own Design

Having created a preliminary setting, we can now draw a map. The simplest way to do this is to use connecting circles with arrows pointing north, south, east, and west. Again, because of memory limitations, we will not include directions like northeast and southeast, but we will include up and down. The map for our Adventure is shown in Figure 1. The rooms highlighted in green are at ground level, the underground lair of the dragon is in earth-tones, and the elevated rooms are shown in blue.

In studying the map, you may notice that the up/down path between the base of the castle and the witch’s chamber is dotted. We did this to indicate that passage is conditional: the Adventurer will have to possess certain items in order to gain access.

Once you are satisfied with your map, you must convert the directions into numbers that the computer can understand. In our example, because the rooms are already numbered on the map, we can look at the number of the room we are moving into. For example, suppose we are in room number 7, the stone passage. Moving south will bring us to room number 11, a mountain path. If we go down, we will descend into room number 4, the lair of the dragon. Movement west will take us back to room number 3, the entrance to the cave. North, east, and up do not lead into any rooms, so the program will tell us that we can’t go those ways.

To convert the map into data, we can draw up a chart called a movement table (see Figure 2) that will tell us the number of the room in which we will end up if we take a certain path. If we cannot go that way, we’ll just mark it with a period (using periods instead of numbers will save about 45 nodes of storage). Note that on the movement table for this game, rooms 8 and 12 contain numbers marked with asterisks. This indicates that special conditions must be met in order to pass through. These conditions, and the procedures to handle this special case, will be included in the next installment. Placing periods in these positions in Listing 1 will only bar movement to the witch’s chamber (room 12) in this month’s LOGO Adventure.

Converting Your Map to Lists

Now we are ready to convert our map and movement table into something LOGO understands very well: lists. We’ll call one “ROOMS” and fill it with 12 smaller lists that represent all of our locations, numbering them for easy reference. The other list will be called “DIRECTIONS” and will also contain 12 sublists, these being numbers taken from the movement table. We’ll put them into a procedure named SET.UP. As we mentioned above, entry to the witch’s chamber will be conditional, so its corresponding list in DIRECTIONS will be all periods, effectively sealing off the room. SET.UP will also include the list of verbs that the parser understands (see Listing 1).

This procedure, when run, will read in all of the necessary information LOGO needs to follow...
**Figure 2**

Movement Table for Rooms in LOGO Adventure

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>N</td>
<td>S</td>
<td>E</td>
<td>W</td>
<td>U</td>
<td>D</td>
</tr>
</tbody>
</table>

1. Forest
2. Glen
3. Entrance to Cave
4. Lair of Dragon
5. Tree House
6. Marsh
7. Stony Passage
8. Base of Castle
9. Ravine
10. Under Tree
11. Mountain Path
12. Witch’s Chamber

*Passage between these points will be conditional.*

```
our commands. As the game further develops, we will add more to SET. UP. For now, notice the last line: MAKE "HERE 2. The variable "HERE will be used to store our current location in the game, and will constantly change. At the beginning of the game, it is set for room number 2, the Glen. We need to modify the ID. LOC procedure published in the last issue so that it changes the number in the :HERE variable into the actual name stored in :ROOMS (see Listing 2).

"You'll find that once you have established a setting, your adventure will take on a life of its own."

ID. LOC prints a sentence consisting of YOU ARE and the BUTFIRST of the second item of the :ROOMS list. ITEM 2 of :ROOMS is the sublist (2 IN A GLEN) and the BUTFIRST of that is (IN A GLEN), which is combined with YOU ARE to print the message, YOU ARE IN A GLEN. Control then returns to GETCOMMAND, which prints out a prompt and waits for the player to type something. In the actual program the screen will look like this:

YOU ARE IN A GLEN

COMMAND?

Lists: The Key to Movement

Well, that is certainly an improvement over last time! But we’ll get bored very quickly by just standing around in the Glen. We still need a way to move from place to place. The answer? You guessed it—write another procedure (see Listing 3). MOVE takes one input, X (which will be a number from one to six), representing a direction for travel. Let’s say that we want to go west:

COMMAND? W

GETCOMMAND and PARSER will process W and send us to the procedure of the same name. To make movement possible throughout our fantasy world you will need to key-in all of the direction procedures: N, E, W, S, U, and D (see Listing 4). Note that N has been altered to work like the other direction procedures.

Because we are presently in the glen (:HERE = 2), MOVE first examines the second ITEM of the :DIRECTIONS list as defined in the SET. UP procedure: ( 6 3 1 1 2). The procedure W passes the value 4 when it calls MOVE (see Listing 4), so MOVE checks to see whether ITEM 4 of the sublist ( 6 3 1 1 ) is a period or a number. Because the fourth item is the number 1, MOVE makes :HERE equal to 1 and returns to GETCOMMAND. When we loop back up to ID. LOC, it displays:

YOU ARE IN A FOREST

COMMAND?

Conversely, had we wanted to move north, MOVE would have been called as MOVE 1. The program would have found that ITEM 1 in ( 6 3 1 1 ) is equal to a period, skipped to the end of the MOVE procedure, and printed YOU CAN’T GO THAT WAY. Because there would have been no change in :HERE, we would find we are still in the Glen.

We can put all this together in a super-procedure as seen in Listing 5: ADVENTURE.

Once you define these procedures, you will be able to move from place to place around this or any other map you wish to create. Yet, our fantasy world still seems sterile and empty, so in the next segment we will populate it with objects and treasures—and eventually, characters to interact with. In the meantime, try experimenting by creating new fantasy worlds, and think about what objects and characters will be part of your own story.
by Ted Barnicoat
and the HCM Staff

Turtles take to the water as they sail for the America's Cup.

My passion is sailing. Unfortunately, I live in Edmonton Canada, a prairie city not known for its sailing facilities. I have therefore developed this model of a yacht race to quiet some of my passion, and pass the long northern nights. Although it is not a typical computer game, it should give sailor and non-sailor alike a feeling of the excitement of last year's America's Cup series.

Let's Bring America's Cup Home

The United States has dominated the America's Cup since the race began in 1851. That is, until the summer of '83, when the Aussies took the trophy down under. Well, it's time to bring the America's Cup back to North America—preferably to Canada! You can't start practicing soon enough, and with your LOGO-equipped TI-99/4A and joysticks, LOGO Sailing can help.

This game is a model of a "match" race between two yachts, just like the America's Cup. It can be used to teach the principles of sailing before venturing out in a real yacht. It could also help as a tactics analyzer for experienced yacht racers. Or, it might just get the adrenaline going as you and your crew are waiting for the start of the sailing season. Good sailing mate!

The Principles of Sailing

The sort of yacht used in LOGO Sailing has one mast and two sails. The "jib" is the sail in front of the mast, and the "mainsail" is the larger one behind or "aft" of the mast. The mainsail is secured along the bottom to a wood or metal pole called the "boom," which swings back and forth allowing the yacht to make maximum use of the wind.

The "rudder" is a plate secured at the back of the yacht which controls the yacht's direction. The "tiller" is a lever attached to the top of the rudder which allows you to turn the yacht. The rudder moves in the opposite direction to the tiller. That is, if the tiller is pulled to the left, the yacht moves to the right. Also, sailboats do not react immediately, so you must hold the tiller in the proper direction for the turn until the yacht responds. In LOGO Sailing, you use the joysticks exactly the same way.

A yacht moves because its sails convert wind energy into a driving force that acts roughly at right angles to the sails. This is split into a forward force (F) and a sideways force (S). Because a yacht has an underwater fin called a "keel," any S motion is reduced and converted into F motion—a bit like squeezing an orange pip between your fingers. These forces move the yacht forward dependent on the speed and direction of the wind in relation to the direction the yacht is moving. If the wind is right behind you, there is lots of F and little or no S. If you are moving into the wind, there is more S, and this reduces the F.

The four primary ways that a yacht moves in relation to the wind are called "points of sail." They are:

1. Head to Wind - When you point the front (bow) of the yacht directly into wind, the sails flap, the boom bangs around dangerously, and the yacht moves backward because the sails are generating no forward force.
2. Tack - When you pull the tiller until the yacht moves away from "head to wind" and the sails begin to fill with the wind. This is called a "port tack" if you are going to the right but the wind is coming over the left (port) side of the yacht as you look towards the bow. It is a "starboard tack" if you are going to the left with the wind coming from the right, or starboard side of the yacht.
3. Reach - When the yacht is moving at 90 degrees to the wind you are "reaching." It is probably the fastest point of sailing. Again, there is a "port" and "starboard" reach.
4. Run - When the wind is behind you, your sails act like kites and pull you forward. At this stage, your yacht uses one of those big balloon-shaped sails called a spinnaker, which allows the yacht to "run" faster.

Racing in LOGO

Before you begin, you must not only key in the procedures, but also define the 25 shapes and 3 characters (tiles) according to the figures on the right. Use the MAKESHAP and MAKECHAR commands to define these shapes. Once they are created, be sure to SAVE ALL and not just the procedures, so you won't have to do it again. [To save you from the somewhat-tedious task of entering the shapes, we'll include them in this issue's edition of ON DISK and ON TAPE—Ed.] Begin the program by typing AMCUP from the LOGO command screen. This game requires the use of joysticks for control of the yachts.

A typical yacht race is run round a triangular course (see Figure 1). Although winds change in real yacht racing, due to memory limitations we always have the wind coming from the north.

LOGO Sailing keeps track of both yachts' progress in the CHK procedure through the letters (A-J) designated on the map in Figure 1. Each yacht's status is displayed
in the upper-left corner of the screen. The first yacht to successfully complete the course (reach letter J) wins the race.

The yachts in this race are sprites, and while sprites "wrap" on the screen, yachts on real race courses don't. Thus, our rules prohibit going off the bottom or top of the screen—a yacht loses when it does so. Due to memory limitations, no such check is made for side-to-side wraps. The race is always between two yachts, and only because of this lack of checking can one person use the program alone. To practice the game alone, just set one yacht on a reach (moving horizontally across the screen) with one joystick, then practice racing with the other yacht.

If you have LOGO II, you have considerably more memory available to you. You might try enhancing the program to include the side-to-side check as well. The top-to-bottom check is made at the beginning of the CHK procedure, with the :Y and :X variable containing the respective row and column locations of the yacht. This enhancement would require you to add some method of anchoring one yacht so you could practice with the other. [Keep us informed of your enhancements in a "Letter to the Editor."—Ed.]

**A Collision Ends the Race**

When the two yachts are on a collision course, the yacht that is traveling more "with the wind" has to yield to the other. If they both have the wind in the same relation to their yacht (i.e., the same "point of sail"), the one with the wind coming over its starboard bow has the right-of-way. For example, a yacht tacking northeast (we say it is on a starboard tack) has the right-of-way over one tacking northwest (on a port tack). If the yachts do collide, they sink, and the yacht with the right-of-way is awarded that race.

No part of your yacht, including the sail, is allowed to touch the mark. If you do, you must go back around that mark again without touching it.

Each race follows the same course and the America’s Cup is awarded on the basis of the best 4 of 7 races. If, when asked whether you want to replay, you choose N (for No) the program is cleared with the BYE command.

We hope you enjoy LOGO Sailing, and don’t forget to give your TI-99/4A credit when you bring the America’s Cup back to North America in 1987.

---

For your key-in listings see HCM PROGRAM LISTINGS Contents.
Hi-Res Page Switching

High-resolution (hi-res) graphics accessibility from BASIC on the Apple II Family of computers is one of the computer’s greatest assets to beginner and experienced programmers alike. There are two hi-res display Pages in the Apple. These hi-res Pages are 8K-byte-long memory areas, and should not be confused with the 256-byte pages such as zero page (the lowest 256 bytes of memory in the Apple) or the I/O page (between $C000 and $C100). To differentiate between the two, we will capitalize Page when referring to hi-res areas, and use a lower-case “p” when referring to the smaller 256-byte pages of the Apple’s memory. The fact that two hi-res Pages are available opens up all sorts of graphic possibilities, but fluid interaction between the two Pages requires the programmer to have a thorough understanding of the “soft-switches” controlling these Pages.

The two hi-res Pages are located in distinct areas of memory—Page 1 from address 8192 through 16383 ($2000-3FFF) and Page 2 from address 16384 through 24575 ($4000-5FFF). How the data on these Pages is transformed into graphics is beyond the scope of this article. In addition, you must be aware that large Applesoft programs can “over-write” these areas of memory, unless certain precautions are taken to protect them. The methods for such protection were discussed in detail in the Apple “Home Computer Tech Note” in Vol. 4, No. 1. To use hi-res Page 2, your larger BASIC programs should make use of those methods to ensure that the program is loaded above hi-res Page 2—starting no lower in memory than 24576 ($6000).

Having taken these necessary precautions, you can use the HGR statement to clear hi-res Page 1, and then HPLOT, HCOLOR=, DRAW, SCALE, ROTATE, etc. to create graphics on Page 1. Likewise, the HGR2 command clears Page 2, and all subsequent hi-res commands default to Page 2. Neither of the HGR statements affect the other Page, so there is no danger of erasing the Page you’re not addressing. However, if you set up one picture on Page 1 and then draw a different one on Page 2, using the HGR statement would clear the screen—preventing you from simply modifying the Page 1 drawing. Thus, you cannot use HGR and HGR2 to alternate freely between the two Pages in a program. But, there is another way: the “soft-switches” located on the I/O page ($C000-$C100) in the computer.

To activate the soft-switches on the I/O page you may either PEEK or POKE the appropriate location. The act of accessing the memory location is what activates the switch, so it doesn’t matter what value is contained there. It also doesn’t matter what you do with the value you PEEK (the value is not significant), and as long as you POKE a legal value (between 0 and 255) it doesn’t matter what value you POKE either. Here’s a short list of the I/O page locations that let you modify the display modes:

<table>
<thead>
<tr>
<th>POKE Location (In Hex)</th>
<th>POKE Location (In Decimal)</th>
<th>Switch Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C050</td>
<td>49223 or -16304</td>
<td>Enter Graphics mode</td>
</tr>
<tr>
<td>$C051</td>
<td>49229 or -16303</td>
<td>Return to Text mode</td>
</tr>
<tr>
<td>$C052</td>
<td>49230 or -16302</td>
<td>Eliminate text on bottom of screen (all graphics)</td>
</tr>
<tr>
<td>$C053</td>
<td>49230 or -16301</td>
<td>Display text at bottom of screen (mixed mode)</td>
</tr>
<tr>
<td>$C054</td>
<td>49230 or -16300</td>
<td>Display Page 1</td>
</tr>
<tr>
<td>$C055</td>
<td>49230 or -16299</td>
<td>Display Page 2</td>
</tr>
<tr>
<td>$C056</td>
<td>49230 or -16298</td>
<td>Lo-res mode active</td>
</tr>
<tr>
<td>$C057</td>
<td>49239 or -16297</td>
<td>Hi-res mode active</td>
</tr>
</tbody>
</table>

One other critical memory location must be altered to switch between Pages: $E6 or 230 decimal on zero page. The locations in the above table affect what is being displayed, but location 230 is used by BASIC to determine which graphic Page is being written to. If it contains a 32, then hi-res commands write to Page 1, and if it contains a 64, BASIC writes to Page 2. Thus it is possible to display Page 1 while writing to Page 2, and vice versa.

The HGR statement effectively POKEs 230 with 32, accesses locations $C050, $C053, $C054, and $C057, and then resets all the bits in the area to 0, clearing the screen. Likewise, the HGR2 statement does the same thing, except that $C055 takes the place of $C054, and 230 is set to 64. Thus, if you wish to write to Page 1 immediately after writing to Page 2, all you have to do is enter POKE 230,32:POKE 49237,0 and Page 1 becomes the active Page. If you also wanted to go to all graphics from mixed mode at the same time you made this switch you could execute POKE 230,32:POKE 49237,PEEK(49234). By PEEKing one location with the POKE of another, you access two locations and set both switches.

—Roger Wood
Merging Files from BASIC

The Commodore 64 lacks some of the more sophisticated programming tools of some other systems—among them the ability to merge one program file with another. Each time you LOAD a program any program in memory is lost. With a disk drive and the following short MERGE listing, however, you can merge two programs of practically any length.

Let's say you have two programs: a main program (PROGRAM1) and a second one you want to merge with the first (PROGRAM2). The first step is to key in the listing shown here and SAVE it on disk as MERGE. This program erases itself from memory when it is through running, so don't try to RUN it—just proofread it very carefully before you SAVE it.

Next, SAVE the program file to be merged as a SEQuential file. Just LOAD it normally, and then LIST it to disk. This is done in command mode with these lines:

```
OPEN 2,8,2,"PROGRAM2.L,S,W":CMD2:LIST:PRINT#2
CLOSE2
```

Above, PROGRAM2.L should be a distinctive name for the SEQuential version of the file to be merged so as not to confuse it with a BASIC Program file. Note that by appending a .L to the name used for the Program file, the SEQuential version is easy to identify.

The next step is to LOAD the program to be merged to: LOAD "PROGRAM2.L".

It's important that neither PROGRAM1 nor PROGRAM2 has a line number as big as the lowest line in the MERGE program listed here (i.e., all must be less than 63800). Now, the MERGE listing below must be added to the PROGRAM1 in memory. One way to do this is to key it in. This is time-consuming, and one error will lead to a "bomb."

Here's another way: Make sure you have the MERGE listing already saved to disk. Memory locations 45 and 46 are pointers to the end of BASIC text. By making the beginning of BASIC text pointers in locations 43 and 44 point two locations in front of the present end of BASIC, a LOAD command will place the MERGE program directly after PROGRAM1. Then, resetting the beginning of BASIC pointers to their normal values, the two programs will link together into one. For example, if when you type PRINT PEEK(45), the number 35 is printed, and PRINT PEEK(46) yields 15. To reset the pointers, just type POKE 43,35-2:POKE 44,15.

Having made this adjustment, LOAD MERGE from disk, and type POKE 43.1.POKE 44.15 to reset the beginning of BASIC text pointers back to the beginning of PROGRAM1. When you LIST the program you will find that PROGRAM1 now has the MERGE program appended to it. This method only works if all the line numbers in the program appended to the first one are higher than those in the first one.

Next, type RUN 68300 and the MERGE program begins to execute. It will prompt you for the name of the SEQuential file to be merged (i.e., PROGRAM2.L). When you input this name, the program reads the PROGRAM2 in from the disk one line at a time. It then prints the lines to the screen followed by a GOTO 63940 command, fills the keyboard buffer with carriage returns (ASCII 13), places the cursor at [HOME] position and ENDS. When any program halts, all characters in the buffer are printed to the screen—in this case, a series of carriage returns actually merge the program lines into the existing program and then restarts the program at line 63940, where the next line in PROGRAM2 is printed. The process continues until all of the lines in PROGRAM2 are added, then all lines above 63800 (i.e., the MERGE program) are deleted, leaving you with a program in memory that is a successful merging of PROGRAM1 and PROGRAM2. Be aware that if PROGRAM2 contains any line numbers that are identical with those of PROGRAM1, they will replace those in PROGRAM1.

—Roger Wood
Hard Copy Screen Graphics

It is easier than you think to capture that high score on the screen for posterity, or get a hard copy of the pie chart created with your financial analysis program. IBM PC and PCjr computers come equipped with the ability to dump the contents of any graphics screen to the printer—with some exceptions noted below—providing you have a graphics printer compatible with the IBM system.

In order to dump a graphics screen to the printer from BASIC, first invoke the GRAPHICS command from DOS. Before starting BASIC—while the system is still in DOS—simply type GRAPHICS and press [RETURN]. Be sure to have a DOS disk inserted in the default drive, usually drive A. If your system auto-boots BASIC, return to DOS by typing SYSTEM and pressing [RETURN]. Then enter GRAPHICS. After the graphics program has been added to the system, the DOS prompt will appear. Now start BASIC by typing either BASIC on the PCjr or BASICA on the PC. Then, to dump a screen to the printer, just press the [PrtSc] key.

To use this screen dump utility, you must have a compatible graphics printer connected to your system. The computer sends a sequence of codes to the printer which tells it to start printing graphics instead of ASCII characters. Your printer must be able to interpret this code to set itself up properly. The setup code is as follows:

```
LPRINT CHR$(27)"\nCHR$(76)"CHR$(n1)"CHR$(n2)";
```

The first two codes, 27 and 76, set the printer for double-density graphics mode. Your printer should be capable of printing at least 960 dots per row when in this mode. The values for n1 and n2 tell the printer that the next n2*256+n1 characters should be interpreted as dot graphics. The n1 and n2 values are calculated in the following manner:

\[
\begin{align*}
    n2 &= \text{INT}\left(\frac{\text{# of dots}}{256}\right) \\
    n1 &= \text{(# of dots)} - n2 \\
    \text{(# of dots)} &= \text{(n2*256)+n1}
\end{align*}
\]

You may need to make one final preparation before you can get perfect screen dumps. The normal line spacing for most printers is either 6 or 8 lines per inch. Most printers think of this as either 12/72" per line or 8/72" per line. But in order to get good screen dumps, you need to set the printer to 7/72" per line. If you can’t do this, you may end up with white space between each printed row of graphics. For example, you can set this command on the Epson MX-60 with the following command sequence:

```
LPRINT CHR$(27)"\nCHR$(65)"CHR$(7)";
```

Now for the exceptions: Because the GRAPHICS command was first implemented on the PC and carried over to the PCjr, there are several screen modes that will not work with the GRAPHICS command from DOS on the PCjr. Screen modes 0, 1, 2, and 4 all work the same way as the corresponding modes on the PC. (Screen mode 4 on the PCjr works identically to PC mode 1.) Screen modes 3, 5, and 6 will not work. Modes 3, 5, and 6 store the graphics screen differently than any of the modes available on the PC. Additionally, it would be difficult to modify the GRAPHICS command to work with these new modes because it would not be able to create shading for 16 colors, as it does with the 3 colors available in modes 1 and 4. Shading is accomplished on the printer by dispersing the dot pattern.

—William K. Balthrop

[Special note to PCjr owners: In Volume 4, Number 4, we published an article on adding a second disk drive to Junior. This project requires a special cable and two IC chips. We now renew our offer to supply these parts in kit form. Order now, while limited supplies are still available, by sending $49.95 to: Home Computer Magazine, Attn: PCjr Disk Kit, 1500 Valley River Drive, Suite 250, Eugene, OR 97401.]
Speeding Up Extended BASIC

One of the complaints we frequently hear about programming on the TI-99/4A is the speed of the computer when running BASIC or Extended BASIC programs. Compared to other home computer BASICs available, the TI variety is fairly slow. A number of reasons account for this—too many to explain fully in this limited space. However, if you have Extended BASIC, there are some things you can do to improve your computer's execution speed. And, if you have the 32K Memory Expansion card, you can increase that speed even more.

The first method involves inserting a special code in your programs that will turn the "pre-scan" on or off. Each time you RUN a program on the 99/4A, the computer pre-scans it, setting aside room in memory for variable storage. This is why the computer seems to hesitate—sometimes at considerable length—before executing a program.

It is not necessary to scan a whole program, however, and a lot of time is wasted by doing so. By turning the pre-scan off and on at selected points, you can decrease the time it takes your program to start. Use a bit of caution here, though. All variables and subprograms must be pre-scanned before a program starts executing. The following lines will ensure that these items do come under pre-scan:

(Program starts in pre-scan mode)
100 VAR1 :: VAR2 :: SVAR2S :: VAR3 :: VAR4 :: DIM A(100)
110 CALL CHAR :: CALL SOUND :: CALL HCHAR :: CALL VCHAR :: CALL KEY
120 @P— (turn pre-scan off)

(place main program here)

750 @P+ (turn pre-scan on)
CALL SPRITE :: CALL SUB1 :: CALL SUB2 :: @P— (turn pre-scan off)

(place main program or sub-routines here)

In the example shown above, SUB1 and SUB2 are Extended BASIC subprograms. The codes to turn the pre-scan off and on are as follows:

@P— Turns pre-scan off.
@P+ Turns pre-scan on.

The second method requires that you have the 32K Memory Expansion card installed in your system. To increase overall execution speed, you can disable the automatic motion of unneeded sprites—which eats up processor time—so that your computer has more time to work on other tasks. Usually, the computer is constantly updating all 28 sprites—even when they are not being used. You can make the computer update fewer sprites, or disable them completely if your program doesn't need them. The following command will disable all of the sprites:

100 CALL INIT :: CALL LOAD(-31875.0)

By changing the second parameter in the CALL LOAD statement from 0 to 5, you would enable 5 sprites (#1 through #5), while still significantly increasing execution speed. Just change this parameter to enable the maximum number of sprites which your program needs to use.

—William K. Balthrop
Looking to join a users group, exchange newsletters or software, increase your users group's membership or pep up your next meeting's agenda? For the latest users group news, put your ear to the Group Grapevine. And if you have a message to put out to other groups, if you are starting a new group, or have an interesting item to share, send a note or picture—or better yet, a group newsletter—to the Users Group Editor, Home Computer Magazine, 1500 Valley River Drive, Suite 250, Eugene, OR 97401, (503) 485-8796.

Group Grapevine

News, information and upcoming events of home computer users groups around the world.

Licking, Missouri is the home of the Licking Users Group (LUG). A representative of this group called Group Grapevine to inform TI-99/4A readers of their existence. LUG produces a software catalog of the programs they have in their library, which consists of close to 300 programs in BASIC, Extended BASIC, and some Editor/Assembler languages. The cost of the catalog is $1 and software can be purchased by members for $3 per program and for $4 by non-members (the group provides the cassette). If you are interested in joining this active club, they meet the first Monday of each month. Or, you can contact: LUG, P. O. Box 439, Licking, MO 65542-0439, (314) 674-5922.

Secretary Debbie Johnston of the Commodore Users Group of Pensacola would like to "welcome Purpose of this group is to expand each member's horizons regarding their Commodore computers. Meetings are conducted the third Tuesday of each month in the Hygeia Coca Cola Bottling Company plant at 7 p.m. Dues are $1 a month per person and $1.50 a month per family. Members have numerous benefits, which include access to VIC-20 tapes and C-64 disks containing public-domain programs. Also, their library contains various books pertaining to the Commodore computer which are available to paid members. Anyone desiring further information can contact Debbie Johnston. P. O. Box 3533, Pensacola, FL 32516. (904) 455-5804.

Bradenton, Florida now boasts its own TI-99/4A users group. The Bradenton Users Group is made up of over 30 members who are considering the possibility of forming a statewide users council and a billboard-type service. They have a library of tapes and disks and would very much like to correspond with other users groups in the Southeastern United States. Persons living outside the Bradenton area may join as a library club member for only $5 per year, which entitles members to use of the library and to receive the monthly newsletter. Being a young group, they would appreciate any tips from "old-timers" to help them become a long-lived success. If you are interested in becoming a member of this group, contact: Louis J. Fabiano, 4515 26th Street West, Bradenton, FL 33507; (813) 755-6400.

Group Grapevine received a telephone call from Mickey Shortencarrier, secretary/treasurer for the Bernadillo Users Group (BUG) in Albuquerque, New Mexico, informing us that this group (which has been in existence since June 1983) is finally taking off. Special Interest Groups (SIGs) are introduced on a demand basis and continue as long as there is an interest in that particular SIG. At present, Editor/Assembler and FORTH SIGs are offered, and the group hopes a SIG for children can be formed. A library consisting of more than 500 programs, and a newsletter, are offered to members. Membership is $15 per year and the club meets the first Tuesday of each month. For more information, contact: Mickey Shortencarrier, 9427 Osuna Place, NE, Albuquerque, NM 87111, (505) 292-3575.

Bonnie L. Snyder, secretary for the Front Range 99'ers Computer Club in Colorado Springs, Colorado, sent a letter to Group Grapevine with information on their one-year-old group. Would you believe that in only twelve months they have grown to 100 members? Their group library boasts over 250 programs for the use of these members, and they have their own TBBS bulletin board which is run by Sysop John L. Williams. Besides their library and newsletter, they have many Special Interest Groups (SIGs) which meet on their own as offshoots of the club. Front Range 99'ers Computer Club would like very much to get in contact with other TI-99/4A users groups to exchange newsletters and programs. For more information, contact: Bonnie L. Snyder, 62 South Roosevelt Street, Colorado Springs, CO 80910.

Secretary Bonnie L. Snyder for the Front Range 99'ers Computer Club in Colorado Springs, Colorado, sent a letter to Group Grapevine with information about their one-year-old group. Would you believe that in only twelve months they have grown to 100 members? Their group library boasts over 250 programs for the use of these members, and they have their own TBBS bulletin board which is run by Sysop John L. Williams. Besides their library and newsletter, they have many Special Interest Groups (SIGs) which meet on their own as offshoots of the club. Front Range 99'ers Computer Club would like very much to get in contact with other TI-99/4A users groups to exchange newsletters and programs. For more information, contact: Bonnie L. Snyder, 62 South Roosevelt Street, Colorado Springs, CO 80910.

Tri-County Commodore Users Group is the monicker the Commodore users in Ocala, Florida have chosen for their recently-formed club. According to President Don Vandeventer, the group has grown to more than 45 members in less than six months and now offers a newsletter, "Syntax," to members. For more information, write: Tri-County Commodore Users Group, P. O. Box 1151, Ocala, FL 32678.

Curtis Miller of the Suncoast 64s wrote to Group Grapevine with information regarding their group in Palm Harbor, Florida. Their public domain library contains over 1,000 programs on 44 disks and is growing rapidly. This is the group's second year, and they have members as far away as West Germany, France, Italy, and Belgium. For more information, get in touch with: Curtis Miller, 2419 US 19 North, Palm Harbor. FL 33563. (813) 785-1036.
"If you own an IBM PCjr, you are part of a fast-growing group of computer users who want more from their personal computer system than Zaxxon compatibility and an occasional letter to Aunt Ruth," says Danny Duran of the now-forming IBM PCjr Users Group in Las Vegas, Nevada. Danny has taken it upon himself to create the opportunity for a club to emerge to accommodate the ever-growing number of PCjr owners out there who use the system for family education and fun, business, communications, or as a hobby to gain a better understanding of the PCjr as well as help others. One advantage of joining this group in the early stages of development is that as a member you will be able to mold a users group with your needs in mind. For example, a public domain software library, software and hardware demonstrations, Special Interest Groups (SIGs), computer bulletin boards, programming tutorials—the possibilities are unlimited! Membership is not limited to users in the Las Vegas area—anyone interested in becoming a member can contact: Danny Duran, 4433 N. Vornsdor #3, Las Vegas, NV 89115. (702) 643-6534.

Maurice Feryn of the IBM PC Users Group of Spokane describes this group as being geared toward business applications for the IBM PC. Dues are $10 per year and the group meets the last Tuesday of each month. A software library with approximately 40 disks is available to members. For more information, contact: Maurice Feryn, Route 1, Box 294, Mead, WA 99021. (509) 466-3685.

Group Grapevine’s fancy must be turning toward sun, surf, and sand out here under the gray skies of Oregon, because here’s another group from Florida! Manasota IBM PC Users Group in Bradenton, Florida was created 2-1/2 years ago to provide about-to-be, new, and “long-time” owners of the IBM PC and PCjr the opportunity to get together for questions and answers ranging from how to turn on the infernal machine...to the latest in software and hardware. Membership consists of year-round residents of the area as well as many retired owners of IBM machines who spend only their winters there. Meetings are held the third Wednesday of each month and dues are $12 per year. Author reimbursement software and freeware are available through the group library, and public domain software will soon be added to their collection of programs. For information on how to join, contact: Richard Reynolds, 2204 Palmasola Boulevard, Bradenton, FL 33529. (813) 792-5400.

Group Grapevine has, of course, heard through the “grapevine” that there are lots and lots of IBM PC users groups out there. But now that PCjr ownership is expanding dramatically, we are expecting a surge in PCjr-specific clubs. So put out the word that Group Grapevine is hungry for information on your club. We’ve been told many times over that mention in this column gets a group great exposure, helping it attract new members and friends.

Group Grapevine talked with L.R. Shultz, secretary/treasurer of the Ft. Wayne Apple Computer User Group, Inc. in Ft. Wayne, Indiana and discovered that they have been in existence for about 6 years. Membership is at 350 (with approximately 175 members attending meetings), and they meet at 7:30 p.m. the third Wednesday of each month. Mr. Shultz mentioned that the number of Macintosh members is growing and they have created a Macintosh Special Interest Group (SIG) to accommodate them. There is also an increase in the number of Apple IIc users attending the meetings. Other SIGs include spreadsheets, BASIC language, communications, genealogy, hardware, Pascal, and a beginners group. A public-domain library of approximately 3600 programs is available to members. Dues are $12 per year and include a subscription to the group newsletter. So, if you are an Apple owner interested in joining a group “dedicated to furthering the use of microcomputers and promoting fellowship among Apple users,” contact: L. R. Shultz, P. O. Box 11507, Ft. Wayne, IN 46858. (219) 432-5923.

Picture a small town in the Northeast in the midst of a winter snow and you could be thinking of Amherst, New Hampshire at the time Group Grapevine’s fancymust be turning toward the “grapevine” that there are lots and lots of IBMPC users groups out there. But now that PCjr ownership is expanding dramatically, we are expecting a surge in PCjr-specific clubs. So put out the word that Group Grapevine is hungry for information on your club. We’ve been told many times over that mention in this column gets a group great exposure, helping it attract new members and friends.

Saucedescibesthisgroupasbeinggearedtoward business applications for the IBM PC. Dues are $10 per year and the group meets the last Tuesday of each month. A software library with approximately 40 disks is available to members. For more information, contact: Maurice Feryn, Route 1, Box 294, Mead, WA 99021. (509) 466-3685.

Downer’s Grove, Illinois is the home of the Dupage Apple Users Group. Membership has grown to 200 members, and spans the age spectrum from junior high students to retirees. The group includes Macintosh and Apple IIc users. Special Interest Groups (SIGs) include machine language, BASIC, and Applesoft. Dues are $12 per year and include the DAUG Newsletter and use of the library, which consists of over 40 disks. For more information, get in touch with: Bob Konikow, P. O. Box 294, Downer’s Grove, IL 60515. (312) 968-3897.

Schools in the Omaha, Nebraska area seem to be benefitting from the existence of the Omaha Apple Sauce users group. Member John Anderson mentioned that this group has gone out into the area’s schools to promote computers in education to teachers who are interested in this concept. Membership in this Omaha group is quite large—200 members, with 90 to 100 members attending the meetings (held the first Wednesday of each month). Special Interest Groups are offered encompassing machine language, finances, and Macintosh. Apple IIc owners are beginning to make their presence known there. Members can take advantage of an extensive software library, as well as a library containing books and magazines pertaining to Apple machines. For more membership information, contact: John Anderson, 3103 South 32nd Avenue, Omaha, NE 68105. (402) 346-8429.
Lessons on Using Simon's BASIC

by William K. Balthrop
HCM Staff

In our continuing effort to enlighten and brighten your computing skills, we bring you this column devoted to Simon's BASIC. Five new commands help bring out two of the C-64's brightest features: sound effects and music. So throw away those PEEKs and POKEs—Simon's BASIC makes composing music fun and easy.

Use the VOL command to change the volume.

Example: VOL 15

The VOL command can be used to adjust the volume of the music or sound created with the C-64's SID (Sound Interface Device) chip. When you set the volume, the same level is used for each output channel in the SID chip. The volume ranges from 0 to 15 units.

Use the WAVE command to select the waveform.

Example: WAVE 1,10000000

The WAVE command is used to assign a waveform to one of three sound channels (voices). The first parameter specifies the voice. The second parameter is a binary number which selects the waveform, synchronization, and ring modulation. This example tells voice 1 to output noise. For the example given at the bottom of the page, try using: WAVE 1,00001000

Use the ENVELOPE command to define the ADSR for each voice.

Example: ENVELOPE 1,0,6,0,0

The ENVELOPE command can be used to set up the Attack-Decay-Sustain-Release (ADSR) for one of the three voices. The first parameter determines the voice number. The next four parameters set up the ADSR with values from 0 to 15. These values refer to time duration for A, D, and R; and to a percentage of total volume for S. Try changing the example at the bottom of the page to use: ENVELOPE 1,5,10,10,10

Use the MUSIC command to compose music.

Example: MUSIC 8,"SHIFT CLR/HOME 1B5 F1 Z F1 C6 F1 Z F1 D6 F1 Z F1 SHIFT CLR/HOME G"

The MUSIC command can be used to compose music. You can specify the notes with a single letter such as A or D, or skip a beat with the letter Z. The octave in which the note is to play is set with the number that follows each letter. The function keys between each note specify the note's length.

Use the PLAY command to play music composed with the MUSIC command.

Example: PLAY 2

The parameter following the PLAY command can have a value from 0 to 2; 0 turns off sound; 1 plays music and continues the program only after the music has finished; and 2 continues the program, with the music playing in the background. Now try RUNing this "machine gun":

1 VOL15:WAVE 1,10000000:MUSIC 4,"SHIFT CLR/HOME 1B5 F1 Z F1 C6 F1 Z F1 Д6 F1 Z F1 SHIFT CLR/HOME G"

2 ENVELOPE 1,0,6,0,0:PLAY 2:FOR TD=1 TO RND(0)*100:NEXT:GOTO 2

HCM
Each month we publish items of interest and news of recently or soon-to-be released computer products. Our publication of information from manufacturers of computers, peripherals, software, and accessories is not to be construed as product endorsement. Prices quoted are the manufacturers' suggested retail prices and are subject to change.

Send press releases to:
Product News Editor
Home Computer Magazine
1500 Valley River Drive, Suite 250
Eugene, OR 97401

Same Power, Smaller Size
Two Half-Height Drives for the Apple

Microsc! Corp. has introduced two half-height floppy disk drives, the A.5 and A.5c, that are compatible with the Apple II family of computers. Both machines operate on a direct-drive motor, and each stands less than 2 inches high. The 143K, 35-track A.5 drive can be attached to any Apple disk controller. The A.5c, with the same features as the A.5, was designed to be a second disk drive for the Apple llec, and plugs directly into the llec. The A.5 is $269 and the A.5c is $299.

Microsc! Corp.
2158 South Hathaway St.
Santa Ana, CA 92705
(714) 241-5600

The Sound of Music
Music Keyboard Plugs Into C-64

Sequential Circuits, Inc. has introduced the Music-Mate, a music keyboard for the Commodore 64 that attaches to the computer through the joystick port. It features full-size playing keys and is polyphonic, allowing users to play 3 notes simultaneously to produce chords. The Model 970 software, included with the $99 package, lets users record up to 10 continuous minutes of their music and play it back, and see a four-color monitor display of the sound values of the Sound Interface Device chip. The sound is adjustable, and a transpose function moves recorded songs up or down in pitch by octaves. Four separate software packages, Song Builder, Song Editor, Song Printer, and Sound Maker allow users to further edit and display their music, and cost $39.95 each.

Sequential Circuits, Inc.
3051 North First St.
San Jose, CA 95134
(408) 946-5240

Write Your Own Adventure Novel
Interactive Programs Aid Novel Writers

Synapse Software has introduced their series of Electronic Novels for IBM PC, Apple III and IIIc, and Commodore 64 computer users. Electronic Novels are packaged in hardbound book form—early chapters set the scenes, the story line, and introduce the characters and information relevant to the "journey," which the user completes using floppy disks included in the package. Blank pages are included for map-drawing or notes. The first titles in the series are Mindwheel, a journey into the minds of four deceased people of extraordinary power, and Essex, the story of an intergalactic search-and-rescue mission. The novels are $44.95 for IBM and Apple computers, and $39.95 for Commodore computers.

Synapse Software Corp.
6221 Central Ave.
Richmond, CA 94804
(415) 527-7751

High-Tech Instruction for Beginners
Texas Instruments Issues Book Series

Texas Instruments is releasing its Understanding Series of books, designed for people who want to learn about today's technology. The Series introduces newcomers to timely subjects in science and technology, or gives readers with prior knowledge on the subjects a quick review. Ten titles will be issued in early 1985, and plans are underway to expand the series to 36 books. Included in the first ten books are: Understanding Automation Systems, Understanding Automotive Electronics, Understanding Communications Systems, Understanding Computer Science, Understanding Data Communications, Understanding Digital Electronics, Understanding Digital Troubleshooting, Understanding Microprocessors, Understanding Solid State Electronics, and Understanding Telephone Electronics. These books will retail for $14.95 each.

Texas Instruments Inc.
P.O. Box 225474, MS 8218
Dallas, TX 75265
(214) 997-3925
Get Back to Your Roots

Record Your Ancestry

Roots II, a program that tracks family trees back as many as 99 generations, is now available for the IBM PC and PCjr from Comm-Soft. Information for more than 4,000 individuals can be stored and rapidly recalled. Once a family's data has been entered, Roots II prints a family book (up to 999 pages long) containing 4 types of forms or charts, biographical sketches, source documentation, and an alphabetized index of the book's contents. In addition, the program will store maps and pictures of people for display on a monitor. A 220-page manual covers program operation and instructions for starting a search for family roots. The package's price is $99.

Do More Than Before With the C-64

A word processor and two utility programs, all for the Commodore 64, compose some of the latest offerings from Abacus Software. Textomat-64 accommodates form letters, chaining of documents, block operations, and a complete printer setup. Horizontal scrolling allows for 80-column line width. Assembler/Monitor 64 assists with the development of machine language programs. The assembler features a fast macro assembler, full screen editing of source programs, and a complete symbol table listing; the monitor has 15 other functions. Pascal-64 is a Pascal compiler and language development package with file-handling capabilities for sequential and relative data management. It also features multi-dimensional arrays, high resolution graphics, and sprites. All three products are priced at $39.95 apiece.

Tennis, Anyone?

Tennis Simulation With the Pros

Gamestar, Inc. has introduced On-Court Tennis for the Commodore 64. It offers full racquet control over groundstroke angles and spins, serves, lobs, and smashes, and a choice of grass, clay, or hard courts. When playing against one of the computer's 4 superstar challengers, the computer's play intelligence “floats” according to your skill. The real characteristics and playing style of each superstar are incorporated into the opponent. Beating the computer entitles you to join Gamestar's exclusive “Top Seeds” Tennis Club. On Court Tennis retails for $31.95.

Getting A Good Return

A Year-End Tax Planning Program

A way to compare the effects of financial decisions on taxes is available with the Tax Command Planner, a program by Practical Programs, Inc. for Commodore 64, Apple II Family, and IBM PC systems. Designed for end-of-year tax planning, the program lets the taxpayer quickly try up to 6 different strategies for periods of up to 5 years simultaneously. For example, it can assist with decisions on how to depreciate equipment, whether to sell stock, or make contributions the lowest cost. Recalculations are automatically completed when an entry is changed or added. Recently revised tax tables for 1984, including the new rules on incomeaveraging passed by Congress, have been incorporated into the program. The Command Planner for the C-64 is $49.95, for the IBM PC $99.95, and for the Apple II Family $79.95.

Keyboard With the Works

A Keyboard/Trackball Peripheral

Wico Corp. has released its SmartBoard, a combination keyboard/trackball peripheral for IBM PC and Apple II, II+, and IIE computers. The SmartBoard is fully programmable, allocating 256 bytes to the 10 function keys according to need. The mouse-emulator trackball can be programmed with up to eight characters in any of the 4 primary directions. It comes factory-programmed with both the QWERTY and DVORAK layouts. A type-ahead buffer and N-key rollover are standard, with a serial expansion port also provided. The SmartBoard retails for $399.95, and an adapter for Apple owners is an additional $50.

A More Flexible Connection

TI Interconnect Turns Corner

The Peripheral Expansion Box Interconnect by Ten-X Precision is a new device that plugs into the TI-99/4A's I/O port or speech synthesizer and the existing cable, which then plugs in from behind the console. It is designed to alleviate the problems associated with the expansion box's heavy cable and interface connection, preventing accidental disconnection of the system. The Ten-X Peripheral Expansion Box Interconnect is available for machines with or without the speech synthesizer for $43.85.

Gamestar, Inc.
1302 State St.
Santa Barbara, CA 93101
(805) 963-3487

Comm-Soft
2452 Embarcadero Way
Palo Alto, CA 94303
(415) 493-2184

Abacus Software
P.O. Box 721
Grand Rapids, MI 49510
(616) 241-5510

Wico Corp.
6400 West Gross Point Rd.
Niles, IL 60648
(312) 647-7500

Gamestar, Inc.
P.O. Box 163
Concord, CA 94522

Abacus Software
P.O. Box 93104
Milwaukee, WI 53203
(414) 278-0829

Pascal-64 is a Pascal compiler and language development package with file-handling capabilities for sequential and relative data management. It also features multi-dimensional arrays, high resolution graphics, and sprites. All three products are priced at $39.95 apiece.

Roots II prints a family book (up to 999 pages long) containing 4 types of forms or charts, biographical sketches, source documentation, and an alphabetized index of the book's contents. In addition, the program will store maps and pictures of people for display on a monitor. A 220-page manual covers program operation and instructions for starting a search for family roots. The package's price is $99.

Horizontal scrolling allows for 80-column line width. Assembler/Monitor 64 assists with the development of machine language programs. The assembler features a fast macro assembler, full screen editing of source programs, and a complete symbol table listing; the monitor has 15 other functions. Pascal-64 is a Pascal compiler and language development package with file-handling capabilities for sequential and relative data management. It also features multi-dimensional arrays, high resolution graphics, and sprites. All three products are priced at $39.95 apiece.

Tennis Simulation With the Pros

Gamestar, Inc. has introduced On-Court Tennis for the Commodore 64. It offers full racquet control over groundstroke angles and spins, serves, lobs, and smashes, and a choice of grass, clay, or hard courts. When playing against one of the computer's 4 superstar challengers, the computer's play intelligence “floats” according to your skill. The real characteristics and playing style of each superstar are incorporated into the opponent. Beating the computer entitles you to join Gamestar's exclusive “Top Seeds” Tennis Club. On Court Tennis retails for $31.95.

A Year-End Tax Planning Program

A way to compare the effects of financial decisions on taxes is available with the Tax Command Planner, a program by Practical Programs, Inc. for Commodore 64, Apple II Family, and IBM PC systems. Designed for end-of-year tax planning, the program lets the taxpayer quickly try up to 6 different strategies for periods of up to 5 years simultaneously. For example, it can assist with decisions on how to depreciate equipment, whether to sell stock, or make contributions at the lowest cost. Recalculations are automatically completed when an entry is changed or added. Recently revised tax tables for 1984, including the new rules on incomeaveraging passed by Congress, have been incorporated into the program. The Command Planner for the C-64 is $49.95, for the IBM PC $99.95, and for the Apple II Family $79.95.

A Keyboard/Trackball Peripheral

Wico Corp. has released its SmartBoard, a combination keyboard/trackball peripheral for IBM PC and Apple II, II+, and IIE computers. The SmartBoard is fully programmable, allocating 256 bytes to the 10 function keys according to need. The mouse-emulator trackball can be programmed with up to eight characters in any of the 4 primary directions. It comes factory-programmed with both the QWERTY and DVORAK layouts. A type-ahead buffer and N-key rollover are standard, with a serial expansion port also provided. The SmartBoard retails for $399.95, and an adapter for Apple owners is an additional $50.

TI Interconnect Turns Corner

The Peripheral Expansion Box Interconnect by Ten-X Precision is a new device that plugs into the TI-99/4A's I/O port or speech synthesizer and the existing cable, which then plugs in from behind the console. It is designed to alleviate the problems associated with the expansion box's heavy cable and interface connection, preventing accidental disconnection of the system. The Ten-X Peripheral Expansion Box Interconnect is available for machines with or without the speech synthesizer for $43.85.
Of Magic, Math, and Mayhem

Develop Math and Memory Skills

Math Magic, for ages 4 to 9, and Race The Clock, for ages 5 to 12, are two recent educational program releases from Mindplay. Math Magic is an arcade game that helps children develop counting, addition, and subtraction skills while knocking down walls to make monsters disappear. Race The Clock helps kids sharpen their memory and thinking skills as they try to match pictures and words. Graphics are used to illustrate active verbs. Both programs can be customized by parents or teachers, and are available for $39.99 each. They run on the IBM PC and PCjr as well as Apple II Family computers.

Methods & Solutions, Inc.
82 Montvale Ave.
Stoneham, MA 02180
(617) 438-5454

It's All In the Wrist

A New Joystick for the C-64 & 99/4A

Suncom has designed a new joystick for TI-99/4A and Commodore 64 computers. The TAC-3, which stands for Totally Accurate Controller includes three fire buttons: two buttons on the base, and one on top of the hand. The joystick has a two-year warranty, and costs $14.95.

Suncom
260 Holbrook Dr.
Wheeling, IL 60090
(312) 459-8000

Make Your Home Your Castle

Design Your Own Home and Yard

Design Your Own Home is a new, three-package series of programs by Avant-Garde Publishing Corp. for Apple II Family computers. Architectural Design ($99.95) offers 126 individual detail shapes that can be rotated and arranged in any way. The program calculates distances, diagonals, and angles, and lets the user construct floor plans, top views and side views of each creation. Interior Design ($69.95) allows the user to move scaled down furniture around to discover where it will best fit, choose multi-colored patterns for wallpaper or fabric designs, and look at arrangements from the top and side. Landscape Design ($69.95) lets the user draw an outline of home and property lines, then arrange flowers, trees, and shrubs around the house or property. Young plants can be aged to preview how they will look when grown, and a "paintbrush" graphics utility allows more artistic expression. Also, north, south, east, and west perspectives are provided, as well as side and aerial views.

Avant-Garde Publishing Corp.
P.O. Box 30160
Eugene, OR 97403
(503) 348-3043

Wage An Historic Battle

Simulate The Ancient Art of War

The Ancient Art of War, Broderbund Software's new strategy game for the IBM PC and PCjr, contains 11 built-in war campaigns from history, each fought by barbarians, archers, and knights from the pre-gunpowder era. The program also features a game generator which allows users to design their own battles—right down to the condition of the troops and the difficulty of the terrain. Action takes place in real time, and a zoom feature allows the user to see close-ups of battles and issue commands that the troops carry out in detailed animation showing individual soldiers. It retails for $44.95.

Broderbund Software
17 Paul Dr.
San Rafael, CA 94903-2101
(415) 479-1770

In Search of the Lost Rules

Indiana Jones Meets the Home Computer

Indiana Jones in the Lost Kingdom, developed by Mindscape Inc. in conjunction with Lucasfilm, Ltd., is a unique game for the Commodore 64—it has no rules. Players must first find out what the puzzle is and then solve it for each of six different rooms. The objective is to retrieve an artifact containing the complete history and knowledge of a lost, forgotten civilization. Frustrated players can consult the manual for encrypted clues or dial a telephone "hotline." The game retails for $29.95.

Mindscape Inc.
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667

Do-It-Yourself Investment Planning

An Investment and Statistical Program

Programmed Press has announced that its Investment and Statistical Software package, containing 50 programs for statistical forecasting, stocks, bonds, options, futures, and foreign exchange, is ready for the Commodore 64. The software also supports Apple and IBM personal computers. A 220-page Computer-Assisted Investment Handbook by Dr. Albert Bookbinder lists, explains, and gives sample RUN illustrations for all 50 of the BASIC programs. The Investment and Statistical Software package is priced at $100, and the Handbook is $19.95.

Programmed Press
2301 Baylis Ave.
Elmont, NY 11003
(516) 775-0933

© Home Computer Magazine
Volume 5, No. 1
An Assembly Language Guide
TI Programmers Get E/A & MM Help

Learning TI-99/4A Home Computer Assembly Language Programming by Ira McComic includes the basic concepts of assembly language programming and the structure of TI's existing programs. Information is also provided about the Editor/Assembler Package, and the line-by-line assembler and debugger that are included in the Mini Memory module. Program examples accompany the guide's tutorial material. The book retails for $16.95.

Wordware Publishing, Inc.
1104 Summit Ave. Suite 104
Plano, TX 75074
(214) 423-0090

Light Up Your Learning
Science Programs for the C-64

Tech Sketch, Inc. has introduced 3 new high-school level science-education programs for the Commodore 64. Each of the new titles is the first in a series planned for three subject areas: biology, chemistry, and the structure of matter. The first programs are Structure of Leaves, Molecules and Atoms, and Passive Transport, which explains how substances move through membranes. The new series of programs is compatible with Tech Sketch’s line of light pens.

Home Nutritional Planning
Track Nutrients in the Foods You Eat

Three new packages designed to track 15 nutrients in more than 800 foods have been released by Nutritional Data Resources. Nutrient Goal Graph 15-1 analyzes 15 nutrients for one day of food intake and graphically compares them to the Recommended Dietary Allowance goals by sex, age, and weight. Nutrient Calculator 15 analyzes the nutritional content of recipes, menus, and daily food intake. Nutrient Tracker 15 allows the user to select 20 foods from the data base and provides an analysis of 15 nutrients in each of those foods. The programs will run on the IBM PC and PCjr, and the Apple IIe with 80-column card. Prices range from $40 to $60 each.

A Turtle Learning Guide
BASIC and Story Structure for Kids

Telly Turtle, a turtle graphics program based on the LOGO language, is one of two new educational programs from Hayden Software Company. Telly Turtle helps children as young as 4 understand BASIC programming through the use of icons and graphic creations. It is available for the Commodore 64 for $29.95. Adventures in Colorland: Space Sagan was created to provide structure to story writing for 6 to 10 year olds. Once a child chooses one of four stories, selects the main character, the space ship for travel, and the means to solve the proposed problem, the choices come to life, allowing the child to see how his or her choices affected the story. It is priced at $29.95 for the Commodore 64, and will soon be available for the Apple II Family and the IBM PCjr.

Removing Language Barriers
International Characters Available

IsraComp has released four new programs for the Commodore 64. Hebrew-Writer II is a Hebrew word processor that prints and displays Hebrew from either the HebrewWriter's right-to-left environment or from user-written programs. Editing and storage is also possible, and the $19.95 program will print on any C-64 dot matrix printer. Creatagraphics allows a user to create and store character sets (graphic, foreign alphabets, etc.) and sprites. The Creatagraphics package includes Hebrew, Arabic, Greek, Russian, and Korean character sets, and will print in both directions. It sells for $24.95. IsraQuiz and Maps & Facts require the user to identify geographical entities and answer randomly-generated questions regarding the geography and politics of Israel (in IsraQuiz), and the world (in Maps & Facts). Both IsraQuiz and Maps & Facts are $9.95 apiece.

Professor Pixel Holds Class
Create Graphics and Sound Effects

Individual Software, Inc. has released Professor Pixel, a program that teaches users how to use the BASIC programming language to create their own graphics, melodies, and sound effects, and then bring it all to life with color animation. Professor Pixel is menu-driven and uses non-technical dialogue and interactive exercises for all ages and ability levels. It runs on IBM PC and PCjr computers, and costs $59.95.
Think In TinkTonk Land

Series Features Fantasy Characters

Mindscape, Inc. has released four new programs from their Tink! Tonk! series, which is part of their Sprout line of educational software for children ages 4 through 8. In Tink's Adventure, Tink leads children through a search for treasure as they learn the alphabet. Tonk In The Land Of Buddy-Bots consists of five games that help children develop concentration and critical thinking skills. By helping Tinka travel through TinkTonk Land in Tinka's Mazes, kids develop basic math concepts and solve addition problems. Tuk Goes To Town is an interactive story featuring five different games designed to teach spelling, build vocabulary, and strengthen reading skills. These programs retail for $39.95 each, and will run on Apple, IBM, and Commodore computers.

Mindscape, Inc.
3444 Dundee Rd.
Northbrook, IL 60062

Helping At Home

Data Base & Reading Aids for 99/4A

Four new programs for the TI-99/4A have been released by Navarone Industries, Inc. Data Base Management System for home and small businesses ($69) keeps track of inventory, customer files, and even personalized form letters. Users can create databases with up to 35 fields in 32,000 records. The System requires a disk drive. Homework Helper for children 8 years and older features a built-in 21,500 word spelling checker with its word processor. The $49.95 program includes a standard format for book reports and class projects.

Navarone Industries, Inc.
510 Lawrence Expressway #800
Sunnyvale, CA 94086
(408) 866-8579

A Striking Offense

Realistic Air-Combat Simulation

Two new programs from MicroProse Software, F-15 Strike Eagle and MIG Alley Ace, simulate modern air combat from an electronic cockpit. F-15 Strike Eagle includes many of the real plane's flight weapons and information systems to use in 7 realistic missions. The Combat Environment has enemy aircraft, radar and infra-red guided missiles, air-to-air missiles, and ground targets. The F-15's defenses include electronic counter measures, after burners, flares, and surface-to-air missile launch indicators. MIG Alley Ace operates in three-dimensional airspace where the pilot must take into account airspeed, turn rates, gravity, and relative position in 3 axes, as well as make tradeoff decisions on the proper time to attack, defend, or escape. Both programs run on the Commodore 64, with versions of F-15 Strike Eagle to be released soon for Apple and IBM PC and PCjr systems. Each retails for $34.95

MicroProse Software
10616 Beaver Dam Rd.
Hunt Valley, MD 21030
(301) 667-1151

It's In The Mail . . .

Electronic-Mail Word Processing

Write Away, Midwest Software Associates, Inc.'s word processing system for the Apple II Family of computers, has been enhanced to accommodate electronic mail. In addition to creating, editing, and printing documents, a user can now transmit them with Terminal, a terminal communications program that has been integrated into the Write Away system. It offers these functions: auto dial, auto answer, read file from disk, write file to disk, transmit file, capture file, full duplex, half duplex, and unattended operations. The Write Away system also includes form letter and mailing list support; logical operators and conditional text features; data base file reading; block delete, move, or copy; and soft hyphenation. It is priced at $175.

Midwest Software Associates, Inc.
1160 Appleseed Ln.
St. Louis, MO 63132
(314) 997-2369
Want to Get Published?
Fame, Fortune, Recognition!
See Your Name in Print!

Home Computer Magazine is looking for articles and programs in all areas of interest relevant to Apple, IBM, Commodore, and Texas Instruments home computers. Here are some of the kinds of material we would like you to submit:

**Software**

Have you written any programs in the areas of home productivity, education, or entertainment? Perhaps you've created unique software to help monitor personal finances, or a new contribution to computer-assisted instruction (CAI). Maybe you have an unusual new game—or a routine that makes certain computer operations easier to perform. Don't be shy. Even if you think your piece is “unpolished,” it may still be a good idea. We will be glad to follow through with your concept—enhancing the program and converting it to work on the other machines we cover.

**Product Reviews**

Have you recently purchased a piece of hardware or software that hasn’t come up to your expectations—or has, on the other hand, impressed you with its performance? We're looking for comprehensive product reviews from different perspectives.

**Hardware Tips**

Perhaps you’ve modified your microcomputer or have interfaced it with some unique or useful hardware. Send us your how-to-do-it story, complete with photos and/or diagrams.

**Tutorials**

Many of our articles are purely instructional. If you have extensive experience in some area of programming or other computer application, put your specialized knowledge down on paper and let us pass it on to our readers.

These are just some ideas. Perhaps you have others. If you’re not a professional writer, don’t worry. Our friendly editorial staff stands ready to help you polish your manuscripts. And we’ll be more than happy to send you a copy of our author guidelines. Here are some comments from happy writers who have already published their work in our magazine:

“"The people at Home Computer Magazine are fun to work with. And it's sure nice to get paid for writing about my favorite subject." —Patricia Swift
Author of "Multiplan Medium" and other articles

"The artwork and layout are creative and contribute a lot to the presentation of my articles." —Roger Kirchner
Author of "Missionary Impossible" and other articles

"It was gratifying to finally see my name in print after all the work I’ve done on my computer." —Brian Lee
Author of "Market Madness"

"I was extremely impressed with the way my program was printed in HCM. It was very interesting to see the way the program was translated into the languages of the other popular computers and to read the comments of the people who reviewed the program. Truly a first class job! Thank you!" —Craig Blazakis
Author of "Bird Brain"

"I was very pleased with the final presentation of my article. It is gratifying to see such judicious handling of an outside submission. The HCM staff fixed a program bug and expanded the application of the article to three other computers, while preserving the style of the article as submitted. The illustration added to the overall readability." —Andrew Keith
Author of "Build a LOGO Adventure"

Please send your double-spaced, typed or printed manuscripts, photos, and disks or cassettes (recorded on both sides) if the article includes program material, to:

Attn: Editorial Submissions
Home Computer Magazine
1500 Valley River Drive, Suite 250
Eugene, OR 97401
As a service to our readers who prefer to key-in their own programs, we are able to offer high-quality blank diskettes and cassettes at low prices.

<table>
<thead>
<tr>
<th>10 Diskettes</th>
<th>12 Cassette Tapes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10 Diskettes</strong></td>
<td><strong>12 Cassette Tapes</strong></td>
</tr>
<tr>
<td>5 1/4&quot; certified single-sided, double density with reinforced hub rings. Bulk-packaged 10 to a set with separate white envelopes and identification labels.</td>
<td>C-20 digital computer cassettes (nominally 10 minutes per side) with 5 screw housing for data integrity.</td>
</tr>
<tr>
<td><strong>Subscriber Price</strong></td>
<td><strong>Non-Subscriber Price</strong></td>
</tr>
<tr>
<td>$19.95 plus $3.00 shipping*</td>
<td>$29.95 plus $3.00 shipping*</td>
</tr>
<tr>
<td>$14.95 plus $3.00 shipping*</td>
<td>$24.95 plus $3.00 shipping*</td>
</tr>
</tbody>
</table>

Please Send Me:

- [ ] set(s) of Diskettes
  (10 Disks to a set)
- [ ] set(s) of Cassettes
  (12 Cassettes to a set)

Please Print:

- Name _______________________
- Address ____________________
- City ___________________ State ____ Zip ______
- Subscriber No. (Found at the top of your address label.)
- MUST BE IN US FUNDS DRAWN ON US BANK
- [ ] Check or Money Order Enclosed
- Bill my [ ] VISA [ ] MASTERCARD

Total Order $ ______

Account Number ______________

Signature ____________________ Exp. Date __________

Phone No. _____________________

Offer & Prices Subject To Change Without Notice.

Homeland Computer Magazine
P.O. Box 70288 • Eugene, OR 97401

For information on ordering TOLL FREE see bind-in card located at the middle of this magazine.
Your Guide to Typing in Programs from HCM

Within these pages is a software bonanza: entertainment, education, home and business applications, utilities, and tutorials—just for you. All you need to do is type them into your computer. HCM has taken most of the strain out of this process:

- Typeset listings with numbers in boldface.
- A bold, double vertical bar separating the line numbers from the program statements in BASIC listings.
- A vertical background grid to aid entry of the spaces.

Look at the Key-in-Reference (Figure 1 below) see how each character actually appears in the listing. By checking any questionable characters with the Key-in-Reference, you can reduce errors to a minimum.

Figure 1: Key-in-Reference

Before You Begin

Since HCM publishes for several different computers, the first thing you should do is make sure that you are looking at the listing designed for your machine. If, for example, you have an Apple IIe, make sure you look for the following black bar above the listing:

The computer model name will likewise appear on each subsequent page of each listing, so always look for the name before you begin typing from a new page of listings.

Before you begin typing in the program, you will want to set up a system to save your program. Whether you are using a cassette or diskette storage system, now is the time to be certain it is properly connected, powered up, and loaded with a blank cassette or an initialized disk. As you type in your program, you should get in the habit of saving your work after every twenty or so lines.

One of the most common errors in entering a listing is typing one symbol for another. These transpositions include substituting the letter O for the number 0, the letter I for the number 1, the letter S for the $ and the upper-case B for the number 8. The last error is especially likely when working in hexadecimal numbers which are composed of 0-9 and the upper case letter A-F.

The listings in HCM are always the same number of characters wide, but the number of characters put on any line of the video display will vary from computer to computer. Don’t try to make your listings look like the type-set listing—instead make sure you key in the listings character for character and space for space.

A Special Note on C-64 Listings

Commodore uses more than 90 special symbols to represent various keyboard operations: for instance, the symbol in a program represents the operation of holding down the [SHIFT] key and pressing the key which has CLR on its upper half (second key from the right on the top row). This operation clears the screen.

Rather than reproducing these symbols, HCM’s listings include keystroke instructions, between two hands with pointing fingers. For example, when you find in an HCM listing, you will know to hold down the [SHIFT] key and press the key with CLR on it.

A number is included if you need to repeat the operation: in an HCM listing, tells you to hold the [SHIFT] key down and press the cursor left key (on the bottom right of the keyboard) eight times.

When you come to the hand symbols, remember:

- Each operation is enclosed in its own set of hand symbols.
- If any key action requires you to press two keys, press the control key or the Commodore key or the shift key first and hold it down before pressing the second key.
- Everything between a pair of hand symbols is set in a different place.

In Figure 2 below, we have included a chart showing you a representative sample of the symbols that appear when you use keystrokes enclosed by the hand symbols. (Notice that the hand symbols always appear within quotation marks—as in a print statement.)

Figure 2: C-64 Special Symbols

When you see:

Press the keys:

To get this display:

Program Identification

Each program header (the first few lines of the program) contains information giving the language the program is written in (e.g., TI Extended BASIC, Applesoft, etc.) and any special system components that are required (special memory cards, Speech Synthesizer, etc.). The first two digits of the version number tell you in which volume and issue of HCM the program initially appeared. The third digit of the version number indicates the version of the program. When a program initially appears, in HCM, it is version 1. Any subsequent revisions to the program if later published in the magazine or in the software available on magnetic medium from HCM will bear a revised version number.

<table>
<thead>
<tr>
<th>Volume no.</th>
<th>Issue</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

End of Program = HCM
**LOGOSAILING**

**LOAN CALCULATOR**

---

**PROGRAM LISTING**

---

**TI-LOGO — TI-99/4A**

**TI-99/4A**

---

**Copyright 1984, 1985 Emerald Valley Publishing Co.**

---

**Home Computer Magazine**

---

Continued
**SET THE DATE**

Continued

```
280: PRINT "ENTER YEAR: " : INPUT I
290: IF I < 1980 THEN 280
300: IF I > 2000 THEN 280
310: NEXT 1
```

```
470: FOR I = 1 TO 2: REM MULTIPLY ON DAY TIMES RIGHT POWERS OF 2 AND ADD TO DECIMAL DAY
```

```
480: NEXT 1
```

```
550: YEAR = YEAR + 2: "J (J-1) YEAR"
```

```
560: GOSUB 580
```

```
590: RETURN
```

**PIE CHART**

```
```

```
350: REM VAL(B): FOR 2: 1 TO N: LOCATE 2+N: 15: PRINT SPACE
```

```
360: REM A*: NEXT: IF A* = "Y" OR A* = "y" THEN
```

```
370: M = 360
```

```
380: LOCATE 21: REM INPUT WHICH RECORD
```

```
```

```
400: PRINT "A=": CHRS(9)-"I": CHRS(9)-"J": CHRS(9)-"K": CHRS(9)-"L": CHRS(9)-"M": CHRS(9)-"N": CHRS(9)-"O": CHRS(9)-"P": CHRS(9)-"Q": CHRS(9)-"R": CHRS(9)-"S": CHRS(9)-"T": CHRS(9)-"U": CHRS(9)-"V": CHRS(9)-"W": CHRS(9)-"X": CHRS(9)-"Y": CHRS(9)-"Z": E
```

```
```

```
```

```
430: REM FOR Z1 TO N: IF B Z1 = BA 7 THEN 420: IF 70 TO 260
```

```
440: NEXT 1
```

```
450: REM A* NEXT: IF A* = "Y" OR A* = "y": THEN
```

```
```

**WORM WOOD**

```
320: REM B: GOSUB 470: GOSUB 470: GOSUB 470
```

```
330: REM B: GOSUB 470: GOSUB 470: GOSUB 470
```

```
340: PRINT Chr$(V): NEXT 1
```

```
350: NEXT 2
```

```
360: IF I-77 THEN 360
```

```
370: GOSUB 550
```

```
380: GOSUB 550
```

```
390: GOSUB 550
```

```
400: FOR Z1 TO 675
```

```
410: CALL SYSCHR((RND-0.5)+1)
```

```
420: PRINT Z1: NEXT 1
```

```
430: NEXT 1
```

```
440: GOTO 280
```

```
450: GOTO 280
```

```
460: GOTO 280
```

```
470: DATA 1810C87713737373716,1811C87713737373716,1812C87713737373716,1813C87713737373716,1814C87713737373716,1815C87713737373716,1816C87713737373716,1817C87713737373716
```

© Home Computer Magazine , Volume 5, No. 1 77
QUIZ-PRINT

COMMODORE 64

© Home Computer Magazine Volume 5, No. 1 81
### ORBITAL DEFENDER

<table>
<thead>
<tr>
<th>Line</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>255</td>
<td>E VAL MID [TIME] 71</td>
</tr>
<tr>
<td>191</td>
<td>255</td>
<td>50 RANGE = 50</td>
</tr>
<tr>
<td>192</td>
<td>255</td>
<td>141 DIM TITILE(154), AFIGHTER(1)</td>
</tr>
<tr>
<td>193</td>
<td>255</td>
<td>132 DATA AB [EMP] 274, BLEST [104]</td>
</tr>
<tr>
<td>194</td>
<td>255</td>
<td>132 DATA AB [EMP] 274, BLEST [104]</td>
</tr>
<tr>
<td>195</td>
<td>255</td>
<td>320 REM DEF</td>
</tr>
</tbody>
</table>
ORBITAL DEFENDER

Continued

IBM PC & IBM PCjr

PROGRAM LISTING

© Home Computer Magazine  Volume 5, No. 1  97
<table>
<thead>
<tr>
<th>TIME</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Y5</th>
<th>Y6</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The table above shows a grid with coordinates for a Backgammon board setup, where the top left corner is (0,0) and the bottom right corner is (23,23) for a standard 24x24 board.
FILE MANAGER

CONTINUED

OUTLINE EDITOR

PROGRAM LISTING
The Organizer for the APPLE II Family

-- OUTLINE EDITOR --

-- MAIN MENU --

-- REPORTS --
THE

THEN

Next

RETURN

NEXT

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN

RETURN
The Organizer for the COMMODORE 64

FILE MANAGER

MAIN MENU

PROGRAM LISTING

OUTLINE EDITOR

REPORTS

APPLE II Family

COMMODORE 64

COMMODORE 64

COMMODORE 64

COMMODORE 64

© Home Computer Magazine  Volume 5, No. 1 131
Each issue, as corrections and/or enhancements to our programs are completed and tested by our "cross-checking" computer. A listing of all the differences is produced, transmitted to the computerized typesetter, and formatted in the same fashion as our standard listings.

This procedure for "DeBugs on Display" offers two advantages: (1) a standard presentation for updating your HCM programs that is clear and straightforward, and (2) inclusion of all published changes in "update files" which are placed ON DISK at the same time the corrections appear in print. This is of special significance to Apple, IBM, and TI (Extended BASIC programs only) ON DISK subscribers, because the correction file can be directly "merged" with the original file—automatically updating it! The procedures for accomplishing this are included with the appropriate media.

We are currently working on an easy method of "update merging" for the Commodore 64, and hope to have it ready soon. (More experienced users can refer to this issue's C-64 Tech Note for one such method—although it may be too complicated for beginners, who may prefer just to key-in the changes.)

If you are going to key-in the corrections from "DeBugs on Display" directly into the original program, follow these steps:

1.) Load the original program into your computer's memory.
2.) Key-in the corrections as directed in the "Program Typing Guide" at the beginning of the Listings section.
3.) Any lines in the listing of corrections that state "****DELETED LINE," are to be deleted from the original program by entering the line number only and pressing either the (ENTER) or (RETURN) key (depending on your computer).

Each set of program corrections is prefaced by an identification bar that tells you the program name, and the computer brand to which the correction applies. Make sure you are working with the right listing to ensure satisfactory results.

---

**Tablut**

From HCM Vol. 4, No. 2

**Market Madness**

From HCM Vol. 4, No. 4

**Elementary Add & Subtract**

From HCM Vol. 4, No. 4
MARKET MADNESS
from HCM Vol. 4, No. 4
APPLE II Family

160 REM VERSION 4.3.3
360 REM TOWER 500 MON 2
400 IF X>SP1 THEN POKE 54,0:GOTO 560
410 IF X<SP1 THEN POKE 54,255:GOTO 560

THE ELECTRONIC HOME SECRETARY
from HCM Vol. 4, No. 2

150 REM VERSION 4.2.3
180 REM IBM PC w/ CARTRIDGE BASIC

SPIDER GRAPHICS
from HCM Vol. 4, No. 3

150 REM VERSION 4.3.2
180 REM IBM PC w/ 64K MEMORY EXPANSION

MISSILE MATH
from HCM Vol. 4, No. 3

150 REM VERSION 4.3.2
180 REM IBM PC BASIC W/ COLOR/GRAFICS MONITOR ADAPTER

STADIUM JUMPING
from HCM Vol. 4, No. 4

TI 99/4A

150 REM VERSION 4.3.2
170 160 IBM PC BASIC I

QUIZ CONSTRUCTION SET
from HCM Vol. 4, No. 5

QUIZ CONSTRUCTION SET
from HCM Vol. 4, No. 5

QUIZ CONSTRUCTION SET
from HCM Vol. 4, No. 5

150 REM VERSION 4.3.2
170 160 IBM PC & PCjr

QUIZ CONSTRUCTION SET
from HCM Vol. 4, No. 5

150 REM VERSION 4.3.2
170 160 IBM PC & IBM PCjr

TAX DEDUCTION FILER
from HCM Vol. 4, No. 5

At the end of Line 550, there should be a space between the word NEXT and the letter Z.

MOVING?
Don't Miss Out On Any Issues of
HOME COMPUTER

Send us a Change-of-Address Card (available at any Post Office) 6-8 weeks prior to the move. Be sure to include both the old & new address, plus the alphanumeric code above your name on the mailing label.

138 © Home Computer Magazine  Volume 5, No. 1
SENSATIONAL SOFTWARE GIVEAWAY

FOR SUBSCRIBERS & NEWSSTAND PURCHASERS ONLY*
To participate in our monthly Software Giveaway, you need to be a bonafide purchaser of Home Computer Magazine and fill out the questionnaire on the reverse side.

Have you taken advantage of our Software Giveaway before? □ Yes □ No

You will receive all the programs ON TAPE™ or ON DISK™ (which have versions for your selected machine) whose listings appear in this issue.

IMPORTANT: The order form below and the questionnaire on the reverse side must be completed. Tear out this entire page and enclose in an envelope along with $4.95 ($6.95 in Canada & Mexico, $9.95 Foreign Airmail). Payment must be made by check, money order, or VISA/MasterCard. Proof of purchase (subscriber label number, sales receipt or any reasonable facsimile thereof) must also accompany this form.

*Non-subscriber and non-purchaser price is $9.95 in the U.S.

TO PROPERLY HANDLE THE VOLUME OF SOFTWARE REQUESTS, ORDERS MUST BE SENT IN ON THIS FORM, NO PHOTOCOPIES. SORRY, WE CANNOT ACCEPT TELEPHONE ORDERS FOR THIS SERVICE.

FREE SOFTWARE!
When Subscribing To
HOME COMPUTER
magazine

Subscribe or Renew today, and with your paid subscription you will receive FREE software—ON TAPE™ or ON DISK™. With a 1-year subscription to Home Computer Magazine you get 2 FREE IssUES of ON TAPE™ or ON DISK™. Subscribe for 2 years and receive 4 issues. And with a 3-year subscription we'll give you 6 full issUES of this convenient software on cassette tape or floppy disk.

DONT HAVE A COMPUTER? TAKE A RAINCHECK!
We'll give you a raincheck for the FREE software so that when you buy a computer, we will send you your choice of ON TAPE™ or ON DISK™ as a FREE BONUS as stated in this offer.

And You Save Up To 40% Off The Single-Copy Price of the Magazine!

SAVE EVEN MORE!
AND ENJOY THE
CONVENIENCE OF A
PROGRAM SUBSCRIPTION

By subscribing to ON TAPE™ or ON DISK™ you will save money off the single-copy price and receive the same high-quality programs published in each issue of the magazine—delivered right to your door!

This cassette tape or floppy disk program service is the convenient, accurate, and affordable way to save hundreds of typing hours.

The Perfect Addition To Your Magazine Subscription!

3-IN-1 ORDER FORM

NAME

ADDRESS

CITY

STATE

ZIP

CHECK OR MONEY ORDER ENCLOSED

BILL MY □ VISA □ MASTERCARD

ACCOUNT NO.

SIGNATURE

EXP. DATE

ENCLOSE PAYMENT OR CREDIT CARD INFORMATION AND MAIL ENTIRE PAGE WITH COMPLETED FORM TO:

HOME COMPUTER MAGAZINE
P. O. Box 70288, Eugene, OR 97401

_ OR -

USE OUR TOLL-FREE LINE FOR VISA/MASTERCARD ONLY:
1-800-828-2212 In Oregon, Alaska, Hawaii, Tel.(503)485-8796
Open Monday through Friday—7:00 AM to 4:00 PM
Pacific Standard Time

YES I send all the programs in this issue: which have versions for my selected machine. I have indicated my choice of media and have enclosed $4.95 ($6.95 in Canada & Mexico, $9.95 Foreign Airmail). Proof of purchase and completed questionnaire must be included.

YES I enter my subscription to Home Computer Magazine for the term below:

Please check one: □ New Renewal (include subscriber number below)

LABEL NUMBER:


PLUS 2 FREE
ON TAPE or ON DISK

PLUS 4 FREE
ON TAPE or ON DISK

PLUS 6 FREE
ON TAPE or ON DISK

Canada add $11; Foreign Surface add $121 for 1-yr magazine subscription. Free software offer available In U.S. & Canada only.

YES I want to save time and money. Please enter my program subscription* to ON TAPE or ON DISK for the term listed below:

□ 8 ISSUES — ONLY $38 “An Extension To Your 2 Free Issues of Software”

□ 10 ISSUES — ONLY $45 “A Full Year Of Program Convenience”

*Does not include magazine.

Canada add $11 for software subscription.
Software subscription not available in other countries at this time.

SURE I want to save time and money. Please enter my program subscription* to ON TAPE or ON DISK for the term listed below:

□ 8 ISSUES — ONLY $38 “An Extension To Your 2 Free Issues of Software”

□ 10 ISSUES — ONLY $45 “A Full Year Of Program Convenience”

*Does not include magazine.

Satisfaction Guaranteed—or the unfilled portion of your subscription will be refunded, less the cost of any premiums you have received. Defective media gladly exchanged. NO REFUNDS on media.
HOME COMPUTER
magazine

QUESTIONNAIRE
Complete and mail to: Home Computer Magazine • P.O. Box 70288 • Eugene, Oregon 97401

FOR ALL READERS
2. What types of software are you most interested in? □ Educational □ Entertainment □ Computer Literacy □ Household Management □ Job-Related Applications □ Business □ Other
3. Are you □ Male □ Female □ 14 or younger □ 15-24 □ 25-34 □ 35-44 □ 45-54 □ 55+
4. Annual Household Income? □ Under $10,000 □ $10,000-$14,999 □ $15,000-$19,999 □ $20,000-$24,999 □ $25,000-$29,999 □ $30,000-$39,999 □ $40,000-$49,999 □ $50,000+
5. Occupation? □ Professional □ Management □ Teacher □ Student □ Other
6. What is your ZIP code?
7. What is the current month and year?
8. Do you presently own a Home Computer? □ No □ Yes. It is a □ Ti-99/4A □ Apple II/II+/IIe □ Commodore 64 □ VIC-20 □ IBM PC □ PCjr □ Other

FOR READERS WHO PLAN TO BUY A HOME COMPUTER
9. Which model do you think you'll purchase? □ Apple II/II+/IIe □ Commodore 64 □ VIC-20 □ IBM PC □ PCjr □ Ti-99/4A □ Other
10. When do you expect that purchase to be? □ less than 3 months □ 3-6 months □ 7-12 months □ at least 1 year
11. What do you anticipate your primary use of a home computer will be? □ Entertainment □ Education □ Computer Literacy □ Household Management □ Job-Related Applications □ Business □ Other

FOR PRESENT HOME COMPUTER USERS
12. Which home computer(s) do you currently own? □ Apple II/II+/IIe □ Commodore 64 □ VIC-20 □ IBM PC □ PCjr □ Ti-99/4A □ Other
13. What is the primary use of your home computer? □ Entertainment □ Education □ Computer Literacy □ Business □ Job-Related Applications □ Household Management □ Other
14. How often is your computer in use? □ Less than 1 hour per week □ 1-4 hours □ 5-10 hours □ 11-15 hours □ 16-20 hours □ over 20 hours
15. On the average, about how many program listings in each issue of HCM do you key into your computer and use? □ None □ 1 □ 2 or 3 □ 4 or more
16. What peripherals do you currently use? □ Disk System □ Printer □ Modem □ Monochrome/Color Monitor □ Other
17. What do you expect to buy within the next year? □ Software □ Disk system □ Printer □ Modem □ Books □ Magnetic Media □ Monochrome/Color Monitor □ Furniture & Accessories
18. How much do you expect to spend on computer-related products during the next year? □ Less than $25 □ $25-$49 □ $50-$99 □ $100-$249 □ $250-$499 □ $500-$999 □ $1000-$2499 □ $2500 or more

OPTIONAL: If you would like to help us by participating in a telephone interview, please include your telephone number _______ here and the most convenient time you can be reached __________ AM or PM

DON'T KEEP YOUR WINNING HAND A SECRET!

TELL 'EM ALL ABOUT HOME COMPUTER MAGAZINE, IT'S YOUR ACE-IN-THE-HOLE!
COLLECT ALL BACK ISSUES

HOME

COMPUTER

magazine

Please Print

Name

Address

City State Zip

☐ Check or Money Order Enclosed Total
MUST BE IN U.S. FUNDS DRAWN ON A U.S. BANK
Bill my ☐ VISA ☐ MasterCard Date Expires
Account No.

Tel No. Signature

Enclose payment or credit card information & mail with completed form to:

Home Computer Magazine
P.O. Box 70288 • Eugene, OR 97401
Or use our TOLL-FREE Order Line for VISA/MasterCard orders only:
1-800-828-2212
In Oregon, Alaska, Hawaii Tel. (503) 485-8796

ITEMS

Home Computer Magazine Back Issues
(Circle Issues Desired)
Vol. 4 No. 1 Vol. 4 No. 2 Vol. 4 No. 3
Vol. 4 No. 4 Vol. 4 No. 5

ON DISK & ON TAPE Back Issues
(Circle Issues Desired)
Vol. 4 No. 1 Vol. 4 No. 2 Vol. 4 No. 3
Vol. 4 No. 4 Vol. 4 No. 5

SAVE EVEN MORE — Order Combined Sets
(Circle Magazine & Media Sets Desired)
Vol. 4 No. 1 Vol. 4 No. 2 Vol. 4 No. 3
Vol. 4 No. 4 Vol. 4 No. 5

□ Check or Money Order Enclosed Total
MUST BE IN U.S. FUNDS DRAWN ON A U.S. BANK
Bill my ☐ VISA ☐ MasterCard Date Expires
Account No.

Enclose payment or credit card information & mail with completed form to:

Home Computer Magazine
P.O. Box 70288 • Eugene, OR 97401
Or use our TOLL-FREE Order Line for VISA/MasterCard orders only:
1-800-828-2212
In Oregon, Alaska, Hawaii Tel. (503) 485-8796

See Page 8

Special Close-Out Offer

YES! Please send me THE BEST OF 99'er ON TAPE along with my
FREE copy of the book The Best Of 99'er. and the SPECIAL BONUS (while supplies last)
of Simon's Saucer™ and the 99'er Programmer's Guide. Enclosed is $35. (Shipping and Handling FREE!)

For more information see page 8.

Offer & Prices Subject To Change Without Notice.

Defective media gladly exchanged. NO REFUNDS on book or media.

The Best Of 99'er
— Book & Tape Set —

Special Close-Out Offer

See Page 8

Save $ $ $ On BACK ISSUES of

99'er Home Computer Magazine, Disk & Tape Back Issues
Exclusively For The TI-99/4A Users!

Now In Effect For TI-99/4A Users!

Please Print

Name

Address

City State Zip

☐ Check or Money Order Enclosed Total
MUST BE IN U.S. FUNDS DRAWN ON A U.S. BANK
Bill my ☐ VISA ☐ MasterCard Date Expires
Account No.

Tel No. Signature

Enclose payment or credit card information & mail with completed form to:

Emerald Valley Publishing Co.
P.O. Box 70288 • Eugene, OR 97401
Or use our TOLL-FREE Order Line for VISA/MasterCard orders only:
1-800-828-2212
In Oregon, Alaska, Hawaii Tel. (503) 485-8796

For more information see inside back cover.

BVC:23/10/B5
GUIDE TO HOME COMPUTER™
READER SERVICES

Subscriptions

See Rear Bind-In Card

Back Issues

See Inside Front Cover

This Issue's Software

See Rear Bind-In Card

Program Subscriptions

See Rear Bind-In Card

Back Issues

See Inside Front Cover

Back Issues

See Inside Back Cover

The Best Of 99'er

See Page 8

Blank-Media Service

See LISTINGS Contents page
A Back-Issue/Software Bonanza Of

Of

At Unbeatable Prices

The original 99'er Magazine and 99'er Home Computer Magazine were the forerunners of the present-day Home Computer Magazine. Each of these magazine back issues—exclusively covering the Texas Instruments TI-99/4A—is now available with your choice of either a floppy disk or a cassette tape that contains all the programs in that issue.

AS LOW AS $1.83 EACH MAGAZINE!

See Order Card at Center of Magazine

ABOUT $4 PER SET!

MAGAZINES OR MEDIA MAY BE ORDERED SEPARATELY

To Order, Use Bind-in Card At Center Of Magazine.

SPECIAL MIX OR MATCH BONUS

—WHILE SUPPLIES LAST—

You will receive a FREE Simon's Saucer™ package and a FREE TI-FEST™ commemorative poster when your order includes at least 12 items from this page in any combination of magazines or media.

• A quality, ready-to-run game on cassette tape.

• A durable and attractive ring-binder collector's case for your software library.

• A complete, easy-to-use programming lesson on a deck of colorful flip cards.

SAVE UP TO $44 AND RECEIVE FREE GIFTS WORTH OVER $15!

Hurry—Supplies Are Limited. Order Yours Today!

Offer & Prices Subject To Change Without Notice.
ALL PROGRAMS IN THIS MAGAZINE

ONLY $4.95* DELIVERED RIGHT TO YOUR DOOR!

The same high-quality Apple, Commodore, IBM, and Texas Instruments programs with type-in-and-RUN listings in this issue are now available ON DISK™ or ON TAPE™ to newsstand purchasers or subscribers of this magazine.

For only $4.95* postpaid (barely covering the cost of a blank floppy disk or cassette tape), you receive all the programs for your particular brand of computer—Truly A "Software Giveaway!"

To Order, Use The Bind-In Card Inside Rear Cover.

* Current issue Price Only — See Center Bind-In Card For Back Issue Prices. Offer & Prices Subject To Change Without Notice.