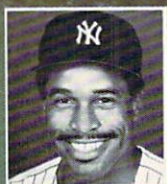A Hands-On Review
COMMODORE 128

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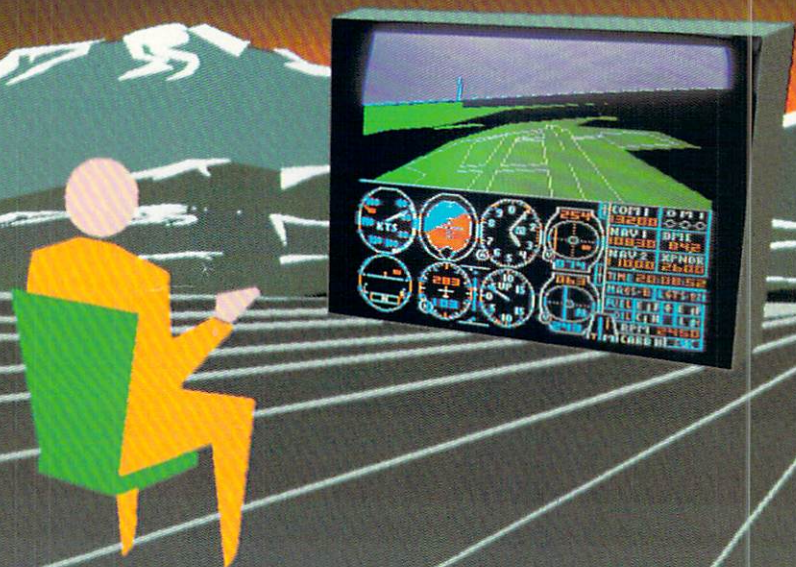MAKE MUSIC,
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JULY
1985

FAMILY COMPUTING

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Direction? 0 to end

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EDITOR'S NOTE
NO REGRETS

"Dave passed through town this afternoon and wanted to make sure you knew that IBM went out of the personal computer market."

I was in London, on vacation, when I heard those words. Although I knew that message had to be severely garbled, you can imagine its effect on my good time. Distracted over dinner, distressed at the theater, and sleepless back at the hotel. That's what I was. Finally, at 2 a.m., Shirrel Rhoades, our publisher, called and set the record straight—it was the PC*jr*. : discontinued

While I fretted over the Editor's Note in the May issue, due to reach readers any minute, in which I'd praised IBM for sticking with the *jr*, Shirrel seemed totally calm. On a personal level, he had a real investment at stake. He owns a PC*jr*.

Shirrel has more than once found himself in a position not uncommon among computer owners— he'd bought a computer that was taken out of production. In addition to the *jr*, Shirrel owns an ADAM, a TI-99/4A, TRS-80 Model III and 100, a TS 1500—and an Apple IIe.

When Coleco announced it would no longer manufacture the ADAM, Texas Instruments the 99/4A, Timex the 1500 and 2068 (1000s were already out of production), and IBM the *jr*, Shirrel rushed out and expanded his system and added to his software library. All of his computers still are being used.

I say, "Three cheers for computer enthusiasts!" Shirrel typifies them. He's thankful for all his computing feats. No regrets on his part. Even with computers no longer found on store shelves, Shirrel and/or members of his family boast a novel, improved SAT scores, a collection of home-brewed computer games, a more efficient workday, work-free weekends, better control of their finances, and a host of other computer-related accomplishments.

That brings us to this issue and some of the additions you can make to your computer accomplishments. For many of us, the approach of summer means a slower pace and more leisure time. You can put that time to better use than ever with the help of your computer. Managing Editor June Rogoznica and Reviews Editor John Wallace have, with tremendous help from Research and Copy Associate Linda "Fax" Williams, assembled a special leisure-time section. With the right software package to help you, you'll find it a lot easier to achieve some long-held goals, ranging from athletic feats to a mastery of music or an increased reading rate. You'll find their editorial feats begin on page 25.

Our increased financial and business coverage is getting a strong response from readers, so you might want to read this month's Home/Money Management column on page 14, which shows you how to figure out what you're worth.

Since almost all readers are eager to know more about the newest computer models, our review of the Commodore 128 is a "must read." Each month we try to put together an entire issue that's a "must read." In large part, we do this by keeping you as well informed as we can.

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

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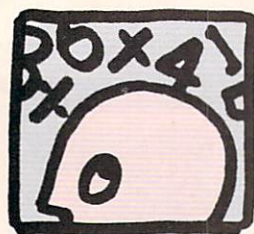
MASTERING MATH SKILLS
How the Computer + Software = Success

BY MINDY PANTIEL AND BECKY PETERSEN

This is the last in a series of articles on how computers can be used at home to help children improve essential skills. This month we look at software that tackles math.

Math can be a killer, for parents as well as kids. When it comes to catching up or staying ahead of the class , how do you make sure that your child is on the right track? Many parents are in the dark about where to begin to help their children excel. Your computer may help. Software packages geared toward improving math skills are abundant. With a little homework, parents can find a package suited to their children's needs.

Take the Blubaugh family, of Parma, Ohio, for instance. Like many computing families, the Blubaughs had education in mind when they purchased their Apple IIc. Each of the four children, ages 7 to 13, have used math software to help them master the basics. CBS Software's *Success With Math* series has helped 9-year-old Katie with borrowing and carrying. "She'd been having trouble with some of these concepts at school. Thanks to *Success With Math*, she's getting the hang of it," her mother, Gayle, reports.

Like the Blubaugh children, your kids may benefit from time spent on the computer with math software.

Contributing Editors BECKY PETERSEN *and* MINDY PANTIEL *have written extensively about computers, kids, and learning.*
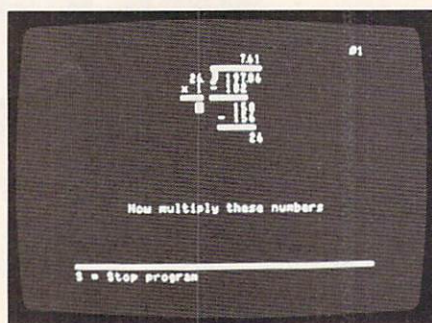
CBS' *Success With Math*
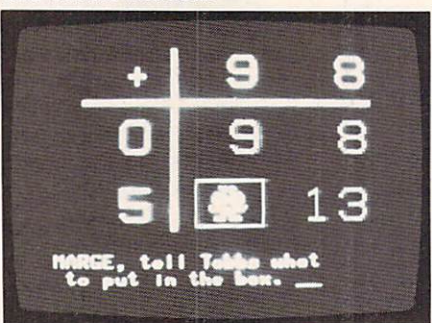
Sunburst's *Teasers by Tobbs*

Well-crafted software transforms the computer into an encouraging, *personal* tool—a friend to hold the flashcard, a teacher to correct the worksheet, a guide to help with a difficult algebra equation.

In the course of our conversations with educational specialists and teachers across the country, as well as from our own evaluations, the packages listed below have surfaced as being particularly good. We've divided the software into three broad categories. (*For more information on what students at each grade level need to know in the way of math skills, refer to the accompanying box.*)

Although many of these packages have been developed for school use, they can be good at home, too. A variety of packages not mentioned here

rely heavily on a game element to entice kids. Although these are usually more fun for children at home, the learning can get lost in the arcade-game sauce. We've tried to focus on the more serious drill-and-practice and workbook programs—packages that, by their very nature, will need your encouragement and guidance for effective use.

COMPUTATION SKILLS: THE FIRST STEP

When students begin with mathematics, their first step is learning arithmetic operations. The simple plus and minus route is easily mastered. It's usually when fractions appear on the horizon that math problems develop.

The *Success With Math* series (CBS Software, for Apple II series, Atari, C 64, IBM PC/PCjr; nine disks or cassettes, for $24.95 each) is like a computerized math workbook. These packages help kids learn and practice computational skills. In the *Addition and Subtraction* package, kids practice borrowing and carrying in randomly selected sets of problems. Pick out the number of figures you want to add or subtract, and the number of digits in each figure. If you make a mistake, the program gives a hint the first time and the correct answer the second time.

Math Blaster (Davidson & Assoc., for Apple II series, Atari, C 64, IBM PC/PCjr; $49), an educational best-seller made up of a number of activities, drills kids in adding, subtracting, multiplying, dividing, fractions, percents, and decimals at five difficulty levels. Addition at the lowest level focuses on single-digit problems. The four activities include a simple option that allows children to view and begin to memorize the math facts covered. There is also an

arcade game, which builds speed as it reinforces math facts learned earlier, adding an element of fun and challenge. This package is good for use by kids at many grade levels.

Path Tactics (Minnesota Educational Computing Consortium, for Apple II series; $29.95) is an easily digestible form of arithmetic practice. Children use on-screen robots and play against the computer or a friend. Trying to outpace your opponent in a race along a path, you must construct an equation out of three numbers provided.

Teasers by Tobbs (Sunburst Communications, for Apple II series, Atari, C 64, IBM PC/PCjr, TRS-80 CoCo and Models III/4; $39.95) presents arithmetic in the form of a logic game. Tobbs is a friendly creature who lays out a three by three grid of numbers. Up to four players determine the number that belongs in the empty boxes by adding, subtracting, multiplying, or dividing other numbers in the grid. Six skill levels challenge all different ages. Even parents may find *Teasers* tough to resist.

BASIC SKILLS AND PROBLEM-SOLVING

Adding and subtracting, carrying, and breezing through the multiplication tables are all important skills—but they're not worth a dime if your child doesn't know how to apply them to a set of circumstances. These are the "problem-solving skills."

"If computation—learning to add, subtract, multiply, and divide—was our only task, then it would take six months to teach math," says Marc Swadener, associate professor of Math and Computer Education at the University of Colorado.

In fact, in its laundry list of items to address in the 80s, the National Council of Teachers of Mathematics targeted problem-solving as one of its top priorities. This skill entails analyzing and sifting through information, planning out the steps necessary to answer a question, and formulating and reformulating ideas—like putting together a jigsaw puzzle.

Unless children learn *how* to use the basic operations to solve different kinds of problems and to apply them to real-world situations, the math facts have little meaning or use. Here are some software packages that do a good job of helping children develop these crucial problem-solving skills.
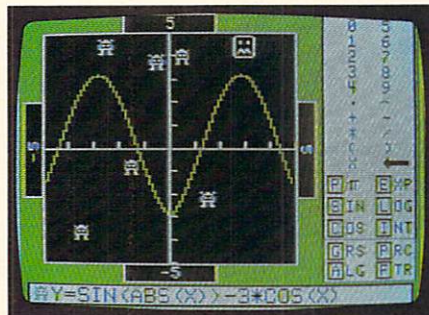
Wadsworth's *Algebra Arcade*

Survival Math (Sunburst Communications; Apple II series, Atari, C 64, TRS-80 Models III/4; $55) applies both problem-solving and computation skills to lifelike situations. Activities such as "Travel Agent Contest" and "Foreman's Assistant" put kids into the position of planning a vacation, or buying materials to construct a room on a budget. Says Phyllis Simon, a computer education consultant with the North Little Rock public school system: "It's the kind of program kids come in early and stay through lunch to work on. We've used the program with students in the elementary grades all

WHAT & WHEN

Knowing what software to buy usually means knowing where your child is or should be in the math curriculum. Here's a map that loosely lays out the various stages of math education. This timetable may vary somewhat from state to state and school district to school district.

Kindergarten, Grades 1, 2, and 3: Whole numbers—what they are, and what they can do. Applying addition, subtraction, and multiplication to solving problems with whole numbers. Early geometric concepts, such as identifying shapes and graphing.

Grades 4, 5, and 6: Division, fractions, integers, percents, decimals, and rational numbers. Performing basic math operations with each and, again, using them to solve problems. More advanced geometry concepts, such as measuring angles and identifying polygons with more than four sides. Learning about unknowns, something most adults know as variables. Beginning algebra concepts (not labeled as such).

Grades 7, 8, and 9: Some geometry, more work with variables. Practice solving problems using basic arithmetic operations. Formal algebra usually introduced in ninth grade.

Grades 10, 11, and 12: Algebra I and geometry. Students can opt for more advanced courses such as algebra II, trigonometry, pre-calculus (analysis), and calculus.

HOME-SCHOOL CONNECTION

the way through general math students in high school." Simon sees it as a good candidate for home use.

The Magic Cash Register (Avant-Garde, for Apple II series; $34.95) lets children play store, set up a shop, or hold a sale. The program displays sales, calculates change, and prints receipts just like a real cash register would. A friendly wizard on the screen uses a magic wand to show youngsters how to work a cash register and points out steps in a calculation. Kids are well taken care of, their errors pointed out and analyzed, with tips on how to correct them. Greg Dowd, a resource teacher in the Hartford, Connecticut, public school bilingual gifted and talented program, uses the program with his 5th and 6th graders, and even younger kids. With a little parental help at the start to introduce the program and the concepts being used, kids should have no trouble with the package at home, Dowd says.

Don't breeze over the game racks when searching for a good problem-solving package. Many of the top-selling, most entertaining adventure games on the market—games from companies such as Infocom, Telarium, Sierra—offer plenty of head-scratching puzzle-solving sure to hone problem-solving skills.

ADVANCED MATH PACKAGES

Trig, geometry, algebra, and calculus: They are the stuff of which math nightmares are made. They're part of the more-sophisticated high school and junior high math curricula most students must struggle with at one time or another. Here are some programs that may help your teenagers in their work with more advanced math concepts.

Graphing Equations (Conduit, for Apple II series; $60) gives students practice with the common algebraic equations for lines, parabolas, circles, ellipses, and hyperbolas. A game called "Green Globs" is what makes the package a hit with high-school math and computer-science teacher Kimberly Petersen's second-year algebra students. Kids must write an equation to hit as many of 13 green globs positioned on a grid as they can.

Algebra Arcade (Wadsworth Electronic Publishing Co., for Apple II series, C 64, IBM PC; $49.95) is a game that actually makes algebra practice fun, even for the usual teen-

age skeptics likely to turn up their noses at a package labeled "educational." You must write algebraic equations to create graphs that touch as many "algebroids" littered about the screen as possible.

Success With Algebra (CBS Software for Apple II series, C 64, IBM PC/PCjr; $34.95), does for algebra what the other *Success* packages do for decimals and fractions. While on the dry side, it does present the basics of algebra in a straightforward and helpful manner.

The Electronic Blackboard Series (Wadsworth Electronic Publishing Co., for Apple II series; $165 for 4 disks) is a set of programs Kimberly Petersen recommends for advanced math students. It covers almost everything students will encounter in algebra and trigonometry. A comprehensive approach introduces students to new concepts, then asks them to complete equations, and finally has them work through problems—mapping the proper graph for a given equation.

Software selection and use can be a tough process. As Haldane Central School Principal Joanne Marien, of Cold Spring, New York, says: "Go to somebody who has the knowledge and ability and ask for a direct recommendation. Check out reviews in magazines. Take the advice of someone who knows. Talk to the school personnel—ideally someone directly relating to your child."

It may not solve all your child's math problems. But take his or her desire to improve, add some encouragement, plus some teacher assistance and the right software, and it can add up to substantial progress on the math front. **FC**
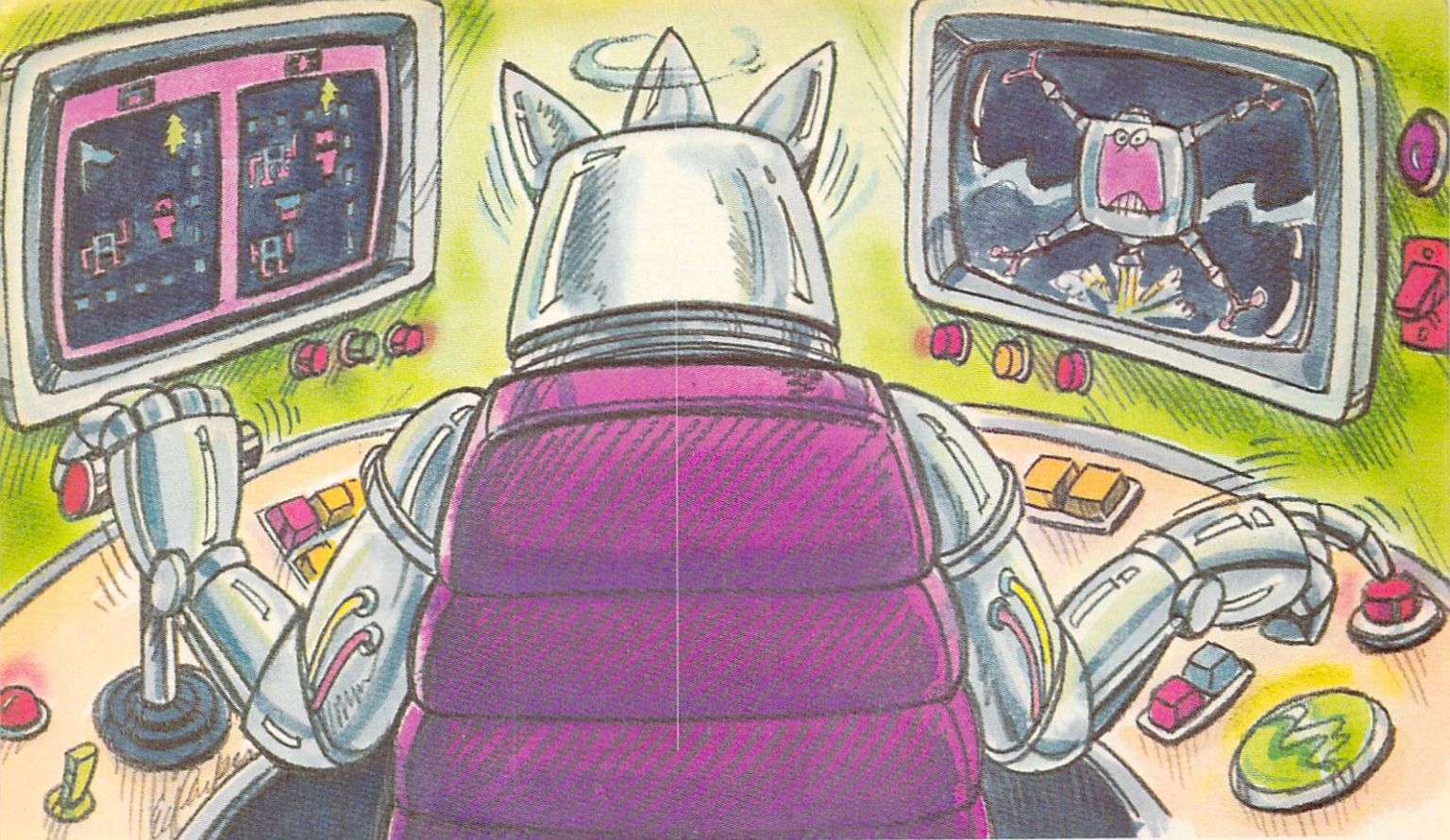
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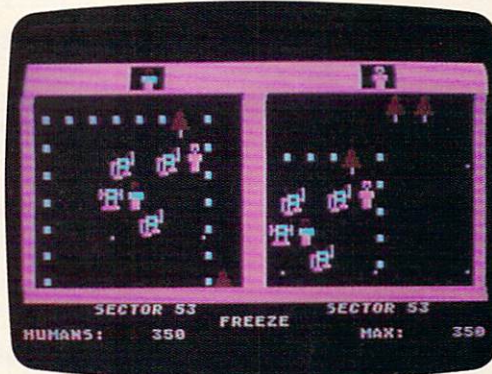
You can pick up Bannercatch where you buy software. Or write to Scholastic Inc., Dept. EW, 730 Broadway, New York, NY 10003.

But please remember, only a handful of people have gone face-to-face against Max and survived.
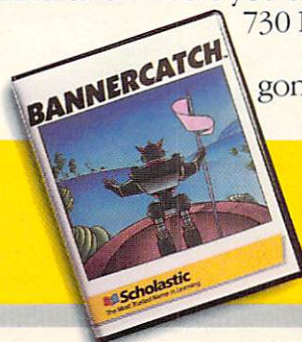
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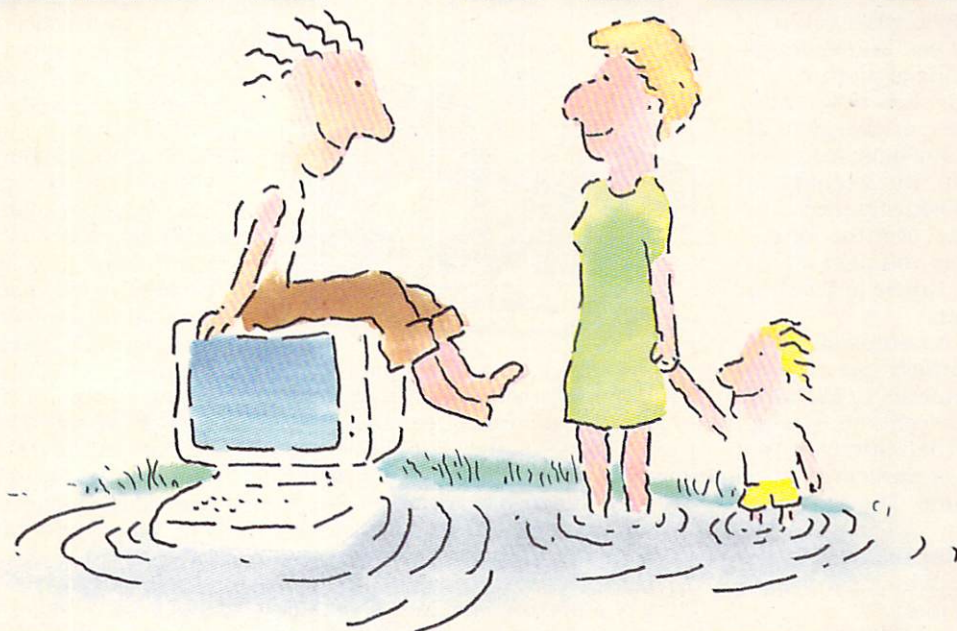
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HOME/MONEY MANAGEMENT

WHAT ARE YOU WORTH?
Use Our Original Program to Set Up a Personal Balance Sheet and Find Out

BY KIMBALL J. BEASLEY

If someone asks you what you're worth today, will you know? Probably not. Your financial picture changes every day. Few of us, however, have the time or energy to devote to tracking our daily cash flow, nor do we need to. But keeping monthly tabs on your finances makes good sense; over the long term, it could help you plan a healthy financial future or avert an economic disaster.

As a matter of business survival, corporations routinely use a variety of financial statements to examine and control their economic strength and, ultimately, their survival. Your family, as a sort of minicorporation, should do the same. Though your family doesn't have a team of accountants to do the analysis, it does have a computer, which can be an extremely useful tool.

A FINANCIAL SNAPSHOT

With the accompanying program and your computer, you can set up a personal balance sheet—the first step in analyzing your financial status. Think of a balance sheet as a snapshot of your personal finances at any given moment in time. You'll need to input the market or current value of your assets (cash and other liquid assets, investments, and property) and list your liabilities (short-term and long-term debt). Your net worth is simply your assets less your liabilities.

Personal Balance Sheet will do more than create an orderly tabulation of assets and debt. It can provide important financial indicators, as well. For example, it may show a decline in your family's net worth. Of course, that's not the end of the

KIMBALL J. BEASLEY *is a senior engineer at a consulting firm in Princeton, N.J. He wrote last month's Home/Money Management column, "Financial Decision-Making."*
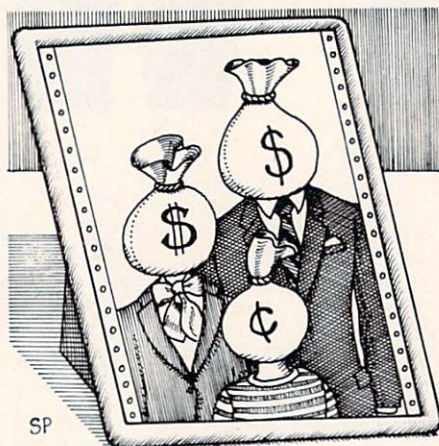
world, but it may be a signal that you've made some poor investments, or that your interest earnings are not as high as they should be. Also, tracking the percentage of assets defined as growth or as liquid can help keep your investment goals on target.

However, one of the greatest benefits of a personal balance sheet lies in its ability to compare current and past financial data. With your computer, you'll be able to input data, do mathematical calculations, and print a record of your results to help in your long-term investment planning.

HOW TO USE THE PROGRAM

Before you sit down at your computer, it's a good idea to work out and write down the numbers you plan to include in your balance sheet. Your figures should represent a reasonable estimate of your current debt and asset values (the amount you would receive if you sold your investments or property today). Though it's not necessary for your numbers to be accurate to the penny, a good round number based on solid data will provide useful results. (The program will round off each category to the nearest dollar.)

The accompanying printout shows the various categories of information you will have to input. Though much of the balance sheet is self-explanatory, such as the value of jewel-

ry and your collectibles, some categories may seem a bit confusing. For example, what does liquid mean? By definition, it's cash or something which can be easily converted to cash within a short period of time, without incurring a loss or penalty. A money-market account, for example, is liquid. On the other hand, bank CDs are not liquid because in most cases there is a substantial penalty for early withdrawal.

Nongrowth and growth investments are other categories that may confuse you. For instance, a tax shelter is labeled nongrowth since you haven't invested with the intention of making a capital gain. In contrast, your investment in a mutual fund under an IRA would be categorized as growth because you expect it to increase in value. (In this case, it also serves as a tax shelter.) Basically, whether you decide to place something in a nongrowth or growth category is a statement of your objectives.

When you're inputting your short-term liabilities, make sure you only include your *unpaid* rent, utilities and charge-account payments for the month—those items not yet deducted from your cash assets.

Once you've determined the proper categories for your investments, you're ready to move to your computer keyboard. First, type in *Personal Balance Sheet* and SAVE it. Make sure your printer is hooked up and switched on. Now, you're ready to run the program. You can input one or multiple values for each category. After each entry, press RETURN or ENTER. (The program will show subtotals after each entry.) When you're ready to go on to the next category, just press RETURN or ENTER without inputting an amount.

The program does not allow you to save your information to disk or cassette. The only record of your infor-

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mation is your printout, so be sure to save it for future financial comparisons.

It's a good idea to work on your personal balance sheet at the same time each month. This will give you a better feel for your cash flow (in-coming and outgoing funds). You'll find that preparing a balance sheet will become habit-forming. And, after you've saved some money or made some as a result of financial planning, you'll discover it's a habit you won't want to break.

This article and program are not meant to serve as advice, but rather as guidelines to aid you in planning your financial future. It's best to consult your accountant before you make any major financial decisions.

SAMPLE PRINTOUT

```
------------------------------------------------------
----------------- PERSONAL BALANCE SHEET --------------
------------------------------------------------------
AS OF 7/1/85
        <ASSETS>                          <LIABILITIES>

CASH ASSETS                    | SHORT-TERM DEBT
-----------                    | ---------------

CASH                   = $  700 | UNPAID RENT           = $     0
CHECKING ACCOUNTS      = $  900 | UNPAID UTILITIES      = $   342
SAVINGS ACCOUNTS       = $ 1500 | UNPAID CHARGE ACCT. DEBT = $ 675
OTHER LIQUID DEPOSITS  = $ 1650 | OTHER SHORT-TERM DEBT = $     0
                       --------  |                        --------
           TOTAL = $   4750     |          TOTAL = $    1017
TIME DEPOSITS AND INVESTMENTS   | LONG-TERM DEBT
                                | --------------

BANK CD'S AND NOTES    = $15000 | BALANCE OF MORTGAGE   = $ 27000
STOCKS AND BONDS       = $12000 | BALANCE OF AUTO LOAN  = $  1200
OTHER GROWTH INVESTMENTS = $5250 | OTHER LONG-TERM DEBT  = $  2400
NONGROWTH INVESTMENTS  = $ 1700 |
                       --------  |                        --------
           TOTAL = $  33950     |          TOTAL = $   30600
VALUE OF PROPERTY               |
----------------                |

HOME                   = $85000 |
AUTO/VEHICLE           = $ 6000 |
HOME FURNISHINGS       = $ 5200 |
JEWELRY/COLLECTIBLES   = $ 1250 |
OTHER PROPERTY         = $  700 |
                       --------  |
           TOTAL = $  98150     |
------------------------------------------------------
TOTAL ASSETS           = $136850 | TOTAL LIABILITIES    = $ 31617
              NET WORTH = $ 105233

------------------------------------------------------
----------------------- ANALYSIS ---------------------
GROWTH ASSETS AS PERCENT OF TOTAL ASSETS = 87.9 %
LIQUID ASSETS AS PERCENT OF TOTAL ASSETS = 12.2 %
```

Base Version (Commodore 64 w/printer)/
Personal Balance Sheet

```
10 DIM P$(20),LP(20),A(20),HD$(5),LH(5),ST(5)
20 D$=" = $":TL$="TOTAL":SP$=CHR$(32)
30 FOR X=1 TO 40:L$=L$+CHR$(45):S$=S$+SP$:NEXT X:FM$=CHR
$(124)+SP$
40 UL$=LEFT$(S$,27)+LEFT$(L$,11)+SP$+FM$+LEFT$(S$,27)+LE
FT$(L$,11)
50 BR$=LEFT$(S$,39)+FM$
60 FOR X=1 TO 20:READ P$(X):LP(X)=LEN(P$(X)):NEXT X
70 FOR X=1 TO 5:READ HD$(X):LH(X)=LEN(HD$(X)):NEXT X
80 W=0:PRINT CHR$(147);LEFT$(S$,9)
90 PRINT "PERSONAL BALANCE SHEET":PRINT LEFT$(L$,40-W*2)
100 PRINT "BALANCE SHEET DATE (MM/DD/YY)"
110 INPUT DT$:IF DT$="" THEN 100
120 PRINT "PRESS <RETURN> TO MOVE TO NEXT CATEGORY."
130 FOR X=1 TO 20:A(X)=0
140 IF X=1 THEN PRINT:PRINT LEFT$(L$,14-W);HD$(1);LEFT$(
L$,15-W)
150 IF X=5 THEN PRINT:PRINT LEFT$(L$,6-W);HD$(3);LEFT$(L
$,5-W)
160 IF X=9 THEN PRINT:PRINT LEFT$(L$,12-W);HD$(5);LEFT$(
L$,11-W)
170 IF X=14 THEN PRINT:PRINT LEFT$(L$,13-W);HD$(2);LEFT$
(L$,12-W)
180 IF X=18 THEN PRINT:PRINT LEFT$(L$,13-W);HD$(4);LEFT$
(L$,13-W)
190 PRINT P$(X);" = ";
200 PRINT "$";:T$="":INPUT T$
210 V=VAL(T$):IF V=0 THEN 230
220 A(X)=A(X)+VAL(T$):PRINT SP$;SP$;SP$;"SUBTOTAL";D$;A(
X):GOTO 200
230 PRINT LEFT$(L$,40-W*2);TL$;SP$;P$(X);D$;A(X):PRINT
240 A(X)=INT(A(X)+0.5):NEXT X
249 REM --TOTAL CASH ASSETS--
250 ST(1)=A(1)+A(2)+A(3)+A(4)
259 REM --TOTAL TIME DEPOSITS AND INVESTMENTS--
260 ST(3)=A(5)+A(6)+A(7)+A(8)
269 REM --TOTAL VALUE OF PROPERTY--
270 ST(5)=A(9)+A(10)+A(11)+A(12)+A(13)
279 REM --TOTAL ASSETS--
280 TASSTS=ST(1)+ST(3)+ST(5)
289 REM --TOTAL SHORT-TERM DEBT--
290 ST(2)=A(14)+A(15)+A(16)+A(17)
299 REM --TOTAL LONG-TERM DEBT--
300 ST(4)=A(18)+A(19)+A(20)
309 REM --TOTAL LIABILITIES--
310 LIAB=ST(2)+ST(4)
319 REM --NET WORTH EQUALS ASSETS MINUS LIABILITIES--
320 NETWRTH=TASSTS-LIAB
327 REM --GROWTH ASSETS (SAVINGS+OTHER LIQUID ASSETS--
328 REM -- +CD'S & NOTES+STOCKS & BONDS+OTHER GROWTH--
329 REM -- INVESTMENTS+HOME) AS % OF TOTAL ASSETS    --
330 PG=INT(1000*(A(3)+A(4)+A(5)+A(6)+A(7)+A(9))/(TASSTS+
0.000001))/10
338 REM --LIQUID ASSETS (CASH ASSETS + STOCKS &--
339 REM -- BONDS) AS % OF TOTAL ASSETS           --
340 PL=INT(1000*((ST(1)+A(6))/(TASSTS+0.000001)))/10
350 PRINT "PRESS ANY KEY WHEN PRINTER IS READY."
360 GET T$:IF T$="" THEN 360
370 OPEN 4,4:CMD 4
380 PRINT L$;L$:PRINT LEFT$(L$,28);
390 PRINT " PERSONAL BALANCE SHEET ";LEFT$(L$,28):PRINT
L$;L$
400 PRINT:PRINT "AS OF ";DT$:PRINT:PRINT LEFT$(S$,15);"<
ASSETS>";LEFT$(S$,32);
410 PRINT "<LIABILITIES>":PRINT L$;L$:PRINT BR$:PRINT BR
$
420 FOR X=1 TO 2:PRINT HD$(2*X-1);
430 PRINT LEFT$(S$,39-LH(2*X-1));FM$;HD$(2*X)
440 PRINT LEFT$(L$,LH(2*X-1));LEFT$(S$,39-LH(2*X-1));
450 PRINT FM$;LEFT$(L$,LH(2*X)):PRINT BR$
460 FOR Y=4*X-3 TO 4*X
470 PRINT P$(Y);:T=A(Y):L=LP(Y):GOSUB 1000:PRINT FM$;
480 IF Y=8 THEN 500
490 PRINT P$(Y+13);:L=LP(Y+13):T=A(Y+13):GOSUB 1000
500 PRINT:NEXT Y:PRINT UL$
510 PRINT LEFT$(S$,18);TL$;:T=ST(2*X-1):L=23:GOSUB 1000
520 PRINT FM$;LEFT$(S$,18);TL$;:T=ST(2*X):GOSUB 1000
530 PRINT:PRINT BR$:NEXT X
540 PRINT HD$(5);RIGHT$(BR$,24):PRINT LEFT$(L$,LH(5));RI
GHT$(BR$,24)
550 FOR Y=9 TO 13
560 PRINT P$(Y);:L=LP(Y):T=A(Y):GOSUB 1000:PRINT FM$
570 NEXT Y
580 PRINT LEFT$(UL$,40):PRINT LEFT$(S$,18);TL$;:T=ST(5):
L=23:GOSUB 1000
590 PRINT FM$:PRINT LEFT$(L$,38);SP$;FM$;LEFT$(L$,39)
600 PRINT "TOTAL ASSETS";:L=12:T=TASSTS:GOSUB 1000
610 PRINT FM$;"TOTAL LIABILITIES";:L=17:T=LIAB:GOSUB 100
0
620 PRINT:PRINT:PRINT LEFT$(S$,27);"NET WORTH = ";
630 T$="":IF NETWRTH<0 THEN PRINT "(";:T$=")"
640 PRINT "$";ABS(NETWRTH);T$:PRINT:PRINT L$;L$
650 PRINT LEFT$(L$,35);" ANALYSIS ";LEFT$(L$,35):PRINT L
$;L$
660 PRINT:PRINT "GROWTH ASSETS AS PERCENT OF TOTAL ASSET
S = ";PG;"%"
670 PRINT "LIQUID ASSETS AS PERCENT OF TOTAL ASSETS = ";
PL;"%"                                              →
```

```
680 PRINT#4:CLOSE 4:PRINT CHR$(147);
690 PRINT "SEE YOU NEXT MONTH!":END
1000 PRINT LEFT$(S$,25-L);"= $";LEFT$(S$,10-LEN(STR$(T))
);T;
1010 RETURN
2000 DATA CASH,CHECKING ACCOUNTS,SAVINGS ACCOUNTS
2010 DATA OTHER LIQUID DEPOSITS,BANK CD'S AND NOTES
2020 DATA STOCKS AND BONDS,OTHER GROWTH INVESTMENTS
2030 DATA NONGROWTH INVESTMENTS,HOME,AUTO/VEHICLE
2040 DATA HOME FURNISHINGS,JEWELRY/COLLECTIBLES
2050 DATA OTHER PROPERTY,UNPAID RENT,UNPAID UTILITIES
2060 DATA UNPAID CHARGE ACCT. DEBT,OTHER SHORT-TERM DEBT
2070 DATA BALANCE OF MORTGAGE,BALANCE OF AUTO LOAN
2080 DATA OTHER LONG-TERM DEBT,CASH ASSETS
2090 DATA SHORT-TERM DEBT,TIME DEPOSITS AND INVESTMENTS
2100 DATA LONG-TERM DEBT,VALUE OF PROPERTY
```

MODIFICATIONS FOR OTHER COMPUTERS
ADAM

Use the base version, changing lines 30, 80, 150, 190, 230, 350, 370, 680, and 1010 to read as follows:

```
30 FOR x=1 TO 40:L$=L$+CHR$(45):s$=s$+sp$:NEXT x:fm$=CHR
$(0)+sp$
80 w=5:HOME:PRINT LEFT$(s$,5);
150 IF x=5 THEN PRINT:PRINT LEFT$ (l$,6-w);hd$(3);LEFT$(
l$,6-w)
190 PRINT p$(x):PRINT " = ";
230 PRINT LEFT$(l$,41-w*2);tl$;sp$;p$(x):PRINT d$;a(x):P
RINT
350 PRINT "PRESS ANY KEY":PRINT "WHEN PRINTER IS READY."
370 PRINT:PR #1
680 PR #0:HOME
1010 PRINT sp$;:RETURN
```

Apple w/printer

Change Lines 80, 370, 680, and 1010 to read

```
80 W=0:HOME:PRINT LEFT$(S$,9);
370 PRINT:PRINT CHR$(4);"PR#1"
680 PRINT CHR$(4);"PR#0":HOME
1010 PRINT SP$;:RETURN
```

IBM PC & PCjr w/printer

Omit line 370. Change "PRINT" to "LPRINT" wherever it occurs in Lines 380-670, and in Line 1000. Add Line 5:
```
5 WIDTH 40:KEY OFF:WIDTH "LPT1:",255
```
(If your printer is configured other then "LPT1:", use "LPT2:", "LPT3:", "COM1:", or "COM2:" as appropriate.)

Finally, change lines 80, 120, 360, and 680 to read as follows:
```
80 W=0:CLS:PRINT LEFT$(S$,9);
120 PRINT "PRESS <ENTER> TO MOVE TO NEXT CATEGORY."
360 IF INKEY$="" THEN 360
680 CLS
```

TRS-80 Model III & 4 (in Model III mode) w/printer

Use the modifications given above for the IBM PC & PCjr, except change Line 5 to
```
5 CLEAR 2000
```

TRS-80 Color Computer w/printer

Change "PRINT" to "PRINT#-2," wherever it occurs between Lines 380-670 inclusive and in Line 1000, except wherever "PRINT:" ("PRINT" immediately followed by a colon) occurs (lines 400, 480, 500, 530, 620, and 640-650), change it to "PRINT#-2:" (note: comma omitted). For example, line 500 becomes
```
500 PRINT#-2:NEXT Y:PRINT#-2,UL$
```
Add line 5:
```
5 CLEAR 2000
```
Finally, change lines 80, 120, 190, 230, 350-360, and 680 to read as follows:
```
80 W=4:CLS:PRINT LEFT$(S$,5);
120 PRINT "PRESS <ENTER> TO MOVE TO NEXT CATEGORY."
190 PRINT P$(X):PRINT " = ";
230 PRINT LEFT$(L$,40-W*2);TL$;SP$;P$(X):PRINT D$;A(X):P
RINT
350 PRINT "PRESS ANY KEY":PRINT "WHEN PRINTER IS READY."
360 IF INKEY$="" THEN 360
680 CLS
```

FC

COMPUTING CLINIC

USED-COMPUTER PRICES ● COLOR PRINTERS ● JUSTIFIED PRINTOUTS ● TIMEX BUSINESS SOFTWARE ● TV INTERFERENCE

BY JEFFREY BAIRSTOW

How much is our old Radio Shack Model 16 computer worth? Is it possible to resell used computers?
KURT SCHNEIDER
St. Johns, Michigan

Yes. The best way to sell a computer is through classified ads, as few dealers traffic in used systems. We don't have a figure for the Model 16. But, according to *The Brown Book* (1st quarter, 1985 edition), an industry guide for microcomputer pricing, a used Radio Shack Model 16B (in good shape, and with documentation) is worth $1,312, and a used Model 12 is worth $800. The value of the Model 16 probably falls somewhere between those two.

The Brown Book lists "Fair Market Value" for computer systems, printers, and monitors. Address: Brown Book Inc., P.O. Box 3490, Santa Barbara, CA 93130; (805) 687-1140; $375 for six quarterly issues.

How can I obtain right-justified printouts from my computer? Is this a function of the word-processing program?
ERIC DOUGLAS
Baltimore, Maryland

In most cases, the printer simply prints the characters it receives from the computer; and the way the characters are sent depends on the word-processing program. To justify lines—that is, make the margins even, or flush—the word-processing program usually has to insert extra spaces between words and/or letters so that the lines all end at the same place. If your word processor can do this (not all can), it should have a command to turn the justification feature on and off.

For example, on Radio Shack's *Scripsit*, printouts normally are justified unless a command is inserted in the text to switch the justification off. On other word processors, such as *MultiMate* for the IBM PC, justification is an option that can be selected just before a document is printed out.

We know of one exception to the general rules above. The NEC Spinwriter printers can be set to print justified text whether your word-processing program calls for it or not.

Who makes a good color printer that does not use expensive ribbon cartridges?
MICHAEL O'MALLEY
Glendale, Arizona

If you have a Commodore or Atari, the Okimate 10 is a good, inexpensive ($238) color printer. The Okimate 20 for the IBM PC and PC*jr*, and the Apple Scribe for the Apple II series, are similar color printers. However, with each of these models you get only 10 or so color pages from each ribbon cartridge. That's because these ribbons can be used only once. New cartridges cost around $7.

The Epson JX-80 ($799) and C. Itoh 8510 SCP ($895) are considerably more expensive, but their ribbons can be used over and over, and thus don't need changing so often. The Epson and C. Itoh color printers come with parallel interfaces; serial interfaces are optional.

I have a Timex Sinclair 2068 on which I'd like to keep my business accounts and records. Where can I obtain such software, now that this computer is out of production?
ROBERT CHESSER
Lubbock, Texas

There are several mail-order companies offering business software for the Timex Sinclair 2068. Try contacting T.E.J. Computer Products, 859 N. Virgil Ave., Los Angeles, CA 90029; (213) 665-5111. Also, Stewart Newfield of Zebra Systems at 78–06 Jamaica Ave., Woodhaven, NY 11421; (718) 296-2385. A distributor of products for Timex computers, Zebra will send you a free 48-page catalog of Timex peripherals, software, and books. Charles Warner, P.O. Box 575, 2 South St., Williamsburg, MA 01096; (413) 268-7505,

has more than 50 TS 2068 programs in stock, including some business ones. And, if you'd like information on how to convert your TS 2068 to a Sinclair Spectrum, which gives you the ability to run hundreds of Spectrum software titles, write: EP Mcghee, No. 150, 10127 121st St., Edmonton, Alberta, Canada.

Why does the image on my TV screen wobble when my computer is connected? The TV works fine without the computer.
MICHAEL S. TRUMP
El Centro, California

Computers and peripherals that meet Federal Communications Commission (FCC) "Class B" requirements (and most electronic equipment intended for home use does) generate some electrical interference, but usually not enough to disturb TV or radio reception. Equipment that is marked "Class A," which is most commonly commercial equipment, is more likely to cause interference.

Try holding an FM radio near your computer to hear the electrical "noise" that the machine produces. To further isolate the problem, disconnect the peripheral devices and their cables one at a time. These devices usually require shielded cables.

If your computer or peripherals are producing signals that cause your picture to wobble, one cure is to move the computer away from the TV set (sometimes, just turning the keyboard around will work); or plug the computer into an outlet on a different circuit than the TV; or turn the antenna on the TV.

The FCC has prepared a free booklet that might be helpful. *How to Identify and Resolve Radio-TV Interference Problems* is available from the U.S. Government Printing Office, Washington, D.C. 20402, stock number 004-000-00345-4.

Also, some defective Commodore 64s produce a "wave" that moves across the screen. They probably have a bad chip, and should be sent in for repair. (*See Helpful Hints in the March* FAMILY COMPUTING *.*) **FC**

JEFFREY BAIRSTOW *is a contributing editor to* FAMILY COMPUTING.

TELECOMPUTING

THE COMPUTER CAFE
Teleconferencing Is the Newest Way to Hold a Meeting, Talk It Over, Get Together!

BY JOHN JAINSCHIGG

Back in the '50s, when my mother was working on her master's degree, she wrote an essay called "The Coffee Shop as a Symbol of Democracy."

"The coffee shop," she wrote, "is a place where everyone can have their say. It is at once a meeting hall, a social club, and a learned society." Sounds appealing, doesn't it? Well, if you've been yearning for this cafe atmosphere, where conversation flows like fresh-brewed coffee, head right for your desktop.

Many of us think of the personal computer simply as a way to increase our productivity. But coupled with advances in telecommunications and network services, it's also a means of bringing people together: to form a caucus, to have a party, to mount a debate.

Using computers this way is called teleconferencing—and it's one of the fastest-growing applications around. It can overcome barriers of distance, schedule, and lifestyle, and can encourage a new freedom of expression.

MESSAGE-BASING

There are two kinds of teleconferencing in wide use: message-basing and "real-time." Message-basing works through the public-message facilities of bulletin-board systems (BBSs) and networks. BBS message-bases were intended as a place for putting up advertisements, personals, and brief announcements. Users could call up, log on, and post messages in open files that others could access, read, and reply to later. But innovative BBSers soon discovered that message bases were good for more than getting rid of unwanted kittens and selling used disk drives. They were also versatile forums for soliciting advice and making statements.

As a result, a kind of "Kilroy Was Here" dialogue began on many pioneer boards. On some, conversation and debate became an important end in itself, and special bulletin-board software was developed. Nowadays, independent conference-orient-

JOHN JAINSCHIGG *is the technical editor of* FAMILY COMPUTING.
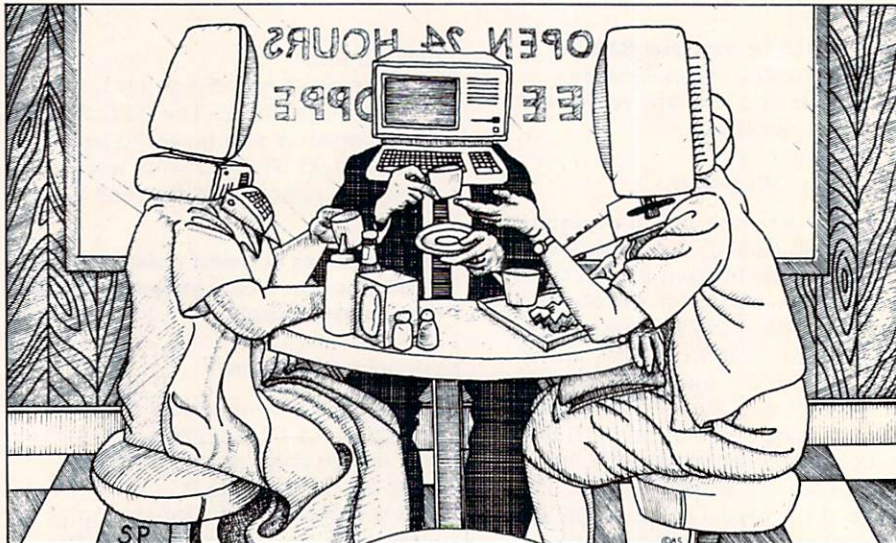
ed bulletin boards exist to serve almost every interest—computers and programming (naturally), but also law, literature, language, science, and agriculture, among others. Likewise, the SIG (Special Interest Group) areas of the major networks (The Source, CompuServe, Delphi, et al) have topical message bases that serve the same function as conference boards, but entertain a nationwide audience.

SIGNING ON

You may have to try several times when dialing up an independent conference board. Most BBSes can't be accessed by more than one user at a time, so the line is often busy. If a board runs 24 hours a day, late evening or early morning may be the best time to call.

Once you sign on, chances are the system will give you full instructions on how to proceed. Access is free for most independent systems, but many board operators require you to leave your name, address, and telephone number for verification, before full access is permitted. (Do not supply credit-card data or other personal info.)

The first time you're on a system or in a SIG, it's a good idea to leave a message for the sysop (system operator) introducing yourself and detailing your interests. No one is more familiar with a board than its operator, and no one will be more

helpful in bringing you into the thick of things. If you decide to contribute to an ongoing conference or collaborative project, don't just start blabbing without knowing what's been going on. Get a grasp of the topic by reading the message base first, and then dive in.

Since message-base conferences are not *immediate* interaction, they sidestep the scheduling problems that plague conventional meetings, but there still can be a relatively rapid exchange of dialogue. However, because message-base conferences do develop over time, they tend to lose some of the self-discipline and direction of real conversation. Digressions occur frequently; unpopular viewpoints are easily ignored. Rules of order or debate seldom are followed, and a new user may find it hard to understand where a debate is going or know how best to contribute. Don't let these things hold you back, though. The aggravation is minor compared to the fun once you've jumped in.

REAL-TIME

This more-advanced form of teleconferencing, which permits actual conversation, is available through some multiuser BBSes and most general information services. Real-time teleconferencing—so called because it allows communication to proceed in "real-time" (i.e., interactively and instantaneously)—is one of the fast-

ed by the name and/or identifying job number of the conference participant who entered it. You think: If I can see their typing, can they see mine? You try it, typing in a tentative HELLO, and press RETURN. Behold! HI THERE, someone answers back. WHERE ARE YOU FROM? asks another. Before long, you've been introduced all around, someone has initiated a topic, and you're deep in conversation.

Of course, there are problems with the medium, particularly for the new user. A well-attended conference channel can fill your screen with messages so fast that it's hard to pick up the thread of a conversation, let alone get a word in edgewise. Though some formal conferences are run by a moderator and start by observing strict rules of order, the medium doesn't seem to be particularly conducive to structure. Slow typists may prefer teleconference-oriented terminal software that features a protected "window" for entering and editing remarks prior to sending. (*HomeTerm*, part of the *HomePak* productivity package from Batteries

Professional jazz musician Ryo Kawasaki will participate in a FAMILY COMPUTING/K-POWER online conference on CompuServe on Sunday night, Aug. 18. Kawasaki, whose group, The Golden Dragon, is well-known in New York, Los Angeles, Tokyo, and the capitals of Europe, wrote the *Kawasaki Synthesizer* music software for the Commodore 64 (published by Sight & Sound Music Software, Inc.). To participate in the electronic discussion, CompuServe members should type GO FAM and enter the conference section of the electronic edition of FAMILY COMPUTING magazine. On our electronic edition, you may read fast-breaking news and reviews, post messages for the editors and other users, attend other "real-time" conferences, and generally participate in the creation of a new electronic magazine!

You can also leave messages (e-mail) for FAMILY COMPUTING on The Source (account No. TI5483).

To operate these electronic services, FAMILY COMPUTING uses modems supplied by Hayes Microcomputer Products, Inc.

McWilliams: ABSOLUTELY! YES! DO YOU HAVE CONTACTS? GA

Georgia: I'M A BOARD MEMBER. GA

McWilliams: AH, WE HAVE AN INSIDE TRACK HERE. CAN I SEND YOU A COPY FOR REVIEW, OR HAVE YOU SEEN THE BOOK? GA

Georgia: I'D LOVE TO HAVE IT . . . COULD YOU ADD A NOTE OF PERMISSION? HERE'S MY ADDRESS . . .

The fluency of the exchange belies the fact that Georgia Griffith is both deaf and blind, and that she read McWilliams' electronic reply via a text-to-Braille conversion device.

The best way to get into teleconferencing? Do it! FAMILY COMPUTING welcomes newcomers to its CompuServe SIG (GO FAM at any system prompt) and invites everyone to participate in the monthly meetings. Or, just stop by the SIG and say hello—leave a message, or just hang around the conference channel and chew the rag—somebody's there most evenings. Of course, you'll have to provide your own coffee and doughnuts, but what the heck—we're open 24 hours a day, and you can't beat the atmosphere. FC

TELECOMPUTING

est growing network services. It accounts for a large amount of CompuServe user time and at least one national network, American People Link, is devoted solely to this activity.

The most formal environment for real-time teleconferencing is found in the SIGs on systems such as CompuServe, PlayNet, Delphi, and American People Link. Most organize regular teleconferences on topics of interest to their members. (The FAMILY COMPUTING Forum on CompuServe, for example, now holds an open conference the first and/or third Sunday of every month at 8:00 p.m. ET.)

Subscribers to CompuServe and other networks should find it easy to locate programs of interest. Notices usually are posted well ahead of time in the SIG directories, and most conference organizers take care to schedule their meetings at conve-

Included, is an excellent example of this kind of program. At presstime it was available for Atari and C 64, and planned for Apple II series, Macintosh, and IBM PC/PC*jr*.)

THE LINES ARE OPEN

For most people, the experience of teleconferencing becomes liberating—for some, in a way face-to-face conversation can't be. The salient criteria for conference participation are interest; access to a computer, phone, and modem; and the ability to type. Age or physical handicaps, for example, do not exclude anyone. In fact, some gurus of the teleconferencing movement are people with severe handicaps. They emphasize that telecommunications can make interactions possible that could occur under no other circumstances.

For example, the following exchange took place during FAMILY COM-

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80 COLUMN 80 CPS TRACTION/FRICTION PRINTER $159.00
You pay only $159.00 when you order the Comstar T/F deluxe line printer that prints 8½x11 full size, single sheet, roll or fan fold paper, labels, etc. Impact dot matrix, bidirectional, LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your printer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied your net printer cost is only $59.00.

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Practicalc	$59.95	$24.95	$19.95
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Disk Filer (by Flip-N-File)	$39.95	$14.95	$12.95
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Pro Joy Stick	$19.95	$12.95	$10.00
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Super Graphics Expander	$29.95	$22.95	$19.95
Music Calc 1	$59.95	$29.95	$24.95
Filewriter	$59.95	$29.95	$24.95

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	LIST	SALE
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2. Oil Barrons-Strategy Board Game	$49.95	$19.95
3. Disk Drive Cleaner	$29.95	$19.95
4. HES Games (disk)	$29.95	$19.95
5. Pogo Joe (tape or disk)	$29.95	$19.95

---

* C128 COMMODORE COMPUTER $269.00
We expect a limited supply the 1st week in July. We will ship on a first order basis. This all-new revolutionary 128K computer uses all Commodore 64 software and accessories plus all CPM programs formatted for the disk drive.
List $349.00. SALE $269.00.

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Easy to use. Just plug into your Commodore 64 computer and you're ready to transmit and receive messages. Easier to use than dialing your telephone, just push one key on your computer! Includes exclusive easy to use program for up and down loading to printer and disk drives. **Best in U.S.A.**
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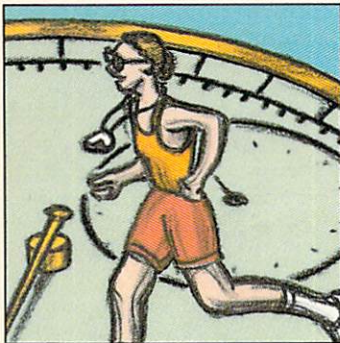
Sharpen Your Sports Skills

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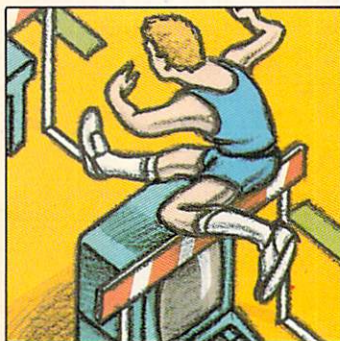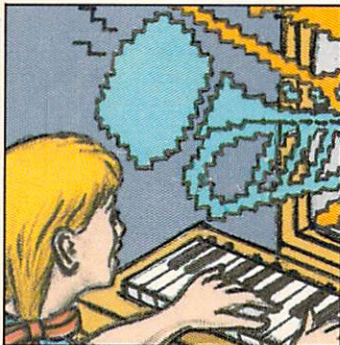
For many of us, the computer has improved the quality of life. We churn out formal reports, retrieve online information, and figure out our finances with increased efficiency. To a great extent, the computer has turned us into productivity purists—as far as our professional lives are concerned.

The summer, however, is the perfect time to concentrate on improving our personal lives and our computer skills—in relaxed mode. Take some time to plan a personal-investment spreadsheet, set up a data base for your book collection, or learn a new language—BASIC, Logo, or Pascal, to name a few. Or, challenge yourself in other ways, as discussed on the following pages. Learn about music, get in shape, hone your reading/typing skills—all with the help of your computer. Your computer can be your coach, tutor, or protege. It can help you develop a fitness program, flip flashcards, and, in some cases, it will even provide words of encouragement needed for success.

Why not use your computer's potential to expand *your* potential? Why not start now!

Manufacturer's phone numbers and addresses on page 34.

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Shape Up, Trim Down

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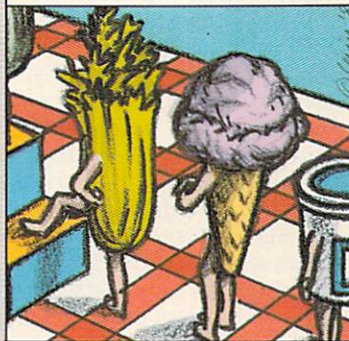
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Make Your Own Computer Game

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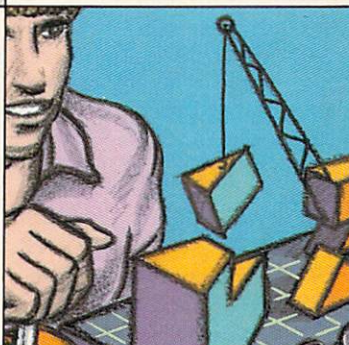
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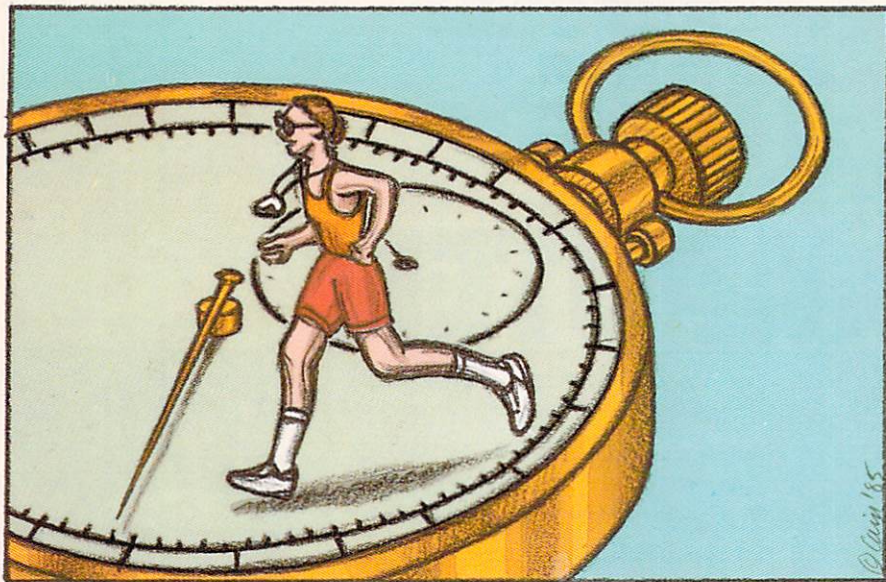
BY BOB CONDOR

Whether your forte is hitting a fastball, swinging a golf club, or running a 10K, there's always room for improvement. And, your computer, teamed with some specialized sports/training software, can be the ideal coach.

Computer-aided sports training has become a popular option for world-class athletes. Olympic gold medalists have benefited from on-line biomechanical analysis. Top-ranked tennis players, including Martina Navratilova, have used computers to study their competition and develop pre-match strategy. And the Dallas Cowboys football team, long recognized for its trend-setting ways, now puts all of its players through a computerized fitness program during training camp. Sixty different variables, such as age, height, ideal weight, body-fat percentage, and calf size, are factored into the Cowboys' computer for each of nearly 150 players and prospects.

"A major advantage I see for applying computer software to fitness," says Bob Ward, Cowboys conditioning coach, "is that it makes it convenient to project your expected rate of growth. You can see where you'll be, in terms of improvement, in a month, six weeks, eight weeks down the line. Then your software will help you monitor your progress as you train."

While little of the sports training software available for home use is as sophisticated as that afforded the Cowboys and other prominent athletes, many of the programs do offer similar advantages. A large number help you develop a training schedule, and teach you the finer points of your favorite sport. Each will motivate you by keeping track of your accomplishments *and* your failures.

Runners have the most—and best—choices of training software. But cyclists, swimmers, golfers, and baseball/softball players can all take heart; all can now turn to their computers for a little coaching.

OFF AND RUNNING

The best of the training software is *The Running Program* (MECA, $79.95 for IBM PC/PCjr, 256K), which was authored by the late Jim Fixx. Although it was designed with runners in mind, several enhancements make it a feasible package for a fitness-oriented family. Besides doing a hefty amount of runner analysis (including detailed training schedules and record-keeping, performance charts and personalized race predictions), *The Running Program* offers excellent interactive sections on conditioning, injuries, nutrition, and stretching. In addition, the Fixx software tracks down your participation in other sports, including expanded entries for cycling and swimming. Also useful for the whole family is the program's fitness test, developed by medical consultants, and a 50-question health and lifestyle quiz.

MECA may come out with an Apple version in the future.

But, if you're eager to employ your computer's help for your fall road-racing schedules, there are other options for Apple owners. *The Running Coach* (Software Publishing Corp., $49.95 for Apple II series, 48K; IBM PC/PCjr, 128K) is based on the ideas and techniques of the renowned New Zealand running coach Arthur Lydiard. It's easy to use and will provide you with a reliable training schedule once you enter your running history and run a "time trial." The program is particularly useful for advanced runners, as it incorporates race advice for interval (variable-paced workouts) and hill training.

One impressive feature of this software is that it looks at your performance in recent training to plan upcoming workouts. It automatically cuts back or increases mileage and pace. One drawback of the program, perhaps not a problem for the more serious, self-motivated runners, is the lack of personalization here; the user receives good information but doesn't have the opportunity to tailor it extensively to his or her personal fitness goals.

One program that offers a more specific goal-setting format is *Be Your Own Coach* (Avant-Garde, $39.95 for C 64; $49.95 for IBM PC/PCjr, 128K). It will develop training
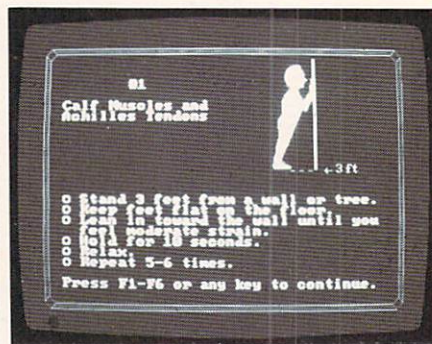
The Running Program

schedules for six different categories of runners: beginning running, weight loss, overall improvement, mileage increase, faster race pace, and peaking for racing. Users can plot mileage, pace, heart rate, weight, and workout times. However, despite some outstanding graphics, this program seems priced high for what it offers.

On the other hand, if you're a serious runner more concerned about improving your running times and less about good graphics and supplementary fitness information, *Running Your Best Race* (Wm. C. Brown Publishers, for Apple II series, 48K; C 64; IBM PC/PCjr, 64K, two drives necessary) is a great bargain for $18.95.

Author Joe Henderson, the founding editor of *Runner's World* and an experienced road racer, provides you with not only a software package but also a full-length book. Clearly, though, the package is not geared to beginners and fairweather joggers. Compared to most running software, Henderson's disk is a bit simplistic and light on recordkeeping capacity. But, he has some excellent pointers for the competitive runner.

HIT THE SWEET SHOT

If all this talk about working out makes you yearn for a peaceful day at the golf course, *Tournament Golf* (Avalon Hill, $30 for C 64; Apple II series, 48K) is the summer software package for you. It's a surprisingly realistic simulation that does more than merely entertain you. Using a joystick, each player makes a club selection (from four choices) before a shot, and the usual hazards and nuances—wind, sand traps, trees, and the break of the green—must be considered before striking a ball successfully. For example, you may be in mild rough and 220 yards from the hole, getting ready for your second shot. There are trees to the left and a creek runs in front of the hole. Should you play it safe and hit a 4-iron on your side of the water? Or do you pull a 3-wood out of your bag and go for the green (and a possible eagle)? Well, only one thing's certain: Your feet won't get wet if you gamble, miss, and drop one in the drink.

The graphics of *Tournament Golf* are solid. Each hole can be seen on one screen with vital statistics (par on the hole, your strokes so far, distance to the pin, selected club's aver-

Tournament Golf

age distance and maximum limits) in a viewing box. When shooting, the player controls the arm and wrist rotation of an animated, on-screen golfer with the joystick's control buttons. It will take a while to "groove" your shots and be ready to move from the "Amateur" to the "Pro" level. As is the case on the real links, putting and other parts of the "short game" are especially tough for the beginner.

For IBM owners, *Pro Golf Challenge* (Avant-Garde, $34.95 for Apple II series, 48K; $39.95 for IBM PC/PCjr, 128K) is another rainy day option. It doesn't measure up to the graphic capabilities of *Tournament Golf*, but it is also meant to educate as well as entertain, something most of us duffers certainly can appreciate. Shooting is a bit more technical here, with the player pushing a specific key eight or nine times per shot, to keep the cursor-shape clubhead within the "perfect swing" arc. It just doesn't feel like a golf swing. Another problem is that some holes are divided into two or three screens, with the player having to press certain command keys to see how far the hole is,

or what length a certain club will travel. Nonetheless, *Pro Golf Challenge* allows you to hit that one "sweet shot" which seems to keep all golfers coming back for more.

PLAY BALL

For that young ballplayer in the family looking for variety, send him or her up to hit against *Dave Winfield's BATTER UP!* (Avant-Garde, $39.95 for Apple II series, 48K; IBM PC/PCjr, 128K; $34.95 for C 64). This is a terrific package for kids just learning how to swing a bat, as well as those family members who are avid baseball fans. Your child will learn all the fundamentals of a good cut: the grip, the stance, how to swing level. Clear graphics, in easy-to-understand sequences, help demonstrate the techniques described on the screen; users can slow down or speed up the swinging action of the on-screen batter (a Dave Winfield look-alike, if you use your imagination). "Hitting Practice" and "Slugfest" options are available once the lesson is complete, with hitters choosing from a wide range of pitchers, including righthanders who throw "smoke" and southpaws who serve up nothing but "junk" pitches.

For the baseball fans in the family who already know how to hit (or gave up dreams of the major leagues long ago), the section in which Winfield describes major league pitches is quite interesting. The New York Yankee outfielder reviews eight different kinds of pitches (fastball, curve, change-up, slider, forkball, screwball, sinker, and knuckleball) thrown by either right- or left-handers, with four different deliveries (overhand, three-quarters, sidearm, and submarine). The capsule descriptions are insightful and informative. (Did you know knuckleballs average about 70 mph? That forkballs are thrown at about 80 percent the speed of a fastball?)

Another fun feature of *BATTER UP!* is the option to choose a park when in the SLUGFEST mode: You select from Yankee Stadium in New York, Wrigley Field in Chicago, Jack Murphy Stadium in San Diego, or the Metrodome in Minneapolis. Even the most experienced hitter will be curious about holding a "Slugfest" in Yankee Stadium, hoping to reach the same fences that faced Ruth, Gehrig, DiMaggio, Maris, and Mantle.

Come to think of it, for some of us, the summer just doesn't seem quite complete without trying to park one in the bleachers at Wrigley Field.

Dave Winfield's BATTER UP! lets you combine your batting knowledge in a "Slugfest."

BOB CONDOR, *a New York-based writer, is a displaced Cubs fan.*

Read a Book
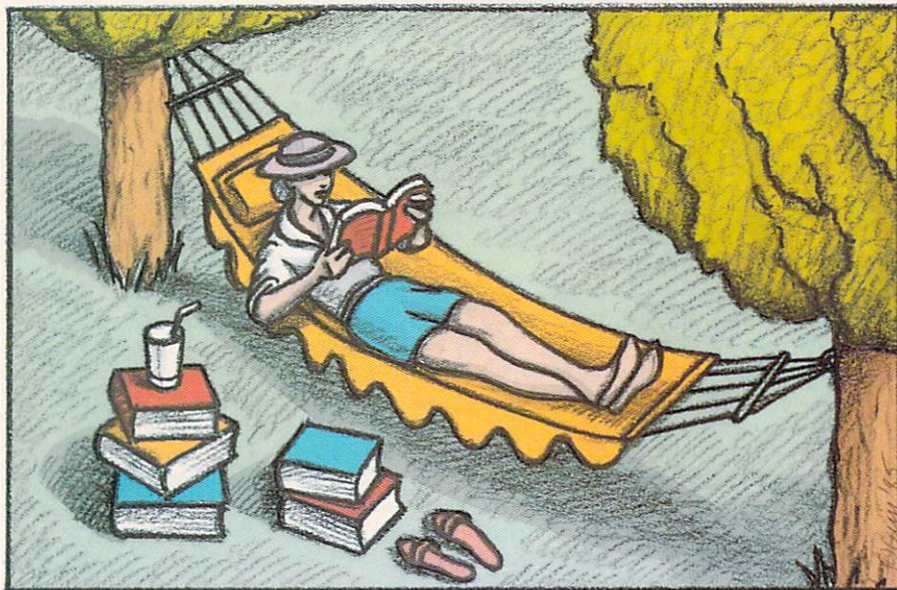
BY SHARON ZARDETTO AKER

Questions. It seems the computer sometimes raises almost as many as it answers. How important is programming to my child's education? What are the effects of video games on my family? What kind of monitor should we purchase? Books are one of the best ways to find out, and summer is the best time to dive into a reading list.

With *Bank Street's Family Computer Book*, and authors Barbara Brenner and Marie Endreweit as your guides, you should make it easily around the potholes and pitfalls of computing. From programming to piracy, sales talk to software, the *Family Computer Book* covers all the buying and usage bases. Some specifics of the "buying guide" section already are outdated, but the general information will still be helpful if you are in the purchasing stage. Especially reassuring during these summer months of endless computer game-playing is the authors' assertion that computer games are not hazardous to your child's health—or yours. (Ballantine Books, 1984; softcover, $6.95.)

It's a fact that eventually, and probably at the most inopportune moment, your computer will choose to malfunction. For those of us who know less about the internals of the computer than we do about what lies under the hood of our cars, Henry Beechhold's *The Plain English Repair & Maintenance Guide* (Simon and Schuster, 1984; softcover, $14.95) is an invaluable reference. Beware; as easy as it is to swallow, it's a fairly strong dose of technical information. Beechhold's informative, unintimidating, well-illustrated chapters introduce not only the basics of electronics and computers, but also the tools and techniques you'll need to clean, improve, improvise on, preventively maintain, cure, and otherwise fiddle with your computer. Customize your computer cables. Install your own reset switch. Several sessions with Beechhold will help put an end to your being at the mercy of temperamental high technology. (*Look for Beechhold's series on computer care and maintenance*, in FAMILY COMPUTING, *starting in October.*)

LOVELY TO LOOK AT

It's an unusual computer book indeed that you'd want to let off your computer shelf and onto your coffee table. *The Joy of Computers*, by Peter Laurie, will fit beautifully in both settings. It's as lushly illustrated and fun to leaf through as it is a valuable reference tool. Discussions of electronics, robots, computer graphics—how they're made, how they work, what they can do now, what they'll do in the future—are easy to understand and accompanied by rich photographs and drawings. (Little, Brown, & Co., 1983; hardcover, $19.95.)

For attention spans shrunken by the hot weather, *The Naked Computer* will go down like a tall glass of lemonade. Packed with anecdotes and interesting facts, Jack B. Rochester and John Gantz's book reads like a cross between *Ripley's Believe It Or Not* and *The Book of Lists*—complete with the smallest/largest/fastest/first computer science categories. (William Morrow & Co., 1983; hardcover, $15.95.)

The personal-computer revolution has left a trail of history books. Few capture the essence of the last three decades as well as Stephen Levy's *Hackers*. Levy chronicles the revolution from the Massachusetts Institute of Technology in the '50s to Silicon Valley in the '80s—from mysterious mainframes to more accessible micros. It profiles the people who were there at the beginning of the revolution—the world's first hackers who programmed their computers by means of switches, and stored their programs on punched paper tape. (Doubleday, 1984; hardcover, $17.50.)

Engines of the Mind takes readers further back in time, animating the early history of the computer. Author Joel Shurkin focuses on the corps people at the center of computer history. Take the chapter about Ada Lovelace, generally held to be the first programmer. The story of her long involvement with Charles Babbage and his "analytical engine," and the unusually cruel treatment meted out by her mother, has enough drama to lend itself to a TV miniseries. (W.W. Norton & Co., 1984; hardcover, $17.50.)

Kids have a big batch of computer-knowledge books to sample. At the top of the list is *The Encyclopedia of Computers and Electronics*. Unlike other standard encyclopedias, this volume divides the subject area into large sections and lends itself to a read-through. Clear prose and numerous illustrations make this book a winner in spite of its glaring omission of women—both in the illustrations and text—and its chapters on computers and war—unnecessary and inappropriate in a book for this age level. These drawbacks notwithstanding, it's recommended for ages 9 and up. (Rand McNally & Co., 1983; hardcover $9.95.)

Monica the Computer Mouse, by Donna Bearden, is a fun entry for the 8–11 crowd. Monica the mouse lives in a computer store, and wishes she could be a computer. Before her wish is granted, she is given a tour of different types of computers: at a store check-out, in a classroom, in a hospital. Monica is guided on her tour by Chip, and the bug Custer tags along, wreaking havoc on any computer program in his path. (SYBEX Computer Books, 1984; hardcover, $8.95.)

SHARON ZARDETTO AKER *is a frequent contributor to* FAMILY COMPUTING.

Clear the SAT Hurdles
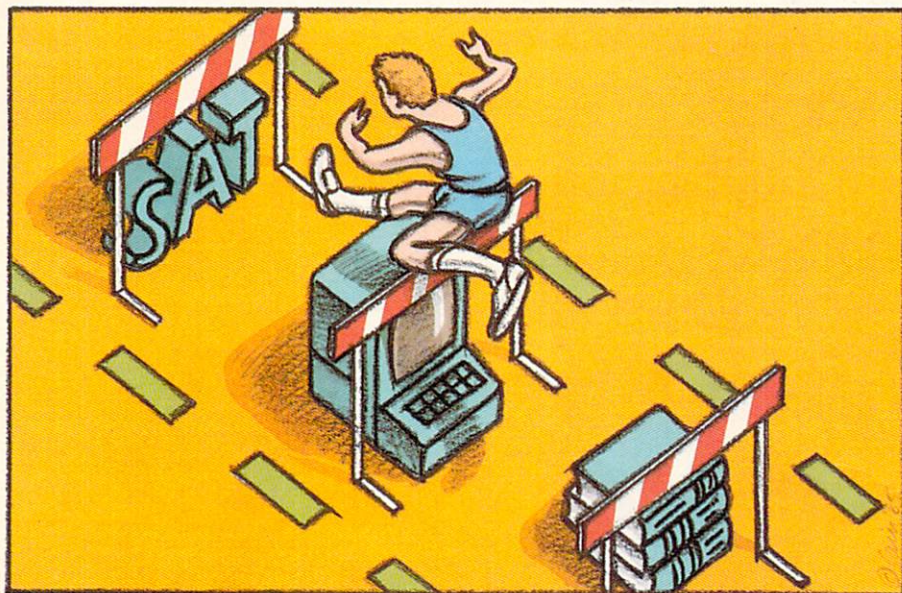
BY LINDA WILLIAMS

When SAT time rolls around, many high school students shrug their shoulders, cross their fingers, and take to their No. 2 pencils. "If I don't know it by now, I'll never know it," is a common quote of those who refrain from last-minute cramming. True, cramming rarely helps—and it's a far cry from preparing. Or so 18-year-old Robert Mullins of Tampa, Florida, learned.

Mullins tried his luck the first time around; the second time he used SAT-preparation software (*Mastering the SAT*, from CBS) and racked up 70 additional points. That might not seem like a substantial gain on a 1,600-point exam, but it's far better than average. According to Anne Grosso of the College Board, which coordinates the SAT, second-timers gain an average of 14 points.

Mullins' improved score didn't guarantee acceptance into his first-choice college, but boosted him into the arena of most-qualified candidates.

Of course, SAT-preparation software isn't geared exclusively to the second-timer. Peter Cockcroft, 17, of New York City, took the test once, and credits the computer for his excellent score.

Though both Mullins and Cockcroft spent some of their summer hours at the computer, their studying tactics varied. Mullins took a structured approach: For two months he spent four hours a day, five days a week at the computer.

Cockcroft took a leisurely approach, loading up the SAT software whenever he felt the urge.

This ability to personalize your approach to fit your study habits is probably one of the most appealing features of using SAT software.

Also, many SAT programs let you work on your specific weaknesses. For Cockcroft, that meant vocabulary building. "Getting someone to hold flashcards for you is a real pain. And I couldn't do it myself—I would cheat," he explained. So, Cockcroft turned to the vocabulary section of *Computer Preparation for the SAT* (from Harcourt Brace Jovanovich), which includes 1,000 "computerized flashcards." In a formal course, he would have spent hours practicing math skills he had already mastered.

Far more important than allowing you to personalize your studies, the most useful SAT software prepares students for the actual SAT format. Such familiarity with the exam, according to Anne Grosso, is a very effective preparation. Of course, all prospective SAT takers receive an informational booklet and sample tests from the Educational Testing Service. Yet worksheets, booklets, and courses may require more motivation than a high-schooler can muster in the summer. And that additional motivation could be software.

Adequate preparation will take a substantial time investment. The discipline must come from the user. No software can drag you to the computer to do work, and a few hours at the keyboard cannot guarantee acceptance to a given university.

SHOPPING STEPS

Once you've recognized and accepted the limitations of SAT software, you'll still have to tackle the hurdle of finding the right preparation package. At $30 to $300, these programs are a hefty investment, so it's worth spending some extra time doing research. Effective software will allow the user to concentrate on problem areas, and indicate, through explanations of answers and a tally of wrong ones, other skills needing work.

Here are some pointers to steer you on the right course when you begin your shopping expedition.

● Gather research on available programs. Read reviews in FAMILY COMPUTING (especially "SAT Software: Does it Make the Grade?" in the September 1984 issue), and in other reliable magazines, or go on-line (the EPIE Institute mans one on CompuServe: type GO EPI).

● Read descriptions on each software package. Does it follow the SAT format? Does it require reading questions from a workbook? Does it offer a self-timer? Can the user concentrate on specific problem areas?

● Ask software dealers if you can try out programs.

● Finally, be aware of simple drill-and-practice programs parading as preparatory packages.

A PROGRAM SAMPLER

It's difficult to make heads or tails out of the large array available, so we're presenting several program titles to guide you. Those we selected follow the SAT format, and received favorable mentions from educators, our own reviewers, and college hopefuls.

Arco's Computer Preparation for the SAT (Arco Publishing, Inc.), Apple II series (48K); $69.95.

Barron's Computer Study Program for the SAT (Barron's Educational Services), Apple II series (48K), C 64, IBM PC/PCjr (128K); $89.95.

Computer Preparation for the SAT (Harcourt Brace Jovanovich), Apple II series (48K), Atari (48K), C 64, IBM PC/PCjr (64K), TRS-80 Models III/4 (48K); $79.95.

Hayden SAT Score Improvement System (Hayden Software), Apple II series (48K) and Macintosh (128K), Atari 800/800XL (48K), C 64, IBM PC w/color graphics adapter/PCjr (128K); $99.95.

Krell's College Board SAT Exam-Preparation Series (Krell Software Corp.), Apple II series (48K), Atari 800/1200XL series (48K), IBM PC/PCjr (128K), TRS-80 Models III/4 (48K); $299.95 (80-point improvement guarantee); $139.95 (no guarantee).

Lovejoy's Preparation for the SAT (Simon & Schuster), Apple II series (64K); C 64; IBM PC/PCjr (128K); $69.95.

Mastering the SAT (CBS Software), Apple II series (48K), IBM PC/PCjr (128K); $99.95; C 64, $79.95.

Owlcat (Owlcat Inc.), Apple II/II plus/IIe (48K); C 64 (directly from Owlcat); IBM PC/PCjr (64K); $89.95, $249.95 (extended version), $19.95 (PSAT diagnostic).

PSAT/SAT Analogies (DesignWare), Apple II series (48K); $29.95.

The Perfect Score: Computer Preparation for the SAT (Mindscape), Apple II series (48K), C 64, IBM PC/PCjr (128K); $69.95.

LINDA WILLIAMS *is* FAMILY COMPUTING'S *copy and research associate.*

Shape Up Trim Down
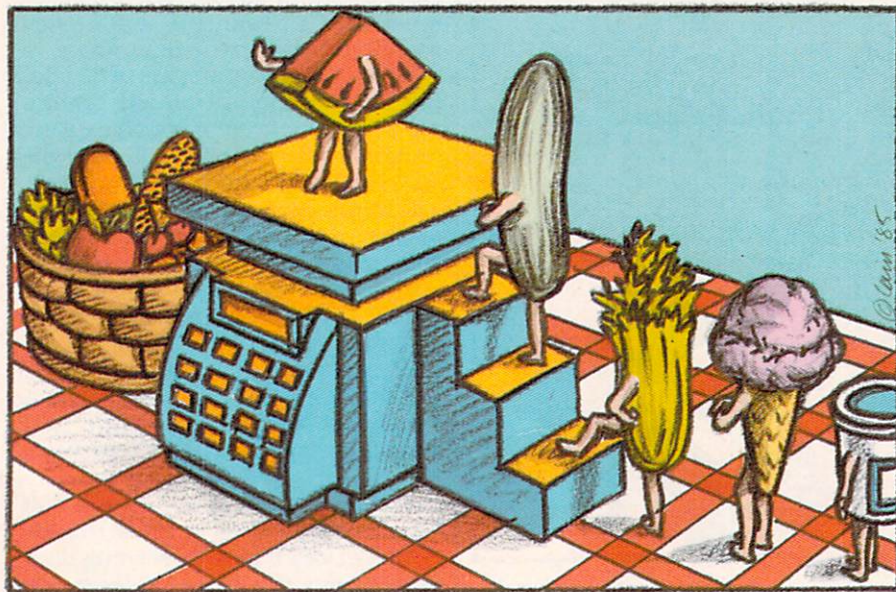
BY JUNE ROGOZNICA

One evening last fall, 30-year-old Jeff Eldred pulled in his not-so-slight gut, braced for the worst, and entered his first Weight Watchers' session. Moments later his worst fears were realized. The spotlight was on him—all 230 pounds, 5 foot 10 inches. He was singled out as a newcomer and applauded by 30 other attendees.

"I was devastated," says Eldred. Needless to say, he never returned.

Weight is an uncomfortable and painful subject for millions of over-weight Americans. Recognizing our flabby mid-sections and thunder thighs is not that difficult; however, discussing the topic openly and seeking help often is. That's just one of the reasons a computer program can be a useful tool; it makes dieting easier to digest.

Dr. Carol Byrd-Bredbenner, a nutritionist in Vernon, New Jersey, agrees. "Computers can raise [a dieter's] consciousness. They often become more interested in health and exercise in general." Another obvious benefit of using software is the time you save interpreting your daily diet, says Byrd-Bredbenner; time better spent jogging around the neighborhood or swimming laps at the pool.

Diet programs, however, are not a panacea. They can't tell if you're estimating your food proportions properly, nor can they prevent you from putting that piece of chocolate cake into your mouth. In fact, additional health questions may arise as you're using the programs. When they do, we suggest you call your physician or a registered nutritionist.

WEIGHING YOUR SELECTION

The current fitness boom has spurred programs of every size and shape. Just about all of the diet programs on the market use RDA (Recommended Dietary Allowance) guidelines, and they all measure your caloric and nutritional input, to varying degrees of complexity. But, as the program price rises, for the most part, so too does the size of the food data base, the personalized feedback, and the additional features.

For example, *Eat Smart* (Apple, 48K) from The Pillsbury Co., is at the low end of the price scale at $19.95. The program lets you analyze your diet day by day, but doesn't allow you to keep long-term records. The user chooses from a food worksheet containing 136 entries. The limited menu leads to a lot of guesswork and off-the-mark calorie counts.

Despite these drawbacks, *Eat Smart* does a good job of covering the basics. It provides a calorie count and nutritional analysis, and gives you advise on how to supplement your daily menu. For instance, if your diet is low in Vitamin A, the program will suggest you eat more yellow fruits and vegetables and leafy greens. If you're on a limited budget, this is a smart buy.

The Eating Machine (for Apple, 48K) from Muse Software is a slightly more upscale program, as its $49.95 price indicates. The data base includes 500 food items, but you can add another 200 items to personalize it for your tastes. The program effectively uses bar graphs to display the user's daily nutritional intake, compared to RDA figures. Another set of graphs show where your calories come from (i.e. protein, carbohydrates, fat, and alcohol).

For the dieter and the chef in the family, a recipe-analysis section will determine the nutritional breakdown of Grandma's Medal-Winning Meatloaf or heaven forbid, Dad's Chocolate Supreme Cream Pie.

Not available at presstime, *The Complete Scarsdale Medical Diet* fits into the same category, with a price tag of $39.95. The manufacturer, Bantam Electronic Publishing, says there will be more than 500 food entries in the data base, with expansion capabilities. The package will include the paperback version of the diet book. It is available for the Apple, 48K, and is planned for the IBM PC/PCjr, 128K.

THE CREAM OF THE CROP

Two recent entries to the growing list of diet programs are *The Original Boston Computer Diet* (Apple, 48K; C 64 (disk); IBM PC/PCjr, 128K; $39.95–$79.95) from The Scarborough Systems, and *Nutri-Byte* (Apple, 64K; and IBM PC/PCjr, 256K; $79.95) from ISC Consultants. Each includes a data base with more than 700 food entries and both have added behavior modification features lacking in many other packages.

The programs not only analyze what you eat but also the feelings that trigger you to overeat. As you input your meals, you're also asked to identify the mood you were in when you ate. *Nutri-Byte* takes this one step further, asking you to identify who you ate with, and where. At the end of a month, you may discover that every time you eat with your sister you consume a high fat meal.

The Original Boston Computer Diet and *Nutri-Byte* have another unusual twist: counselors. The former lets you select from three ("sweet" Amy, "matter-of-fact" George, and "freewheeling" Shirley), while *Nutri-Byte* gives you an "electronic conscience" named Dan. Your counselors add a note of humor when you need it most. And, as many dieters know, a little humor and a lot of willpower go a long way.

Managing Editor JUNE ROGOZNICA *used to think she had good eating habits. Then she researched this article.*

Compose a Tune or a Symphony
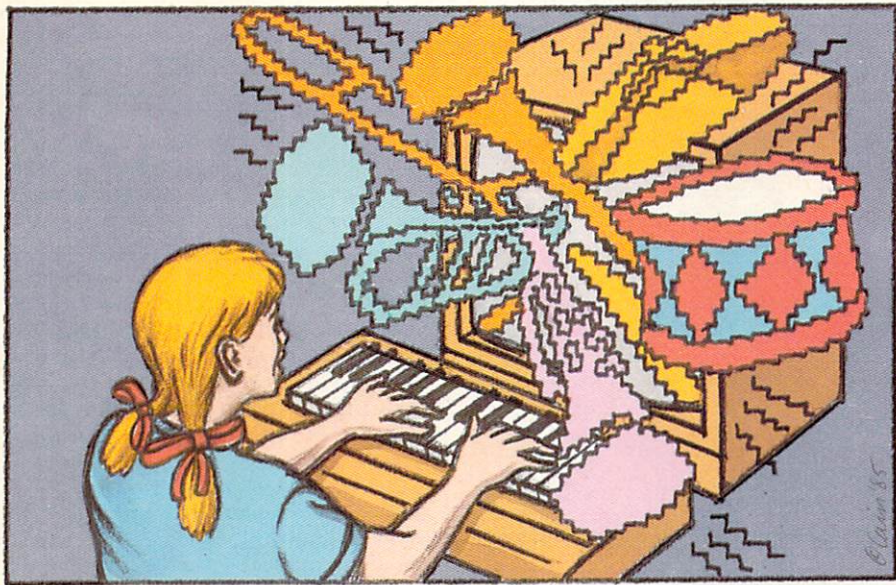
BY JOEY LATIMER

Sixteen-year-old Mike Todd of Idyllwild, California, sings with his computer. Using BASIC, he programs his IBM PC to play the tenor parts he must learn for his choral group. The computer effortlessly plays the music over and over, while Todd memorizes the melodies and echoes them.

Todd is just one of a growing number of music enthusiasts discovering the potential of the computer as a music tutor or music processor. A lot of well-known talents—Stevie Wonder, Herbie Hancock, and The Steve Miller Band, to name a few—have tapped the computer's music capabilities for their professional recordings. (If you want to hear computer-aided music, turn to Microtones on page 62, and type in *The Curly Calypso*, a computerized song written by Steve Miller Band members.)

You don't have to be a professional musician or a top-notch programmer to turn *your* computer into a musical tool. There are packages designed for the novice musician and computer neophyte. The programs vary, from drill-and-practice tutorials to simple melody-makers to more powerful packages that let you compose and record. As with all programs, your selection will be limited by your computer brand and its capabilities. Following are brief summaries of programs I've found educational, entertaining, or just plain fun.

If you're new to the music field, and you're interested in learning the basics step-by-step, there are quite a few packages designed just for you. For instance, *Music Made Easy*, by Sandy Feldstein of Alfred Music Publishing, will take you through music lessons as an instructor would. You'll cover the staff, clefs, time signatures, notes and rests, tempos, chords, harmonies, composing, and more. The $29.95 package is written for the Apple II series and Commodore 64.

LEARN THE FUN WAY

Clef Notes is an instructional program with a gaming twist. Priced at $39.95, it's available for the Apple II series, C 64, and IBM PC/PCjr. *Clef Notes* lets you work on treble, alto, tenor, and bass clefs. In addition, it helps you improve the speed at which you can identify music notes as they are placed on the staff. The user's scores are stored in a "Hall of Fame."

Another instructional program especially good for the young or novice musician is *Musical Stairs* (Apple II series, C 64, IBM PC/PCjr) a game that helps you identify intervals on the bass and treble clefs, and features a graphic representation of a piano keyboard. The package sells for $29.95.

Music Made Easy, *Clef Notes*, and *Musical Stairs* are available through Electronic Courseware. For more information on these and other instructional music programs, write Electronic Courseware Systems, Inc.,

1210 Lancaster Drive, Champaign, IL 61821; or call (217) 359-7099.

In addition to the step-by-step music courses and exercises, there are good products available for those who prefer to compose, synthesize, experiment, or just play around. *3001 Sound Odyssey*, by Sight & Sound Music Software, Inc., for $34 turns your C 64 into a three-voice synthesizer. Its main menu offers you a choice of a sizzling demo—an animated, hands-on tutorial covering sound synthesis—or a diverse synthesizer program.

Songwriter, from The Scarborough System, is one of the simpler programs for creating and saving songs, and it's available for the Apple II series, Atari, C 64, and IBM PC/PCjr for $39.95. The program lets you make up songs while you learn about metronomes, scales, and the names of notes. You create music by hitting keys on the roll of a computerized player piano. Once you've created your own tune, you can save it to disk and play it back later.

TACKLE THE TOUGH ONES

MusiCalc, from Waveform Corp., is more time-consuming and difficult to use than many of the other programs on the market. But, you'll find the results are well worth the time and energy spent. In effect, with this program you'll be able to turn your C 64 into a powerful music synthesizer. It lets you produce a full range of notes in seven different octaves. The $29.95 package has 32 preprogrammed tunes.

Will Harvey's *Music Construction Set*, from Electronic Arts for Apple II series, Atari, and C 64, still stands up as one of the most entertaining programs on the market. However, unlike *MusiCalc* and *Songwriter*, you can't play music by pressing the keys on your keyboard; you use a joystick or touch tablet to put notes on a standard music score sheet (or, in this case, screen). You can edit or save your piece by using icons displayed on the screen.

Of course, these are just a few of the programs on the market. There are dozens more packages and an assortment of music-related peripherals available. (*Check out the "Buyer's Guide to Music Peripherals" in the upcoming August issue.*) Combine music software and hardware, and you'll be able to stretch your machine's capabilities to the limit. Within moments, you and your computer will be ready to sing. Now, a one, and a two, and a three . . . .

Associate Technical Editor JOEY LATIMER *is a musician, and recording engineer. He writes* K-POWER's *Microtones.*

Read Faster Type Faster
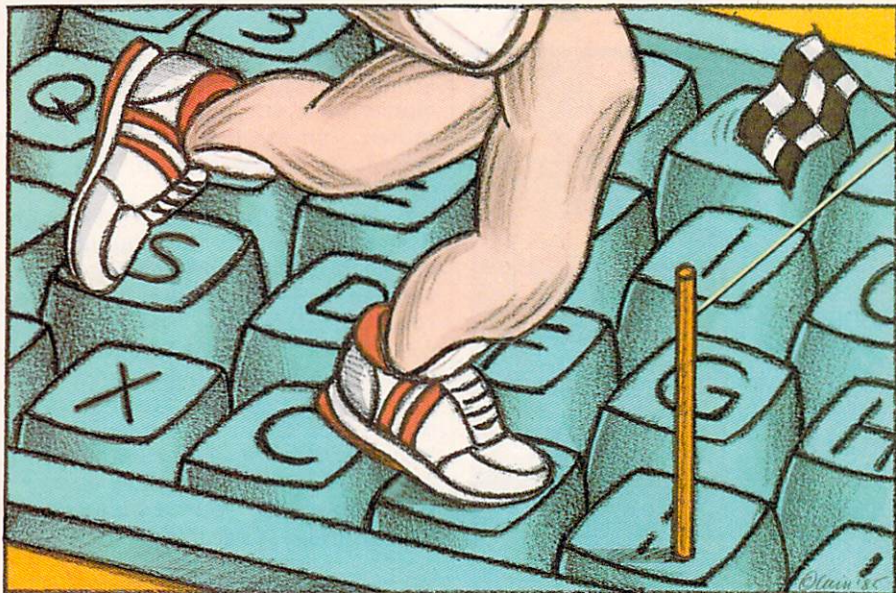
BY TONY MORRIS

Do these comments sound familiar?

"It'll take all night to type this paper and it's due tomorrow!" or, "I've got so much to read, how will I ever get through it all by exams?"

They are frequent complaints at our house. Or at least, they *were*. Thanks to the computer and special software, we've managed to improve our reading and typing speeds to handle practically any work load the office or school throws our way.

Building speed-reading and typing skills are among the most useful applications of your family's computer. It's tough to find the time or the inclination to take formal classes. But, with packages tailored specifically to helping build such skills, your family can make real gains on both fronts—in your own home, at your own pace.

Practice is at the heart of improvement and computer software never quits. It drills you over and over again—furnishing immediate feedback to let you know how you're doing, tracking your progress and increasing the challenge.

Used faithfully, these packages are capable of producing phenomenal results. Our kids' reading speeds shot up from about 200 words per minute (wpm) to more than 600 wpm. When skim-reading, they can plow through material at an unbelievable 3,000 wpm with 50 percent comprehension.

As for typing skills, our kids cheered the packages disguised as arcade games. Typing furiously to protect their mother ship from alien at-

tacking letters and such, they forgot they were learning to type.

More serious typing packages dispense with the fun and games and present clearly structured lessons, acting like computerized tutorials.

For maximum effect, figure on putting a lot of time and effort into these packages—at least one hour's work a week for six to eight weeks. The arcade typing packages are, in general, the easiest to get kids to use. More serious packages won't succeed unless the user has a desire to improve.

If you are looking for ways to stimulate less-motivated kids, there are a variety of approaches you can take. Make the lessons a joint effort. Each participating family member can plot his or her scores side by side to see who's improving the fastest. Different skills can be accommodated by making it a race of percentage improvement in performance.

READING FASTER

With both *Micro SpeedRead* (CBS; $99 for Apple, IBM PC/PCjr) and *The Evelyn Wood Dynamic Reader* (Timeworks; $69 for Apple II series, Mac; $49 for C 64; $89 for IBM PC/PCjr), you should more than double your reading speed with no loss of comprehension. The two programs differ somewhat: The former emphasizes building speed, the latter stresses comprehension.

Micro SpeedRead uses written material presented in the accompanying manual on the one hand and computer demonstrations and practice

on the other. After a few weeks with this package, virtually anyone should be able to read more rapidly. Moreover, you'll learn how to adjust reading speed to the nature of the material.

Dynamic Reader seems most appropriate for college-age or adult users prepared to make a serious effort to improve their reading skills over a six- to eight-week period. Average readers can expect a two- or threefold increase in reading speed with 90—100 percent comprehension after completing the course. *Dynamic Reader* uses a combination of computer exercises, drills, and readings, together with off-the-computer reading provided with the package and regular practice on everyday material.

Micro SpeedRead fascinated our two younger teenagers, Matt, 14, and Anne, 17. They appreciated learning the variety of reading methods, and took great satisfaction in tracking their improvement. It was with *Micro SpeedRead* that my kids had such terrific success.

I preferred *Dynamic Reader*. It sets more modest goals and is a bit more demanding to use. It seems to offer a comprehensive reading-skills program tailored to the serious adult reader interested in reading more rapidly without a loss in comprehension.

TYPING FASTER

The list of typing packages is long and growing longer every month. *MasterType* (The Scarborough System; $39 for Apple II series, Atari, IBM PC/PCjr; $49 for Mac), is one of the oldest and best packages available to help you and your family improve in the words-per-minute department. Words in the four corners of your screen launch missiles at your command ship; only by typing the words before the missiles hit can you save your ship. Eighteen lessons come with the disk, and it is possible to add lessons of your own making. A new improved version includes more help with finger positions. Vary the level of difficulty within each lesson, and the speed you must type.

If you prefer a more straightforward approach to touchtyping, *Typing Tutor III* (Simon & Schuster; $39–$49 for Apple II series and Mac, C 64, IBM PC/PCjr) is a little less flashy. A no-nonsense combination of drills and tests tailored to your abilities, this package adjusts with you as you improve. An arcade-style game called "Letter Invaders," separate from the lessons and tests, may satisfy the trigger-happy members of your family.

TONY MORRIS *and his family have been reviewing educational software for* FAMILY COMPUTING *since the magazine began.*

Make Your Own Computer Game
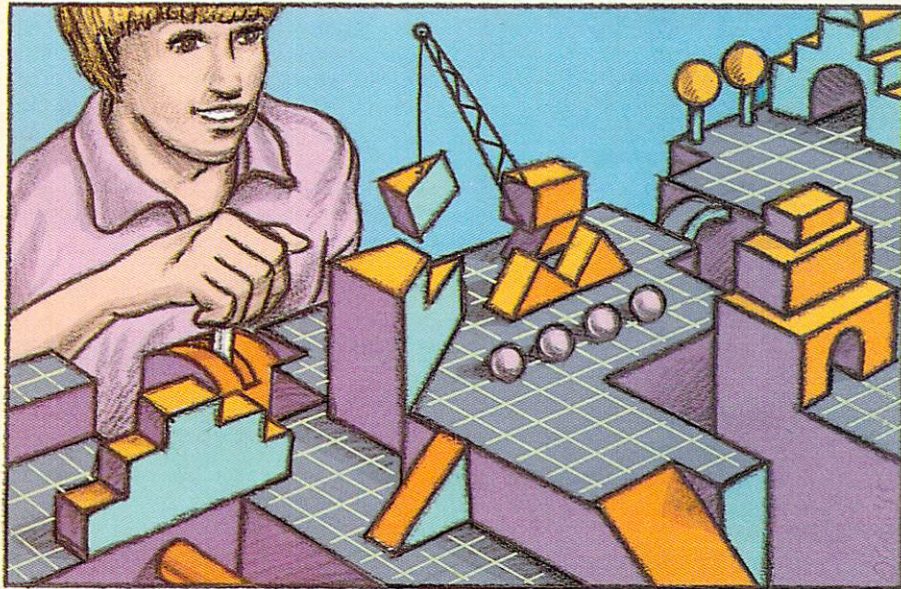
BY JAMES DELSON

Even the best games can wear out. One member of the family after another maps all the levels, shoots down all the missiles, and finds all the treasures. But what about a game that puts *you* at the designer's table? With construction sets, users can create their very own games, challenging friends and family—all summer long.

The typical construction set is like an electric-train setup. Using prefab "building blocks," such as characters in an adventure game or sections of terrain in a strategy and tactics game, you create a challenge from the ground up. As you add new pieces, words, images, or other material, your game becomes more and more complex, its elements eventually meshing together into a finished whole. To test the results, you run the program, just as you would run a train over your newly laid tracks to see if everything fits. Fine-tune until you're satisfied with the results, then make copies for yourself and friends. (This is one instance where it's not considered piracy, as you own the imaginary copyright.)

It may sound like an involved process, suited only for programming pros. But in fact, much of the work's been done for you by the program developers. They've given you the shortcuts you'll need to craft a challenge worthy of your imagination.

There's a construction set out there for every taste, from easy-to-use, arcade game-builders, which can take as little as half an hour to set up, to complex text-graphic adventure-writers that might require hundreds of hours of your time. The information in parentheses following each description refers to the package's degree of difficulty and the minimum time required to build and play a game.

PINBALL

Remember standing around the pinball tables in pizza parlors, trying to squeeze the most "play" out of your nickels? Computerized pinball-construction programs offer the chance to "fix" the play action of a machine. Alter the laws of gravity, for instance, or change the bonus for each rebound.

Pinball Construction Set (Electronic Arts, $22.95 for Atari, C 64; $34.95 for Apple, IBM PC/PCjr; planned for Mac), although not the first kid on the block, was the program that made a name for the construction set genre. It's easy to use and practically foolproof. Pinball-playing Picassos can color each element of the game, and reshape the bumpers and playfield. This classic is ideal for all ages over 8. (Easy; 30 minutes.)

POLITICAL GAMES

President Elect (S.S.I., $39.95 for Apple II series, C 64), is a simulation of a U.S. electoral race between characters programmed into the game or created by you. These can be historically accurate or totally fictitious. Contenders can run against each other in a variety of political climates, based on fantasy or projected reality. Run Gary Hart against Howard Baker in 1988 or pit Jesse Jackson against Gerald Ford in '84. This takes a long time to play, but only a short time to set up, so it's ideal for newcomers to the field who have summer nights to spare. (Average; five hours.)

STRATEGY/TACTICS GAMES

There's always some variety in these games, thanks to menus that usually let you set levels of expertise, number of players, length of scenarios, and other variables. But the construction set form has pushed strategy and tactics games miles ahead. You can create armies or fleets and the ground or seas on which they maneuver with no end to the different battles that can be fought.

The Shattered Alliance Toolkit (S.S.I., $15 for Apple), for example, let my playtesters and me restage the Battle of Hastings one day and fight out a scenario from the Crusades the next. We could build armies that would give newer players a fair chance against more experienced ones. (Average; two hours.)
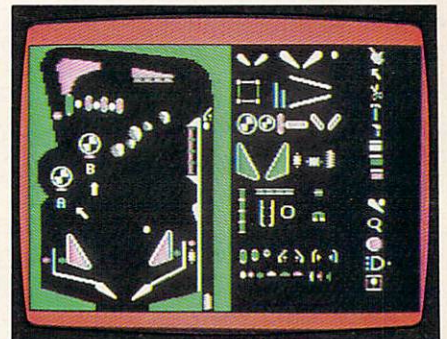
Pinball Construction Set (top); *The Ancient Art of War* (bottom).

The Ancient Art of War (Broderbund; $44 for IBM PC/PCjr; planned for Apple Mac) lets players carpet the screen with terrain of their choice, including lakes, forests, mountains, forts, villages, and more. As forces clash, the action zooms into the scene you've created and a battle takes place. Players select men from a

variety of troops, position them in formation, adjust combat rules, and even choose the computer opponent they'll take on. It's a sign of things to come in this field, and well worth the investment for a summer of creative wargaming. (Average; two hours.)

Broadsides (S.S.I; $39 for Apple, Atari, C 64) and *Clear for Action* (Avalon Hill; $25–$30 for Atari, TRS-80 Models I/III) are naval construction sets that allow players to create ships and send them into battle. *Broadsides* allows for more flexible movement and combat and more accurately depicts 18th-century sea combat. (Average; 30 minutes.) *Clear for Action* is best-suited for beginning players. (Average; one hour.)

ARCADE GAMES

Surprisingly few kits let you assemble your own arcade games. *Lode Runner* (Broderbund; $34–$39 for Apple Mac, Atari, C 64, IBM PC/PCjr) and *Mr. Robot and His Robot Factory* (Datamost; $34 for Apple, Atari, C 64) are two excellent options that let you craft ladder games (*Lode*: Easy; one hour. *Mr. Robot*: Easy; one hour.)

Mail Order Monsters (Electronic Arts; $32 for C 64), is new and especially noteworthy. Choose from a variety of creature types and sizes, arm them with weapons and other deadly devices, then send them into combat. The game features a state-of-the-art combat system and could be a real winner with strategy/arcade fans. (Easy; one hour.)

SPORTS

Most sports games provide plenty of joystick-operated fun and then leave it at that. There are two racing games, however, that let you make use of track-building features.

Rally Speedway (Adventure International; $49 for Atari) is a road-race game in which you use a joystick to select and lay track sections, obstacles, and backgrounds. With the test feature, you can carefully lay down a course, making sure the tracks you create are usable. (Easy; one hour)

Racing Destruction Set (Electronic Arts; $32 for C 64), is for those with a little more daring. Players can create a wide variety of tracks with a number of road surfaces, track patterns, jumps, changeable gravity, and cloverleaf intersections with maniacal drivers trying to hit you. Build a custom car and equip it (à la *Road Warrior*) with armor plating and oil-releasing spray. (Average; one hour.)

ADVENTURES

Once you've explored every nook and cranny of an adventure game, you have little choice but to pass it on
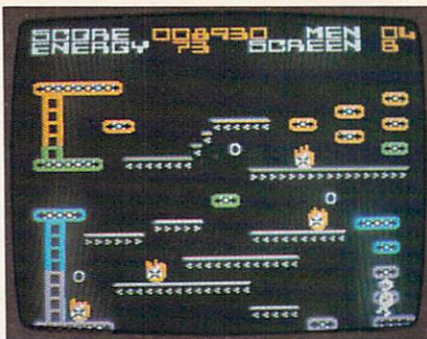
Mr. Robot and His Robot Factory (top); *Rally Speedway* (bottom).

to a friend. But more and more games let you play creator and fabricate your own worlds to map and explore. The programs sometimes are unwieldy, but with time and patience you usually get results.

Galactic Adventures (S.S.I.; $59 for Apple, Atari) a complete game by itself, also offers the chance to build an entirely new challenge. It has one of the longest play lives of any construction set I've come across. If you like the way characters grow and develop new skills, and wish to travel to remote locales in fantasy/role-playing games, this one's for you. Players can create single rooms, buildings, cities, or entire worlds. Populate these climes with a variety of creatures and seed them with treasures. (Average; two hours.)

Fans of the great *Ultima* series will want to try *Adventure Construction Set* (Electronic Arts; $39 for C 64; planned for Apple, IBM), which lets you build a role-playing adventure, complete with traps, weapons, spells, and monsters of your own making. You can add music and give personality to beings you meet along the way. The program will finish an adventure any time you get tired of creating it—a feature that may come in handy when you've had enough of wading through the package's incomplete documentation.

Text-only and text-graphic adventures demand patience, quick wits, and a certain world view unmatched in any other type of gaming. The same qualities are required for adventure *authoring* programs. *Adventure Writer* (CodeWriter Corp.;

$40–$50 for Apple, Atari, C 64, IBM PC/PCjr) and *Adventure Master* (CBS; $44 for Apple, Atari, C 64, IBM PC/PCjr) are a pair of good solid programs that require chunks of time, in order to produce games of any length and quality. (Both programs: difficult; 10 hours.)

So, when you've topped out at *Donkey Kong*, dug through all the dirt in *Boulder Dash*, mapped the last dungeon in *Wizardry*, or if you're in the mood for a diversion that tests your creative as well as your gaming skills—turn to the construction set, and take your place next to the game designers. **FC**

JAMES DELSON *is* FAMILY COMPUTING'*s games critic.*

SOFTWARE COMPANIES

Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043; (415) 960-0410.
Adventure International, P.O. Box 3435, Longwood, FL 32750; (305) 862-6917.
Avalon Hill, 4517 Harford Road, Baltimore, MD 21214; (301) 254-5300.
Avant-Garde Publishing, 37B Commercial Blvd., Novato, CA 94947; (415) 883-8083.
Bantam Electronic Publishing, 666 Fifth Ave., New York, NY 10103; (800) 223-5780.
Barron's Educational Services, 113 Crossways Park Drive, Woodbury, NY 11797; (516) 921-8750.
Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101; (415) 479-1170.
Brown, William, 2460 Kerper Blvd., P. O. Box 539, Dubuque, IA 52001; (319) 589-2822.
CBS Software, 1 Fawcett Place, Greenwich, CT 06836; (203) 622-2500.
CodeWriter Corp., 5605 W. Howard St., Niles, IL 60648; (312) 647-1270.
Datamost, 19821 Nordhoff St., Northridge, CA 91324; (818) 709-1202.
DesignWare, 185 Berry St., San Francisco, CA 94107; (415) 546-1866.
Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403; (415) 571-7171.
Epyx, 1043 Kiel Court, Sunnyvale, CA 94089; (408) 745-0700.
Harcourt Brace Jovanovich, 1250 Sixth Ave., San Diego, CA 92101; (800) 543-1918.
Hayden Software, 600 Suffolk St., Lowell, MA 01864; (800) 343-1218.
ISC Consultants, 14 E. Fourth St., Suite 602, New York, NY 10012; (212) 477-8800.
Krell Software Corp., 1320 Stony Brook Road, Stony Brook, NY 11790; (516) 751-5139.
MECA, 285 Riverside Ave., Westport, CT 06880; (203) 222-1000 or (800) 631-MECA.
Mindscape, 3444 Dundee Road, Northbrook, IL 60062; (800) 221-9884.
Muse Software, 347 N. Charles St., Baltimore, MD 21201; (301) 659-7212.
Owlcat, 1850 K St. NW, Suite 380, Washington, D.C. 20006; (202) 466-5124.
Pillsbury Co., Pillsbury Center, Minneapolis, MN 55402; (612) 330-8732.
Scarborough System, 55 S. Broadway, Tarrytown, NY 10591; (914) 332-4545.
Sight & Sound, 3200 S. 166 St., P.O. Box 27, New Berlin, WI 53151; (800) 558-0910.
Simon & Schuster Electronic Publishing, 1230 Ave. of the Americas, New York, NY 10020; (212) 245-6400.
Softsync, 162 Madison, New York, NY 10016; (212) 685-2080.
Software Publishing, 1901 Landings Drive, Mountain View, CA 94043; (415) 962-8910.
Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139; (617) 494-1200.
Strategic Simulations, 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043; (415) 964-1353.
SubLogic, 713 Edgebrook Drive, Champaign, IL 61820; (217) 359-8482.
Timeworks, P.O. Box 321, Deerfield, IL 60015; (312) 948-9200.
Waveform, 418 N. Buchanan Circle, No. 12, Pacheco, CA 94553; (415) 825-1722.

Yankee Dave Winfield and Computers
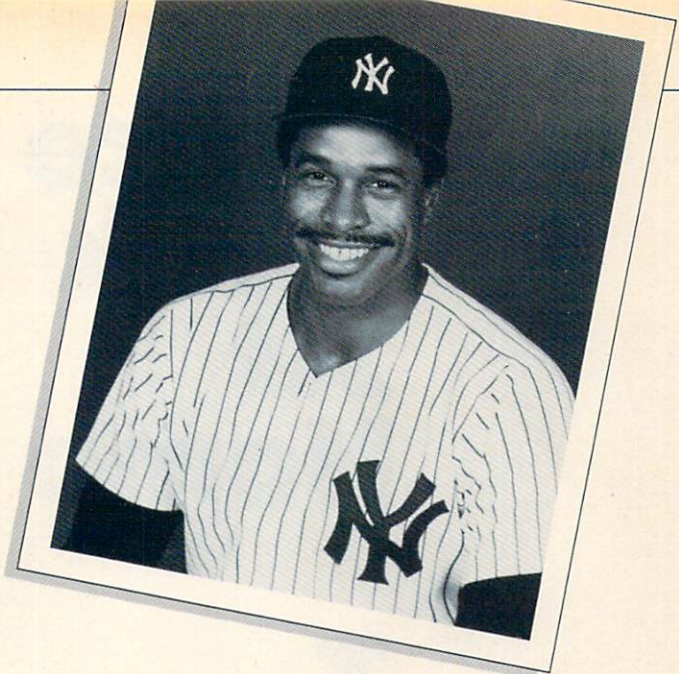
THE ALL-STAR RIGHT FIELDER GIVES DISADVANTAGED KIDS A CHANCE TO JOIN THE COMPUTER GENERATION

BY JUNE ROGOZNICA

The New York Yankees' right fielder Dave Winfield was up to bat. He waited for the pitch, patiently. He swung, expertly. You could almost hear the breeze as he released his wrists and swung his bat across his chest. Strike one. The second pitch came and went. Strike two. "I'll get the hang of it," said Winfield to a disappointed crowd of admirers, and he did. The third pitch was his. Wood met leather, or so it seemed, and the ball sailed over the centerfield wall.

The 6-foot-6-inch, 220-pounder checked his score knowingly, grinned, and set down the joystick. *BATTER UP!*, Winfield's recently released computer program (*see review, page 27*), shared part of the limelight one spring evening at Visage, one of New York City's hottest dance clubs. But, the gala affair was meant for neither Winfield nor his program. They were the sideshows for the main event—a benefit sponsored for the David M. Winfield Foundation.

JUNE ROGOZNICA is FAMILY COMPUTING's managing editor.

The foundation, started in 1976 to help disadvantaged kids, has health, education, and recreation as its three main building blocks. A recently added cornerstone is computers.

"Those are the equalizers," explains Seretta McKnight, executive administrator of the foundation. "Once they [the kids] have these, then it's up to them whether or not they better themselves," she says, explaining the philosophy of the foundation.

Clearly, this philosophy follows Winfield's lead. The 33-year-old baseball star had a slightly rocky early childhood—his father left the family when Dave was only 4 years old—but sports kept him on a straight and steady course. "Dave took care of his body, got a good education, and had recreation to keep him out of trouble," says McKnight.

"He's the first one to tell you he remembers from whence he came, and the road he traveled," says McKnight, who's obviously become a friend and fan over the past "five seasons" she's known Winfield.

"People say, it (the foundation) is a write-off. The guy was doing this when he had no money—back in Minnesota in 1976." Winfield, who was 24 years old at the time, established a sports scholarship program in St. Paul, Minnesota, the home of his family and alma mater, the University of Minnesota.

HOW IT ALL STARTED

Winfield's initiation into the technology age came about six years ago when the foundation started growing and a computer was purchased for record-keeping and mailings. He purchased an IBM PC for home use three years ago, and uses it primarily to track his finances and for word processing.

About the same time, the foundation added computers to its list of equalizers. It's another area in which many of the underprivileged are lacking, says Winfield. "There's already a gap . . . I hope everyone can be introduced to computers. I believe it will be a necessity in the future."

The foundation started promoting computer literacy several years ago by offering scholarships and summer computer-camp sessions for students from Martin Luther High School in Queens, New York. Since then, the organization has expanded its computer involvement in a big way. Its recent project is a 1½-year-old computer-literacy program at the Eastern District School in Brooklyn, New York. The foundation plans to duplicate the pilot program at other high schools.

COMPUTERS & KIDS

Does Winfield worry that computers will draw kids off the baseball fields and basketball courts—leading them away from physical exercise? That's doubtful, he says. "There's always going to be a need for personal interaction; we won't be giving up one for the other."

Winfield says that computers can actually help kids improve their physical performance. He uses his program, a batting tutorial, as an example. "In a baseball game, kids usually just look at the box scores. But, the result has nothing to do with using the right technique. You can learn more with a program. You can watch and try to imitate."

Would Winfield have been a computer hacker if he had been given the tools as a kid? "Probably not," he says. But for those kids who are interested, says Winfield, "Once they gain the skills, they can carry them with them the rest of their lives— it's long-lasting." **IC**

Office Work At Home

WITH A COMPUTER AT HOME, YOU CAN DO MORE THAN JUST EXTEND YOUR DAY AT THE OFFICE. YOU CAN VARY AND ENRICH YOUR PROFESSIONAL LIFE.

BY BARBARA E. AND JOHN F. McMULLEN

"FOR THE FIRST TIME, I CAN PRODUCE A FINISHED PRODUCT AT HOME."
MIKE HUDAK
Director of Research,
ABC-TV

BARBARA E. *and* JOHN F. McMULLEN *are the authors of* Microcomputer Communications, A Window on the World *(John Wiley & Sons); and cofounders of a consulting firm,* McMullen & McMullen.

The mention of people doing office-related work at home may conjure up images of executives carrying home *Lotus 1-2-3* data disks and working into the wee hours of the morning on a financial model. While this certainly happens, it's not the whole story. A lot of people who bought computers in the late 1970s—when *VisiCalc* and Apple IIs went hand-in-glove—have learned to use computers in more flexible ways, and not just as strict extensions of office tools.

In many cases, people who rarely brought work home before they bought a computer now work at home regularly. Many of these executives, in fact, originally bought computers for their kids, and only began using them for work after living with them for a while. Since then, their use of the computer has evolved to the point where it's quite natural to sit down and casually work on it. And, unlike those who cart home *Lotus 1-2-3* or *dBase III* disks to complete work they started at the office, these people often do work at home that they wouldn't do at the office.

For them, this new work is not a burden—not like grinding out long "overtime" hours. Our investigation revealed that working with computers at home often allows people to enrich their professional lives. They perform activities they normally wouldn't have the time for, or be equipped to do, at the office. Furthermore, the very use of the computer in a way that clearly cost-justifies it often is a great satisfaction. And those given to tinkering get additional enjoyment from directing the urge into a productive channel.

Here are a few case studies:

'THE FINISHED PRODUCT'

Mike Hudak, director of research for television stations owned by ABC-TV, started using an Apple II and *VisiCalc* at home in the late 1970s. Although he has expanded his collection dramatically to include an IBM PC XT and a Macintosh, with state-of-the-art software

(*Symphony* and *Lotus 1-2-3* on the IBM; *Crosstalk, Multiplan,* and *Microsoft Chart* on the Macintosh), he feels that the work he did with *VisiCalc* set the standard. "For the first time, I could produce a 'finished product' at home," he says. "When I entered data from Nielsen rating sheets into my computer, I could make all the calculations, perform the analysis, and then produce a finished document for presentation to my management. No more bringing raw data to the office and being dependent on a graphics department or a word-processing clerk to create the final output."

Hudak feels an incentive to work at home, knowing his computer system will provide the "instant gratification" that developing a finished product provides. He points out that, after four years of doing such "homework," he still feels exhilarated by attaining immediate results. And these results, which are now commonplace, were once unattainable.

He cites a recent request by his management for a rapid, detailed analysis of job bidding. Three years ago, this would have taken a week's work. Hudak recalls leaving work on a Friday knowing he would spend three to four hours over the weekend using his Macintosh, *Multiplan,* and *Microsoft Chart* to complete a presentable analysis on Monday morning!

WORD PROCESSING

When you analyze what kind of office activities are most easily done in the home, word processing is certainly at, or near, the top of the list. Dr. Charles "Chip" Mann, formerly the associate director of Agricultural and Social Sciences for the Rockefeller Foundation, has long used a computer (first an Apple II plus, in 1979, and now both an Apple IIe and a Macintosh) to prepare drafts and memoranda at home—away from the interruptions of administrative matters. Like many early owners of the Apple II, he "discovered" the power of *VisiCalc,* which made working with a computer both fulfilling and productive.

Being able to work in this manner proved doubly useful a few years ago when Mann was forced to remain at home for six weeks with a back injury. He used his Apple and a dictating machine to produce daily written and verbal memoranda and administrative instructions for the office, which were delivered via express mail or messenger service. The computer allowed Mann to remain productive during a difficult period.

Richard Tannor, manager of Systems Development and Technical Support for Inco (formerly International Nickel Co.), has also found word processing at home to be productive. He finds the atmosphere more relaxed than at the office, and thus more conducive to creativity. Moreover, he realizes that he wouldn't be as likely to work at home without the catalyst of a word-processing program at hand.

Tannor now uses an Apple II and *Screenwriter*, but feels that an optimum configuration for home use would be a Macintosh with a printer, *Microsoft Word* for word processing, and *ThinkTank* as an outliner/idea processor. This system would provide him with all the tools necessary for a finished document, including graphics.

SPREADSHEET

Running neck-and-neck with word processing as an in-home office function is spreadsheet analysis. In fact, when people talk about "cost-justifying" a computer at home, the programs they mention most often are *Lotus 1-2-3* (if they have an IBM PC or compatible), and *VisiCalc* (if they have an Apple II). Of course, there are good spreadsheet programs for virtually all microcomputers. *(See "Spreadsheets at Home" in the May issue.)*

Paul F. Gaconnier, an institutional trader for Lovett, Mitchell, Webb & Gerrison in Houston, Texas, purchased an Apple II plus, thinking that exposure to computers would be necessary for his children. It wasn't until a year later that he sat down at the computer and began to use *VisiCalc* to chart out the investment strategies he recommended to clients. Since the pressures of institutional trading (which involves buying and selling large blocks of stock for corporations) don't allow him enough time for such analysis, he welcomes the chance to do it at home with a computer. "Using the computer at home helps me make difficult decisions in a relaxed atmosphere," he says.

Also, since he's been able to reduce his intuitive judgments to mathematical rules, he's able to respond to a wider variety of market conditions. To increase productivity, he commissioned his son John (17 at the time) to write a program for use at the office. The program performs the calculations that underlie the proprietary analysis methods that Paul uses to determine when to buy and sell securities. When completed, this program may be used as the basis for a new investment-analysis service to the firm's clients.

GRAPHICS

When Bill McLoughlin bought his Macintosh, he felt that its prime purpose would be as an educational tool for his two grammar-school-age children. But, while his children have been using the computer for assignments (and his son, Gregory, has been infected with an advanced case of "*Zork*-mania"), Bill finds that he's spending a great deal of time using the computer for activities related to his position as associate director of placement at Baruch College (in New York City).

Two or three times a week, Bill makes use of his "Mac" to write interoffice memoranda and articles for professional journals. He also uses the Mac's stunning graphics capability to prepare signs for the various companies that come to Baruch to recruit students.

"I don't have to go to the art department anymore," he says. "Doing office work at home gives me a reason to fiddle with the machine, and that's enjoyable. Besides, it allows me to easily do things that I don't have time for in the office."

'CONFIDENTIAL'

Thomas "Tod" Roach, a group leader at Mobil Research Development Corp. in Princeton, New Jersey, originally bought an Apple II plus for his children. But he ended up using it more than they did. He, too, uses *VisiCalc*—to perform engineering functions, such as "weight-distribution analysis." And he uses the *Applewriter 11* word-processing program to prepare confidential documents, such as job appraisals for his subordinates. "I now can spend as much time as I wish preparing confidential material without fear of interruption," says Roach.

Pausing to analyze the work habits of these executives, it seems that the function (such as word processing or spreadsheet) is not the most important factor in making computers useful for work away from the office. Rather, what seems most important is the fact that the user is able to accomplish something *different* at home.

Hudak, who uses an IBM PC in the office, produces graphic analyses on his Macintosh . . . Roach is able to work on confidential appraisals . . . Gaconnier has the ability to plan his investment strategies in a nonstressful situation . . . Tannor, McLoughlin, and Mann are able to produce thoughtful memoranda in a creative atmosphere not fraught with the normal distractions of their office environments.

There are certainly thousands of people carrying *1-2-3* data disks from their office IBM PCs to their compatibles at home—to merely extend the working day. But those who are happiest and most productive with their computers at home might just be those who are doing something that could not be done easily in the office. In such cases, the work takes on the aspect of a hobby, and does not "tie" people to the computer. 🄵🄲

"IT HELPS ME MAKE DIFFICULT DECISIONS IN A RELAXED ATMOSPHERE."
PAUL GACONNIER
Institutional Trader, Lovett, Mitchell, Webb & Gerrison

"USING THE COMPUTER TO WORK AT HOME EXPANDED MY PRODUCTIVITY."
DR. CHARLES MANN
Former Assoc. Director of Agricultural and Social Sciences, Rockefeller Foundation

"IT ALLOWS ME TO EASILY DO THINGS THAT I DON'T HAVE TIME FOR IN THE OFFICE."
BILL McLOUGHLIN
Assoc. Director of Placement, Baruch College
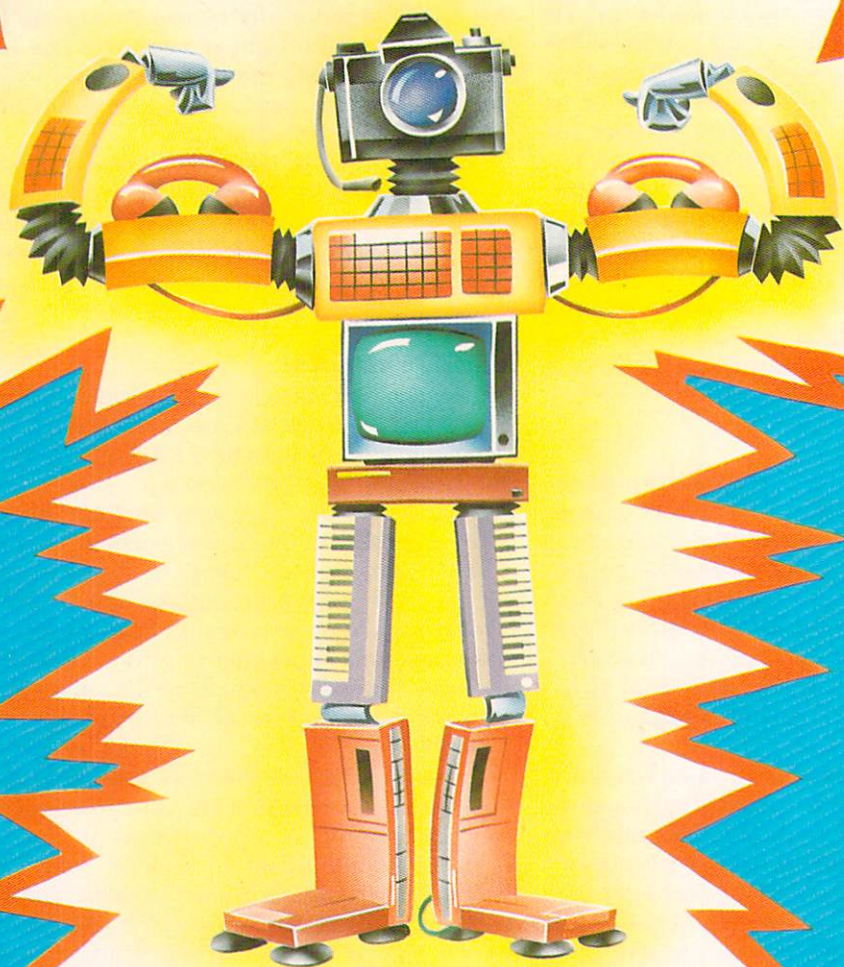
YOU CAN PLUG A LOT MORE INTO YOUR COMPUTER THAN DISK DRIVES, PRINTERS, AND MODEMS

LOOK AT SOME OF THESE OFFBEAT PERIPHERALS

ILLUSTRATION BY RICHARD TIMPERIO

BY DAN GUTMAN

Not too long ago, the classic teenage dream was to drive a jacked-up, gas-guzzling machine with mag wheels, side-pipes, and a 351-cubic-inch fuel-injected engine that could go from zero to 60 in less than seven seconds.

Nowadays, a more common teenage dream is to own a 512K computer with a hard-disk drive, double hi-res graphics, a 2400-baud modem, and a letter-quality laser printer that can go from zero to 120 characters in less than a second . . . with a boyfriend or girlfriend telecommunicating from a keyboard thousands of miles away.

The dream is the same—to take a prized possession and customize it—make it bigger, more powerful, more *indi-vidualistic* than the ones you buy off the rack. Some add-ons have become almost standard equipment on computers these days. Disk drives and printers are commonplace, more people have modems every day, and who hasn't got a joystick? Depending on your primary application, maybe you've also got a mouse, a track ball, a light pen, or a touch tablet.

You may think you've got it all, but you've barely scratched the surface. The computer is made to be customized for your own needs. There's almost no limit to the things you can plug in. In this article, we're going to look at a few of the more interesting peripherals we've tested. (*Next month we'll cover music peripherals.*)

CONTROLLING YOUR HOME

Baby boomers are familiar with "The Jetsons," a cartoon series that appeared in the mid-1960s. As opposed to "The Flintstones," who lived in prehistoric times, the Jetson family ("Meet George Jetson! His boy Elroy! Daughter Judy! Jane his wife . . .") lived in the distant hi-tech future. Their food was cooked at the touch of a button. Automatic mops flew around cleaning the house. A machine did Elroy's homework in seconds.

In 1965, this was funny. In 1985, it's almost reality. The computer (Elroy's word processor?) is making possible the science-fiction dream of the automated house of the future. Today you can interface your computer with a home control device that will do things even George Jetson wouldn't have dreamed of.

CyberLYNX's Smarthome I, for the Apple II line and the IBM PC/PCjr, is designed for people who want a home control system but don't know a lot about electronics. The $529 system consists of an external box that plugs into the serial port of your computer, plus software. Unlike a lot of similar systems, once Smarthome I is programmed for your particular house, it works independently of the computer—so you can use the computer to do your word processing or play games—or even turn it off—without having to disconnect Smarthome I.

Don't be scared off by the word "programmed." The Smarthome I software is icon-based, so it's easy to use a joystick or mouse to "program" it, even if you don't know a thing about programming. It's also completely wireless, so you won't have a snakepit of cables around the furniture. Radio signals transmit information from Smarthome to your appliances.

OK, so Smarthome I can turn your lights on and off at predetermined times automatically. Big deal. So will a cheap device you can buy in any hardware store. But Smarthome I can be instructed to do a lot more than that. *All* your appliances can be controlled—air conditioners, heaters, ovens, and lawn sprinklers. You can turn your tape deck into an alarm clock and have Bruce Springsteen *scream* you awake in the morning. You can arrange to have your dinner start cooking in the oven while you're on your way home from work.

> THE JETSONS' FOOD WAS COOKED AT THE TOUCH OF A BUTTON. AUTOMATIC MOPS FLEW AROUND CLEANING THE HOUSE. IN 1965 THIS WAS FUNNY. IN 1985, IT'S ALMOST REALITY.

Smarthome I also can be used as a security device. Optional sensors can be placed in windows and doors that will sound an alarm if these are opened when you're not home. An infrared motion sensor will detect body heat and alert you in case of a break-in. If there's a fire, the smoke detector won't just beep—it also will turn on all the lights so you can see to escape, and automatically call the fire department. These alarm systems can be particularly useful if you've got a vacation home that's empty for long periods of time. By programming a few appliances to turn off and on at different times during the day, even a completely abandoned house will look and sound lived in. That might just prevent a robbery.

Within the next few years, all this equipment probably will be built into new houses and apartments. Computers will protect our homes and regulate our appliances to save the most energy. Mitsubishi already has displayed a prototype "house of the future" with an infrared camera on the front porch that sees in the dark and takes an instant photo of anyone who rings the doorbell.

AN UNUSUAL SPEECH SYNTHESIZER

Someday, we won't need keyboards. You'll be able to simply *talk* to your computer and see the words on the screen instantly. You'll be able to say "Print!" "Save," or "Read the third paragraph back to me," and the computer

> IF YOU WRITE COMPUTER PROGRAMS, YOU CAN USE VOICE MASTER TO PUT HUMAN SPEECH IN YOUR WORK, AND EVEN SELL THE PROGRAMS.

will obediently do it. (The TI Professional Computer already can do some of these things.) Voice recognition and voice synthesis aren't quite there yet, but they are developing rapidly.

One of the more amazing speech modules presently on the market is Voice Master, by Covox ($90 for Commodore 64, $120 for Apple IIe, soon to be available for Atari and IBM PCjr). It consists of a Walkman-size box, a disk, and a headset that will make you look like an air-traffic controller. Voice Master is somewhat like a digital tape recorder. When you speak clearly into the microphone, you can store up to 64 words, beeps, honks, or other sounds in the computer's memory and an unlimited number on disk. The sounds you record can be played back, altered, speeded up or slowed down, and even replayed backwards. The voice doesn't sound like some robot from a cheap science-fiction movie—it sounds like your voice.

The speech-synthesis and word-recognition program that comes with Voice Master is used mainly for entertainment, but will eventually find its way into automatic telephone dialers, aids for the handicapped, and voice-activated padlocks. If you write computer programs yourself, you can use Voice Master to put human speech into your work, and even sell the programs.

Sure, there are plenty of speech modules that can duplicate and recognize a few human grunts. Voice Master is one of the few with any *musical* talent. With the *Voice Harp* program (included) you can sing, hum, or even whistle a happy tune, and the appropriate notes will fly across the screen on a musical staff. Do you realize what that means? If you can hum (and who can't do that?), you have the potential to *compose* music.

Voice Harp is a music processor. Just whistle your masterpiece into the mike and watch the screen turn to sheet music. It's amazing. Then you can play the song back, in the sound of a violin, banjo, xylophone, or a dozen other instruments. Is the tune too high? No problem. The tap of a key will make it an octave lower. You can scroll the music left and right to change notes, insert rests, and turn that improvised ditty into a polished song. When it's perfect, save it on a disk and print it out. Instant sheet music! Music for the masses.

But remember—word processors don't make great writers, and graphics programs don't make great artists. If you don't have a song in your heart, *Voice Harp* isn't going to put one there. But if you do, it might get it out.

SCIENCE MODULES

If Galileo had owned an Apple II, he wouldn't have had to throw things off the top of the leaning tower of Pisa to prove his point. If Isaac Newton had owned an Atari, he might have discovered a *fourth* law of motion. Today the computer is a scientific tool, and several companies make peripherals that let the Galileos and Newtons of tomorrow perform simple science experiments.

Perhaps the most intriguing science plug-in is The Home Automatic Weather Station (HAWS), from Vaisala Inc. ($99.95). It consists of software and a sensor the size of a large flashlight, which plugs into the joystick port of the Commodore 64 or VIC-20. When you stick the sensor out a window, it records atmospheric conditions and displays them on your computer screen.

It's not just a big thermometer. HAWS records temperature (-130 to 140 degrees Fahrenheit), atmospheric pressure in milibars (1060 mb to 3 mb), and humidity. The computer updates this information every 15 seconds. One program can calculate the wind-chill factor based on temperature and your own observation of the wind speed. Another program calculates the altitude of the clouds based on temperature, dewpoint, and relative humidity.

There are 10 programs altogether. An amateur meteorologist can calculate highs and lows, print out graphs, and even forecast tomorrow's weather (see who's more accurate, you or your local TV weatherperson). Farmers and gardeners can predict when a frost is about to hit. Homeowners can check the energy efficiency of air conditioners and heaters. You can, of course, get most of your vital weather information by sticking a hand out your window

WITH SCIENCE MODULES, AN AMATEUR METEOROLOGIST CAN CALCULATE HIGHS AND LOWS, PRINT OUT GRAPHS, AND EVEN FORECAST TOMORROW'S WEATHER.

or by turning on another hi-tech gizmo—the radio. But to really *understand* what's happening out there, it helps to measure, graph, analyze, and learn the science behind it.

If HAWS is a tutorial on meteorology, AtariLab (Atari, $99.95) and Temperature Lab (from Hayden's Science Discovery Series, for the Apple II series and Commodore 64, $99.95) are more general learning tools, designed to transform a home or classroom into an inexpensive science research center. The kit, which includes a temperature sensor and software, was developed to answer questions such as, "What causes dew on cool mornings?" and "Why is salt sprinkled on icy roads?" Both products come with an Experimenter's Guide that offers instruction in temperature and heat-energy principles.

BIOFEEDBACK DEVICES

"Welcome to the land of virtual time and space . . . to the universe of the subconscious . . . of altered states . . . ."

So begins *The Hypnotist*, one of the more off-the-wall programs you can plug into a computer. Biofeedback is a technique of manipulating your pulse rate, muscle tension, brain waves, or other body functions as you observe them changing. Many people are able to make their heart rate go faster or slower at will while watching it change on a TV screen. *Relax* ($99–$139 for Apple II series, Atari, C 64, IBM PC/PCjr from Synapse) and *Calmpute* ($99 for Apple II series from Thought Technology) also use biofeedback to help you reduce stress. *The Hypnotist* is the first computer biofeedback plug-in that attempts to put you in a *trance*.

First you strap the "PSI Biofeedback Device" to your wrist and slip the small sensor over your pinky. The other end gets plugged into the paddle port of the Commodore 64. This device calculates the elapsed time between your heartbeats and displays it on the screen. *The Hypnotist* program helps you slow your heartbeat as much as possible, which, according to Psycom Software, relaxes you and makes your subconscious more receptive to suggestions. The program employs a funky-looking Egyptian fellow named Kurian to help you slowly drain the tension from your head, neck, shoulders, arms, and legs—a technique used in yoga to help raise the level of mental activity.

Let's say you're trying to lose weight. When you have brought your pulse down as low as it can go, a purple pendulum appears on the screen, swinging back and forth. It gets faster and starts "strobing" all over the screen. Next you'll see words flashing—EAT, TWINKIES, FOOD (or whatever you've selected). At the same time you'll see *negative* words flashing—PIG, FAT, UGLY, or whatever. You're in a trance, remember, so if your brain learns to associate eating with "fat ugly pig," perhaps you won't be so quick to wolf down that next Twinkie.

That's the theory, anyway. Psychologists have been using hypnosis, word association, and biofeedback for years, but they don't work for everybody. If Kurian *does* put you

THE COMPUTER-VIDEO CONNECTION

Videodiscs. Earlier this year, Pioneer Video showed how hooking its laser videodisc to a computer could turn a fast-paced, space-age video into an interactive game. It was somewhat like watching "Buck Rogers" on TV, but being able to step inside and control the characters.

Marrying laser videodiscs and computers, as this and other demos have showed, gives users a beautiful blend of technologies. Laser videodiscs can store about 55,000 frames of high-quality video, and have random-access capability. Computers can be used to control and access these optical discs—making them "interactive."

When will this dreamlike combo become commonplace? Pioneer and other companies now make interfaces to connect videodisc players to computers, but several factors are slowing the match: 1) Few consumers have videodisc players; 2) There's little interactive software available; 3) Unlike floppy disks, videodiscs allow you to record only once.

Look for videodiscs to be used primarily by institutions until prices drop and software arrives. In Japan, and at companies like Apple and IBM, videodisc R&D is well underway, increasing the likelihood that they will "arrive" eventually.

VCRs. Unfortunately, VCRs don't have random-access capability, so using a VCR with a computer is somewhat like using a cassette tape instead of a floppy disk. But, VCRs can be linked fairly easily to computers, and the mix can help both devices. You can use VCRs as a kind of "color printer," whereby you record games, animations, or anything with movement and color that cannot be otherwise printed out. You can then show these videotapes to friends who have VCRs but not computers, and/or customize them by adding voice overlays, special graphics, or text screens (see "Computer Plus VCR: Tips For a Mix," in Helpful Hints, page 41 of the March FAMILY COMPUTING).

Alternately, you can make videotapes with a video camera, and then use your computer to dress them up with titles, credits, custom messages, colored screens (to wipe out commercials, or "snow"), etc. You can use your own programming skills to accomplish this, or custom software that includes "canned" displays for birthdays, anniversaries, weddings, vacations, or "video mail."

—NICK SULLIVAN

under, he won't make you cluck like a chicken or forget who you are, like some stage hypnotist. You control everything that happens on the screen. The program can be instructed to change your bad habits, help you memorize text, or have you regress to your childhood. You don't have to worry about remaining in the trance until the electric company turns off your computer's power. At the end of a session, *The Hypnotist* screams like an elephant and instructs you to WAKE UP!

COMPUTER PHOTOGRAPHY

A few thousand years after painting was developed, along came photography. Now, just a few years after computer art programs became popular, photography is coming to the computer. With Koala's MacVision, you can use Apple's Macintosh computer as a digital imaging system. In other words, you can point a camera at any object in the real world and see it appear on your computer screen. Two powerful technologies of the 1980s—video and computer—finally have been married. The result has been called "digitizing" and "image scanning," but "computer photography" is a lot friendlier.

MacVision ($399) is a box about the size of a disk drive and weighs just 2 pounds. It's very simple to hook up—you just plug one end into the printer or modem jack on the Mac, and the other end into your video camera, videodisc player, or videocassette recorder.

Let's say you're pointing the video camera at your friend's face. That image is captured by the camera and passed on to MacVision, which scans it and converts it into a high-resolution digitized image. This is then sent to the Macintosh display screen, where you'll see the image of your friend. The whole process takes about five seconds.

At its best, computer photography isn't as sharp as regular photography, at least not yet. A MacVision image looks something like those computerized T-shirts you sometimes see in malls and amusement parks. Still, simply putting a photograph up on a computer screen is amazing.

The real power of the computer comes in *manipulating* the photograph. A MacVision image can be cropped, printed out on your printer, and stored on a floppy disk. More important, you can use the Mac graphics program, *MacPaint*, to "retouch" the image. You can draw a beard on your friend's face. You can change her hairstyle or see what she'd look like with a new nose. You can even take that image and send it electronically over phone lines to another computer thousands of miles away.

Computer photography is fun to play with, and it can also be useful. You can shoot a digital photo of something and "paste" it into a word-processing document to liven

up a book report, term paper, or memo. You can create your own newsletters, or photo greeting I.D., or business cards. You can include a few digital snapshots in your next letter, or create logos or letterheads.

Macintosh owners aren't the only ones who can enjoy computer photography. A company called Digital Vision makes a similar product—Computereyes ($129.95)—for the Commodore 64, Apple II series, and Atari Home Computers. With these computers, naturally, you don't get the same graphic resolution as on the Mac.

Until now, computer graphics have been limited to what you could draw with a mouse, light pen, or touch tablet. The camera is the latest "alternative input device," and perhaps the most exciting one. Computer photography is an art form about to be born.

ROBOTS

Your home of the future won't be complete without another science-fiction dream-come-true—robots. There are factories in Japan where robots are assembling vacuum cleaners 24 hours a day in complete darkness. This kind of talent could be put to good use around the house! Right now, however, consumer robots are basically glorified toys. Yet, some of them can also be used as programming aids, just like the original mechanical Logo turtle whose movements kids can control from a computer keyboard.

"Andy" looks something like a garbage can with wheels and eyes. He's made to be plugged into an Atari and Commodore 64, and comes from Axlon Inc., one of the many offspring of Atari founder Nolan Bushnell. Like most of today's primitive robots, Andy ($119) doesn't do very much. He won't go out and buy the Sunday paper for you or scrub the bathtub. He won't save your life, like R2D2.

What he *can* do—after you program him with *The Personality Editor* software—is quite amazing, though. He'll move in all directions, of course. If you shine a flashlight in his "eyes," he'll follow the light. If he bumps into something, he'll stop and turn around. If you clap your hands, he'll stop what he's doing and your computer screen will read, I HEARD THAT!

Andy responds to Logo-like commands. If you type FD '3' on your computer, he'll move forward three feet. If you type VOICE 3 TO 8, he'll emit a rising sound from his speaker. You can string together a series of commands to make Andy wend his way around your house, beeping weird noises the whole time. He's got a personality, which *you* control. If you want him to appear intellectual, program him to pace back and forth. If you want him to appear silly, program him to roll around in crazy circles. He also can be programmed to behave randomly, so even *you* don't know what he's going to do. Andy's "personality" easily can be written, edited, reviewed, and changed, the same way a word processor manipulates text.

Eventually, we'll be using robots to mow our lawns, vacuum our floors, educate our children, and carry our golf clubs. At a recent exhibition of new technology in Japan, new robots were reading music, playing the organ, and painting portraits. These are experimental and would cost many thousands of dollars, *if* they were for sale. Right now, we'll have to settle for "alien puppydogs" that don't do much more than roll and beep.

DREAM ON

Nine years ago, when the whole microcomputer madness started, many of these peripherals might have been hard to imagine. Nine years hence, we'll probably be plugging peripherals into our computers that haven't been dreamt of today. 🔳

DAN GUTMAN, *coauthor of* The 93 Best Computer Games of All Time, *is a freelance writer specializing in computers.*

COMMODORE 128

BY LOUIS R. WALLACE

IT'S A C 64... AND MORE

The Commodore 128 is a potentially powerful personal computer that runs C 64 software and can use C 64 hardware. Commodore sees the C 128 as a "high-end" computer for the home, and/or as a computer that can be used by small businesses.

The C 128 has the potential to fill either of these shoes—but it's still in its infancy as a consumer product. The machine I saw was fabulous from a hardware point of view. However, the software side of the story—and for most users that's the crucial side—is very fuzzy (see box). Right now, the C 128 is basically a "souped-up" C 64 with a great built-in BASIC.

The C 128 computer itself sells for about $300; the new Commodore 1571 disk drive and 1902 RGB monitor, needed to take full advantage of the computer, will each sell for about $300 to $350. Thus, a complete C 128 system will cost about $900. For this, you get a very flexible computer, with growth potential.

A CHAMELEON

• The C 128 is actually three computers in one skin. In the C 64 mode, it runs all C 64 software, uses all C 64 peripherals, and has the legendary SID chip, responsible for the 64's wonderful sound.

• In the C 128 mode it has 128K RAM, and can display 80 columns on the screen—which gives it the ability to run more powerful or enhanced software than the C 64. Commodore also says that the C 128's memory *can* be expanded to 512K, though expansion modules are not yet out.

• In the third mode, the C 128 employs the CP/M operating system, which gives it the *potential* to take advantage of the massive library of commercial CP/M business programs, such as *WordStar*, *dBase II*, etc., in addition to the wide selection of public-domain CP/M software found on bulletin boards.

Keyboard. The C 128 has a very sleek, professional-looking keyboard that has a sharp feel. It offers a large number of special functions. These include a numeric keypad (for crunching numbers), an ALT key

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LOUIS R. WALLACE, *a chemist who writes about Commodore products, is also the resident Commodore expert on the* FAMILY COMPUTING FORUM *on CompuServe.*

(which functions as an extra control key), a HELP key (which can be used when debugging BASIC programs), LINE FEED and NO SCROLL keys (which should be useful for software developers), and a 40/80-column display toggle switch. The C 128 also has every key found on the C 64—including the familiar graphics symbols on the key-fronts—for a total of 92 keys.

Expansion ports. The Commodore 128 also has all the ports and slots of the 64—a cartridge port, an "expansion" port, a "user" port, and the nonstandard Commodore serial port. This is a major plus, as all the peripherals developed for the C 64 can be used on the C 128. It also means that new peripherals, such as the forthcoming Commodore 1670 modem (a 1200-baud modem for less than $200) can be used by both the C 64 and the C 128.

In addition, the C 128 has an RGBI video output port. This latter allows use of an RGB monitor, for high-resolution 80-column displays.

Video Display. In the C 64 mode, only 40 columns are available, but this still gives you full access to the graphics of the computer (sprites, 16 colors, special characters).

C 128 FEATURES

- 128K RAM (expandable to 512K)
- BASIC 7.0 (with more than 140 commands and statements)
- 40-column display (with TV or monitor)
- 80-column display (with RGB monitor)
- 100-percent compatible with C 64
- CP/M Plus operating system
- 3-voice sound
- Sprites: 16 colors
- Professional keyboard (with numeric keypad)

In the C 128 or CP/M modes, you may select either a 40- or 80-column screen format. In the 80-column mode, the graphics aren't quite as versatile, but the display is a real plus for productivity applications. In order to use the 80-column display, you must have a monitor able to accept the RGB signal. (Your TV will not display the 80-column format, but Commodore's new monochrome monitor will.) I used a Zenith 135-VM monitor for testing, and the 80-column output was quite sharp, clear, and colorful.

Disk Drive. The new Commodore 1571 disk drive (about $300) is three drives in one. When you're in the C 64 mode, it acts as a 1541. In this mode it will store 174K on single-sided, single-density disks.

In the C 128 mode, the 1571 is double-sided double-density, with 360K storage. It's also five to 10 times faster than the 1541. In the CP/M mode it stores 410K, and goes up to 15 times faster than the 1541, according to Commodore. This will allow the user to handle data as efficiently and as fast as an IBM PC or compatible.

In both the C 128 and CP/M modes, the disk drive is "self-booting." That is, when you turn on the computer, it automatically will "look" in the disk drive, and try to load whatever disk it finds there.

C 64 MODE

To access the C 64 mode, you turn the computer on and type GO 64. You will be asked if you are sure, and if you reply yes, your screen abruptly becomes the familiar soft blue of the C 64, with its own power-up message. That's all very nice, but the real

question is: How compatible with the 64 is the 128?

The answer seems to be: 100 percent compatible. I loaded some 50 of the most popular C 64 commercial programs without any problem at all. In addition, I tested a large number of hardware devices designed for the original 64, and all worked. This included RS-232 and IEEE interfaces, the Commodore 1541 and compatible disk drives, monitors, printers, modems, voice synthesizers, light pens, and touch tablets.

When in the C 64 mode, however, you don't have use of the calculator pad or other special keys.

C 128 MODE

When you first turn on the computer, you're in the C 128 mode—a screen with a black background and cyan characters. The power-up message states you have 123K available for programming. This means you have more available BASIC memory space than on an IBM PC or compatible with 256K or more using Advanced BASIC! Right now, since there's little or no software to take advantage of the extra memory afforded by the C 128, users will have to content themselves with BASIC. But—the C 128 has perhaps the most comprehensive BASIC yet incorporated into a micro!

BASIC 7.0. This version of Microsoft BASIC contains virtually every BASIC command and statement ever built into a Commodore computer, with more unique to the C 128 (140-plus in all). Programmers will find commands that access every aspect of the computer's graphics power, including DRAW (for lines), CIRCLE, BOX, PAINT, CHAR, COLOR, and GRAPHIC, each with many parameters that change the function. For instance, the CIRCLE command can be used to draw a circle, ellipse, arc, or even a polygon. And the GRAPHIC command offers five modes—TEXT, HIRES, HIRES/TEXT (a split screen with text at bottom), MULTICOLOR, and MULTICOLOR/TEXT.

Creating programs with sprites, which is a Herculean task on the C 64, is a breeze on the C 128. You can color and size (SPRITE), move (MOVSPR), and save sprites (SPRSAV), and detect collisions with other sprites or background (COLLISION). The C 128 even has a sprite editor (SPRDEF), for drawing sprites.

When programming in the C 128 mode you have control of the exquisite musical SID (Sound Interface Device) chip. The statements that control the music are SOUND, ENVELOPE, VOL, TEMPO, PLAY, and FILTER. Again,

most have multiple parameters that change their function. The ENVELOPE command allows you to set the characteristics of each of three voices, creating many different instruments

C 128 SOFTWARE

Commodore, which plans to market "less than 10 titles" for the C 128, is depending on third-party manufacturers to bring out software, according to Paul Goheen, Commodore's software director. Here's a look at the kind to expect for the C 128, as Goheen outlined it for FAMILY COMPUTING.
● The C 128 can run all C 64 software.
● A handful of new software packages developed for the C 128 will be available this summer, including *Perfect Calc*, *Perfect Filer*, and *Perfect Writer* (Thorn EMI). "These will be our bread-and-butter professional products," Goheen says. Also new is *Jane* (Arktronics), an easy-to-use word processing, spreadsheet, and filing program that uses icons. "It's what *Magic Desk* should have been."

Island Graphics is working on an advanced "painting" program for the C 128. Commodore also plans to release *Complete Course in BASIC*, a tutorial on disk; and *Typing Professor*.
● A number of software developers have C 128 models, and are being encouraged to redo existing products for the C 128, to take advantage of the extra memory or 80-column display. These companies include Activision, Batteries Included, Broderbund, Creative Software, Spinnaker, Scarborough, subLogic, and Timeworks. "Programs such as *Flight Simulator*, in particular, could make good use of the extra memory," says Goheen.
● As far as CP/M goes, it's not clear at this writing exactly how many commercial or public-domain programs will run on the C 128. But, because the computer world is so dominated by MS-DOS, it's not likely that new CP/M software will be written.

Included in the box with the C 128 is a coupon that will allow owners to buy substantial CP/M documentation (a 4.5-inch packet!) from Commodore. This is a signal that novice users should not expect much from the CP/M mode; it's something for experienced users to wrangle with. "The CP/M capabilities of the C 128 are for professional users, but it also gives entry-level users a growth path," says Goheen.
—NICK SULLIVAN
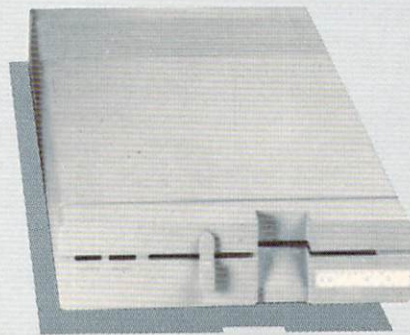
The new Commodore 1571 disk drive.

and sounds. Or, you can use one of the 10 preset sounds, which range from piano to guitar.

C 128 BASIC also allows for structured programming, with statements like IF-THEN-ELSE, DO WHILE, DO UNTIL, and BEGIN-BEND. Business programmers will like the PRINT USING and GET-KEY statements, and the WINDOW command. The C 128 even does windows!

Also built in is a 14-command machine-language monitor for machine-language programming.

CP/M MODE

The C 128 comes with the CP/M Plus (version 3.0) operating system, as well as two "utility" disks. I didn't have the final version of CP/M Plus, but the preliminary one available from Commodore passed every test I put it through. It ran an Osborne version of *WordStar*, the C 64 CP/M versions of FORTRAN and COBOL (programming languages), and several programs on the utility disks, including MBASIC and a Z-80 Assembler. All programs ran in the 80-column mode.

According to Paul Goheen, Commodore's software director, the C 128 with 1571 disk drive can read CP/M software written in several disk formats. These include IBM System 34, Kaypro, Osborne, and Epson QX-10. In addition, the 1571 drive is highly "intelligent," and reportedly can be configured to read other disk formats as well. Nonetheless, if you're interested in the CP/M aspect of the computer, we suggest you proceed with caution, and don't assume any program will work without testing it.

SUMMARY

The C 128 is without doubt the best computer Commodore has introduced to date. It has an extremely powerful version of Microsoft BASIC, and all the graphics, sprites, sound, and music of the C 64. Combined with 80-column color output, and the 1571 disk drive, you have a fast, high-powered computer system that is very competitive in price. Since it supports C 64 software, there are many high-quality programs ready to run, and because of its unique qualities, it should entice developers to produce original software.

Nonetheless, as with any new computer, the advice is: Buy it only if it does what you want *now*. If you want software that takes advantage of 128K, or CP/M software, wait until you see it run. If, on the other hand, you're a C 64 fan (with lots of software and peripherals) who feels constricted by the machine's limits, the C 128 is a natural upgrade. **FC**

HELPFUL HINTS

MONEY-SAVERS: COMPUTING ON A SHOESTRING

EDITED BY ROXANE FARMANFARMAIAN

Saving money takes savvy, especially where your computer is concerned. There's always one more piece of software you'd like to add to your library, your printer ribbon runs out faster than you ever imagined, and your ream of fanfold paper regularly fills the "round file" in a mountain of waste. To keep you computing with maximum pleasure and minimum cost, here's a handful of penny-saving hints—corner-cutters without compromise.

Reminder: Turn off your computer and peripherals before tinkering with them. Parental guidance is recommended for young children undertaking any of these activities.

A Cheap Save: Recycle Cassette Printer Ribbon.

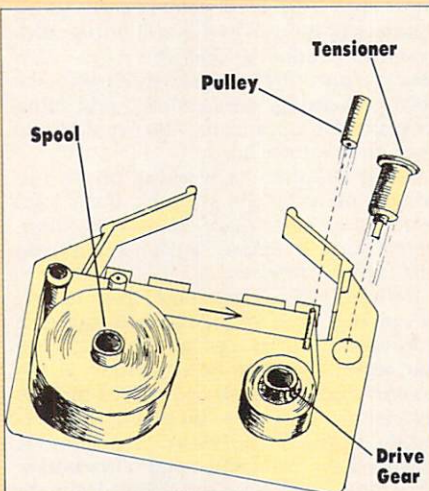Rewinding printer ribbon not only saves dollars, but heartache, too, if you run out of cassettes after store hours. You can rewind a ribbon up to six times and still read the printout with ease, by following these six simple steps:

1. Remove the external rubber-band drive. Most cassette or cartridge shells have a peg-and-hole friction-fit cover. Coax the cover open with a flat blade (if a few pegs break off, use tape to shut the cover later).

2. Note the pathway and direction of the ribbon as it winds around pulleys, drive gears, and the tension mechanism. Remove the loose parts (e.g. pulleys, drive gears) which could get lost accidentally during the rewind process. Leave the spools in the shell.

3. Remove the tensioner and arrange the ribbon so it travels directly from spool to spool.

4. Rewind the ribbon from the take-up spool back onto the supply spool (apply tension to the take-up spool). Some spools have holes where a rod can be inserted and spun by hand or with a reversible drill. Otherwise, a bit of stickum on

your finger might help as you spin the supply spool. Periodically press down high spots on the rewound ribbon. Don't worry if the rewound ribbon appears irregular. Also, variable winding speeds and tensions might make it difficult to rewind the ribbon completely.

5. Reinstall the parts you removed, and restore the ribbon to its original pathway.

6. Press the cover back on. Replace the external rubber-band drive. Mark the cassette as being rewound.

BRIAN C. LEE
Cincinnati, Ohio

Turn Your Dot-Matrix into Letter-Quality (Almost).

Transform your dot-matrix printouts into almost-letter-quality using a little trick that even double-strike and boldface features can't approximate. Print the first copy of your document onto multiple forms (two or more sheets of fanfold paper sandwiched with carbons). Duplicate the first carbon copy on a good quality photocopier. Copying the carbon blends all the dots together, making for a near-letter-quality printing.

ROBERT COLLINA
Lake Hopatcong, New Jersey

Don't Paper Your Wastebasket; Recycle!

How many times has your printer fed through an extra sheet of blank or *almost* blank (expensive) fanfold paper that you've just thrown away? Rather than discard all this costly, perforated paper, save it for reuse as printing scrap. Leave the feed holes attached and store in a binder. When you're ready to use it, tape the pages into a single, continuous sheet. Next time you try new printing features or print a draft, you'll have the perfect (throwaway) paper.

MIKE IMEL
Newburgh, Indiana

File Manage With Your Word Processor.

You want to use your computer to ease your filing, but don't want to invest in yet another software package. With your word processor's SEARCH function, you already have a handy filing program in your library. It can act as an address book, record-collection catalog, listing of your tax-deductible expenses—everything a file manager can.

Type in the information you wish to file as a list of entries. Make sure to keep the format systematic so the

computer can later SEARCH through each entry for the same type of information. Include a keyword (e.g. CLASSICAL, in a record listing) in the first line of each entry to help identify categories. In the future, when you "leaf" through the file, you can prompt the computer to SEARCH for a category keyword so you can find or update specific information in your listing. You also can scroll through the file using your cursor.

Once you have finished typing in all the information you want, SAVE the file to disk. Later, if you wish to

group certain entries into a hard-copy listing, LOAD the file, use the SEARCH function to identify which entries to print out (e.g. all CLASSICAL records), and use your word processor's cut-and-paste function to place them at the top of your screen. Delete the rest of the file in memory (do not delete the file from your disk). Now just print them out.

JOSEPH W. COLLINS
Author: Atari Color Graphics: A Beginner's Handbook
Merced, California

DIAGRAM BY TODD NEAL

ILLUSTRATION BY BARTON STABLER

the Programmer

ILLUSTRATION BY JIM CHERRY III

TIPS TO THE TYPIST

Typing in FAMILY COMPUTING'S programs is a great way to become familiar with your computer and get some free software "to boot." But it's frustrating to type in a long program only to find it doesn't work as it should. When this happens, simple typing errors are most often the cause. So to help you gain greatest value from the time you spend computing with us, we've put together some tips on how to avoid typing errors—and what to do if a program doesn't run right. Read them carefully and you'll be up and running in no time!

SOME GENERAL RULES

1. Do set up your computer in a well-lighted, comfortable location, and prop the magazine up so that you don't have to strain to read the printed listing.

2. Do read instructions and program headings carefully. Make sure your computer has enough memory, the right version of BASIC, and the appropriate peripherals (joysticks, printers, disk drives, etc.) for a program.

3. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, try typing in shorter programs first. Type in a longer program in easy stages, SAVEing each installment as you go.

4. Until you are fairly familiar with BASIC, **do** assume that every word, number, letter, space, and punctuation mark in a program listing must be copied accurately if the program is to function as intended.

5. Do watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements: long lines filled with numbers or incomprehensible secret codes. If possible, have someone else read DATA to you as you type, and help you proofread it if you have trouble later on. Proofreading from a printout is best.

6. Do be aware that program listings printed in FAMILY COMPUTING sometimes differ from what you will see on your computer's screen or in printouts you produce at home. Our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER until you've checked to see if the program "line" you're typing really ends there. The way to tell is to check if the line following begins with a multiple of 10 that follows in sequence from the previous logical line. REM statements are the exception and typing them in is optional.

Several computers (ADAM, Apple, Atari, and TI) format BASIC programs according to unique rules of their own. Don't let this throw you—just type in the listing exactly as printed in the the magazine and your computer is guaranteed to accept it, even though it may end up looking a little different on your screen.

7. One foolproof way to correct an error in a BASIC program line is to type the line in again from the beginning, and press RETURN or ENTER to set it in place of the old one in your computer's memory.

WHICH PROGRAMS WILL RUN ON MY COMPUTER?

Unless a program heading indicates otherwise, programs will run on any version of the computer specified, with the following exceptions:
- Apple programs run under AppleSoft (*not* Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIc. The Macintosh is not supported as of this writing.
- Our Atari programs may in some cases be incompatible with the Atari 1200XL.
- IBM PC owners may occasionally require a Color Graphics Adapter to run our graphics programs.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.
- TRS-80 Model III programs will run on the Model 4 in Model III mode.

DEBUGGING HINTS

Sometimes even the most careful typist makes a mistake. Don't expect your program to run right off the bat. If you have problems, remain patient and follow these general instructions for a probable quick fix.

LIST the program in screen-size chunks (check your manual for instructions on how to LIST parts of a program). Even better, if you have a printer, get a printout. Compare what you've typed in—letter by letter—to the published program. Make sure that you haven't typed the numeral 0 (which is slashed in our listings) for the letter O (which isn't), swapped a small letter "l" for the numeral one, dropped or mixed up some punctuation, switched uppercase text for lowercase or vice versa (particularly in DATA statements or within quotes), or miscounted the characters (and/or spaces) between a pair of quotes. Get someone to help you if possible.

Check your DATA statements—then check them again. Mistakes in DATA statements are the single most common cause of program failures. Bad DATA can cause a program to malfunction at any point, which can be misleading.

WHAT TO DO WHEN YOU'VE DONE IT ALL

We're proud of our programs, and we want you to enjoy them as much as we enjoy writing them. If you just can't figure out what's wrong with a program, we'd like to help. But we can't if you don't provide us with important information. When you write us (no telephone calls, please), indicate:

- Which program you're having trouble with.
- Which type of computer you own, the type of BASIC you are using, how much RAM your computer has, and what DOS and peripherals you're using, if any.
- What error messages your computer has given you.
- Your name, address, and telephone number.

If possible, please enclose a printout. Address all correspondence to Programming P.S., FAMILY COMPUTING, 730 Broadway, New York, NY 10003.

AGE SPLITTER

BY JOEY LATIMER
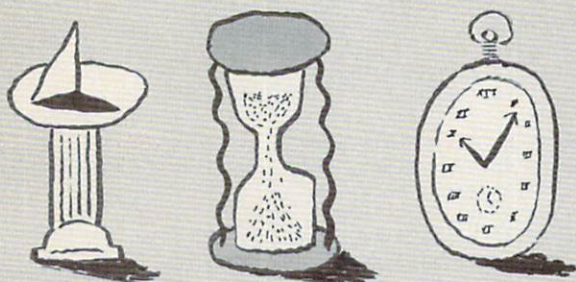
How old are you in minutes? In seconds? *Age Splitter* will tell you what your age is in these units—and in months, weeks, days, and hours, too! Just type in the program listing for your computer, and SAVE it to disk or cassette. When you type RUN, the program will ask you to type in your age in years. Use numerals only, and press RETURN or ENTER when you're done. Your computer will churn away for a split instant, and then print out the results. Press "P" to go back to the beginning and start over, or "Q" to quit.

PROGRAM NOTES

Age Splitter demonstrates how PRINT statements can be used to evaluate and display the results of mathematical expressions. The program starts by asking for your age in years, accepting this number via an INPUT statement, and placing it in a variable called AGE. Then a series of PRINT statements multiply the value in AGE by different numbers, to calculate how many months, weeks, days, hours, minutes, or seconds old you are, and print these figures out on the screen in combination with text. Semicolons are used to keep the result of each expression and its identifying text together on the same screen line.

If you keep playing with the program, you'll sooner or later enter a number for years that's so great that your computer will be unable to print out the number of seconds it contains in normal fashion. Instead, you'll see an expression something like this where the seconds should be: 1.5768E+10.

This is a form of scientific notation that your computer uses to save printing unnecessary zeroes when displaying very large or very small numbers. The left-hand side of the expression contains only the significant digits of the figure, expressed as a decimal number between 1 and 10. The right-hand side of the expression stands for the power of 10 the left-hand side is multiplied by to achieve the final value. 1.5768E+10 simply means 1.5768×10 to the 10th, which translates to 1.5768×10 billion, or 15 billion, 768 million. That's a BIG number: the number of seconds in 500 years!

Programmers may enjoy the challenge of finding out the biggest and smallest numbers their computers can display normally. Different machine brands have different maximum and minimum limits.

If you devise a good enhancement of one of our beginner programs, we might mention it in a future issue. Send a printout of your program (no tapes or disks, please) to:

Beginner Programs
FAMILY COMPUTING
730 Broadway
New York, NY 10003

ADAM/*Age Splitter*

```
10 HOME
20 PRINT "Type your answer;"
30 PRINT "then press <RETURN>."
40 PRINT
50 PRINT "How many years old are you";
60 INPUT age
70 HOME
80 PRINT "If you are ";age;" years old,"
90 PRINT "you have lived more than ..."
100 PRINT
110 PRINT age*12;" months, or"
120 PRINT age*52;" weeks, or"
130 PRINT age*365;" days, or"
140 PRINT age*365*24;" hours, or"
150 PRINT age*365*24*60;" minutes, or"
160 PRINT age*365*24*60*60;" seconds."
170 PRINT
180 PRINT "Press <P> to play again,"
190 PRINT "or <Q> to quit."
200 GET k$
210 IF k$ = "P" OR k$ = "p" THEN 10
220 IF k$ <> "Q" AND k$ <> "q" THEN 200
230 END
```

Apple/*Age Splitter*

```
10 HOME
20 PRINT "TYPE YOUR ANSWER; THEN PRESS <RETURN>."
30 PRINT
40 PRINT "HOW MANY YEARS OLD ARE YOU";
50 INPUT AGE
60 HOME
70 PRINT "IF YOU ARE ";AGE;" YEARS OLD,"
80 PRINT "YOU HAVE LIVED MORE THAN ..."
90 PRINT
100 PRINT AGE*12;" MONTHS, OR"
110 PRINT AGE*52;" WEEKS, OR"
120 PRINT AGE*365;" DAYS, OR"
130 PRINT AGE*365*24;" HOURS, OR"
140 PRINT AGE*365*24*60;" MINUTES, OR"
150 PRINT AGE*365*24*60*60;" SECONDS."
160 PRINT
170 PRINT "PRESS <P> TO PLAY AGAIN,"
180 PRINT "OR <Q> TO QUIT."
190 GET K$
200 IF K$ = "P" THEN 10
210 IF K$ <> "Q" THEN 190
220 END
```

Atari/*Age Splitter*

```
10 OPEN #1,4,0,"K:"
20 PRINT CHR$(125);
30 PRINT "TYPE YOUR ANSWER; THEN PRESS <RETURN>.";
40 PRINT
50 PRINT "HOW MANY YEARS OLD ARE YOU";
60 INPUT AGE
70 PRINT CHR$(125);
80 PRINT "IF YOU ARE ";AGE;" YEARS OLD,"
90 PRINT "YOU HAVE LIVED MORE THAN ..."
100 PRINT
110 PRINT AGE*12;" MONTHS, OR"
120 PRINT AGE*52;" WEEKS, OR"
130 PRINT AGE*365;" DAYS, OR"
140 PRINT AGE*365*24;" HOURS, OR"
150 PRINT AGE*365*24*60;" MINUTES, OR"
160 PRINT AGE*365*24*60*60;" SECONDS."
170 PRINT
180 PRINT "PRESS <P> TO PLAY AGAIN,"
190 PRINT "OR <Q> TO QUIT."
200 GET #1,K
210 IF K=ASC("P") THEN 20
220 IF K<>ASC("Q") THEN 200
230 END
```

BEGINNER PROGRAM

Commodore 64/*Age Splitter*

```
10 PRINT CHR$(147);
20 PRINT "TYPE YOUR ANSWER; THEN PRESS <RETURN>."
30 PRINT
40 PRINT "HOW MANY YEARS OLD ARE YOU";
50 INPUT AGE
60 PRINT CHR$(147);
70 PRINT "IF YOU ARE";AGE;"YEARS OLD,"
80 PRINT "YOU HAVE LIVED MORE THAN ..."
90 PRINT
100 PRINT AGE*12;"MONTHS, OR"
110 PRINT AGE*52;"WEEKS, OR"
120 PRINT AGE*365;"DAYS, OR"
130 PRINT AGE*365*24;"HOURS, OR"
140 PRINT AGE*365*24*60;"MINUTES, OR"
150 PRINT AGE*365*24*60*60;"SECONDS."
160 PRINT
170 PRINT "PRESS <P> TO PLAY AGAIN, OR <Q> TO QUIT."
180 GET K$
190 IF K$="P" THEN 10
200 IF K$<>"Q" THEN 180
210 END
```

IBM PCs/*Age Splitter*

```
10 KEY OFF
20 CLS
30 PRINT "TYPE YOUR ANSWER; THEN PRESS <ENTER>."
40 PRINT
50 PRINT "HOW MANY YEARS OLD ARE YOU";
60 INPUT AGE
70 CLS
80 PRINT "IF YOU ARE";AGE;"YEARS OLD,"
90 PRINT "YOU HAVE LIVED MORE THAN ..."
100 PRINT
110 PRINT AGE*12;"MONTHS, OR"
120 PRINT AGE*52;"WEEKS, OR"
130 PRINT AGE*365;"DAYS, OR"
140 PRINT AGE*365*24;"HOURS, OR"
150 PRINT AGE*365*24*60;"MINUTES, OR"
160 PRINT AGE*365*24*60*60;"SECONDS."
170 PRINT
180 PRINT "PRESS <P> TO PLAY AGAIN,"
190 PRINT "OR <Q> TO QUIT."
200 K$=INKEY$
210 IF K$="P" THEN 20
220 IF K$<>"Q" THEN 200
230 END
```

TI-99/4A/*Age Splitter*

```
10 CALL CLEAR
20 PRINT "TYPE YOUR ANSWER;"
30 PRINT "THEN PRESS <ENTER>."
40 PRINT
50 PRINT "HOW MANY YEARS OLD ARE YOU";
60 INPUT AGE
70 CALL CLEAR
80 PRINT "IF YOU ARE";AGE;"YEARS OLD,"
90 PRINT "YOU HAVE LIVED MORE THAN ..."
100 PRINT
110 PRINT AGE*12;"MONTHS, OR"
120 PRINT AGE*52;"WEEKS, OR"
130 PRINT AGE*365;"DAYS, OR"
140 PRINT AGE*365*24;"HOURS, OR"
150 PRINT AGE*365*24*60;"MINUTES, OR"
160 PRINT AGE*365*24*60*60;"SECONDS."
170 PRINT
180 PRINT "PRESS <P> TO PLAY AGAIN, OR <Q> TO QUIT."
190 CALL KEY(3,K,S)
200 IF K=80 THEN 10
210 IF K<>81 THEN 190
220 END
```

TRS-80 Color Computer/*Age Splitter*

```
10 CLS
20 PRINT "TYPE YOUR ANSWER;"
30 PRINT "THEN PRESS <ENTER>."
40 PRINT
50 PRINT "HOW MANY YEARS OLD ARE YOU";
60 INPUT AGE
70 CLS
80 PRINT "IF YOU ARE";AGE;"YEARS OLD,"
90 PRINT "YOU HAVE LIVED MORE THAN ..."
100 PRINT
110 PRINT AGE*12;"MONTHS, OR"
120 PRINT AGE*52;"WEEKS, OR"
130 PRINT AGE*365;"DAYS, OR"
140 PRINT AGE*365*24;"HOURS, OR"
150 PRINT AGE*365*24*60;"MINUTES, OR"
160 PRINT AGE*365*24*60*60;"SECONDS."
170 PRINT
180 PRINT "PRESS <P> TO PLAY AGAIN,"
190 PRINT "OR <Q> TO QUIT."
200 K$=INKEY$
210 IF K$="P" THEN 10
220 IF K$<>"Q" THEN 200
230 END
```

TRS-80 Model III/*Age Splitter*

```
10 CLS
20 PRINT "TYPE YOUR ANSWER; THEN PRESS <ENTER>."
30 PRINT
40 PRINT "HOW MANY YEARS OLD ARE YOU";
50 INPUT AGE
60 CLS
70 PRINT "IF YOU ARE";AGE;"YEARS OLD, YOU HAVE LIVED M
ORE THAN ..."
80 PRINT
90 PRINT AGE*12;"MONTHS, OR"
100 PRINT AGE*52;"WEEKS, OR"
110 PRINT AGE*365;"DAYS, OR"
120 PRINT AGE*365*24;"HOURS, OR"
130 PRINT AGE*365*24*60;"MINUTES, OR"
140 PRINT AGE*365*24*60*60;"SECONDS."
150 PRINT
160 PRINT "PRESS <P> TO PLAY AGAIN, OR <Q> TO QUIT."
170 K$=INKEY$
180 IF K$="P" THEN 10
190 IF K$<>"Q" THEN 170
200 END
```

VIC-20/*Age Splitter*

```
10 PRINT CHR$(147);
20 PRINT "TYPE YOUR ANSWER;"
30 PRINT "THEN PRESS <RETURN>."
40 PRINT
50 PRINT "HOW MANY YEARS OLD"
60 PRINT "ARE YOU";
70 INPUT AGE
80 PRINT CHR$(147);
90 PRINT "IF YOU ARE";AGE;"YEARS"
100 PRINT "OLD, YOU HAVE LIVED"
110 PRINT "MORE THAN ..."
120 PRINT
130 PRINT AGE*12;"MONTHS, OR"
140 PRINT AGE*52;"WEEKS, OR"
150 PRINT AGE*365;"DAYS, OR"
160 PRINT AGE*365*24;"HOURS, OR"
170 PRINT AGE*365*24*60;"MINUTES, OR"
180 PRINT AGE*365*24*60*60;"SECONDS."
190 PRINT
200 PRINT "PRESS <P> TO PLAY"
210 PRINT "AGAIN, OR <Q> TO QUIT."
220 GET K$
230 IF K$="P" THEN 10
240 IF K$<>"Q" THEN 220
250 END
```

HIT OR MISS

BY JOEY LATIMER
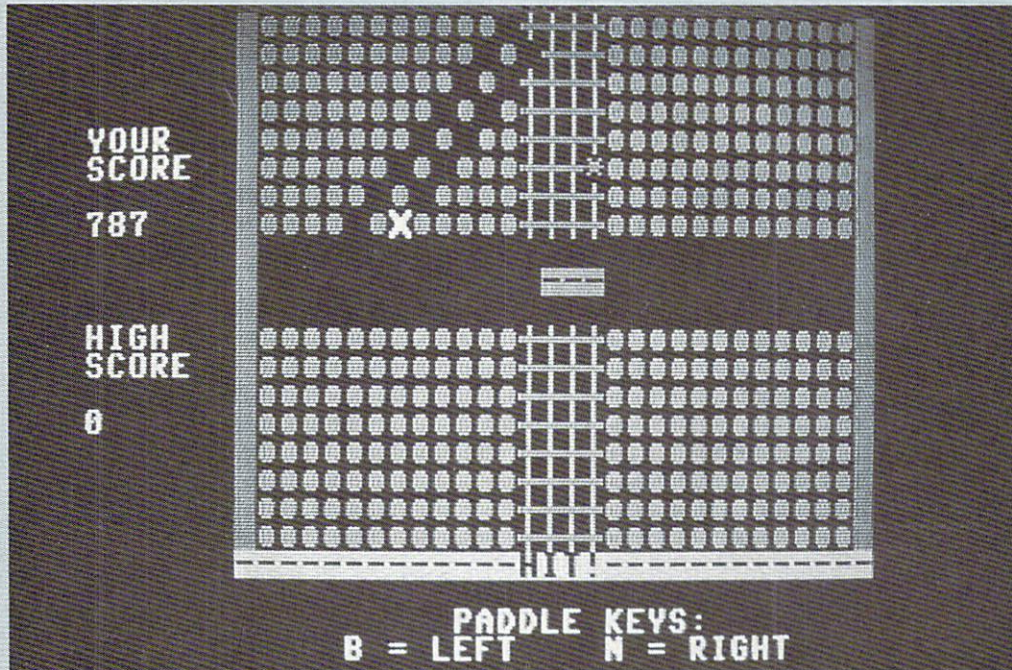
Commodore 64 version of *Hit or Miss*

Hit or Miss is an arcade-style game that's kind of a mixture of Ping-Pong, pinball, and bowling. When you first type RUN, you're presented with a square grid, surrounded by four rails. The upper and lower parts of the grid are filled with little circles (point markers) and plus signs (bumpers). The top and bottom rails are marked HIT and MISS, respectively.

Press any key to start the game. A projectile character will be sent into play, heading upwards at an angle toward the HIT rail. Your paddle will appear at the center line of the grid—move it left with the "B" key, right with the "N" key.

As the projectile travels upward, it encounters some of the circles or plus signs. Circles are worth 20 points each—they disappear when you hit them and do not change your projectile's direction. Plus signs also are worth 20 points, but these will send your projectile in a new direction before evaporating.

When the projectile encounters the HIT rail, it bounces off, and starts heading back. Every time

the projectile strikes the HIT rail, you receive a bonus equal to the number of pluses and circles you've already hit. The object of the game is to keep the projectile in play, and win points by preventing it from getting past your paddle and hitting the MISS rail. If it does, the game is over. Simple.

But wait! The HIT and MISS rails frequently swap position. You'll have to be ready to change your strategy in a split-second to keep the projectile away from the deadly trap.

And that's not all. Bonus markers (asterisks) appear randomly in the grid throughout the game. These are worth 500 points each. To further stir things up, more plus-sign bumpers will start appearing before you've played too long. A nest of plus signs can really bounce you around!

PROGRAM NOTES

When you sit down to write an arcade-style game in BASIC, you have to make some hard decisions. BASIC is great for most general-purpose computing

projects, but it's slow, and this works against you when you want to write an action-oriented game.

Machine language, in the hands of a good programmer/designer, is fast enough to make almost any game scenario into a complex, delicately timed, and briskly responsive program. BASIC isn't—so the BASIC programmer has to plan an action-oriented game carefully to exploit BASIC's advantages and ensure that the game doesn't rely purely on speed for its appeal.

In designing *Hit or Miss* to run on six different computers, I took a careful look at BASIC, and reached the following conclusions. Since drawing complex graphics on the screen is not BASIC's strong suit, I knew I couldn't design an entertaining game that depended heavily on "realistic" images—spaceships, airplanes, and so on. On the other hand, one of the things BASIC does best and fastest is handle text; and letters, numbers, and graphic characters can combine to form interesting images. So I decided my game would be pro-

grammed in text mode, and that it would be based on simple, abstract shapes.

Next, I realized that since text mode provides only a very coarse array of screen positions, objects in my game would have to move in very simple ways—up, down, sideways, or diagonally. I decided on a bounce-and-ricochet theme, first because I could simulate these motions with simple movements, and second because the bouncing projectile could be formed from a single character. A paddle is a natural tool for bouncing things, and I had block characters to make it with—perfect! My theme would be single-paddle bounce-and-ricochet.

But what fun is bouncing, anyway? To provide a challenge, I had to find a reason for bouncing—some goal to be accomplished, or peril to be avoided. Eventually, I found both—but by a very indirect route. Hoping to provide a goal consistent with the scenario, I started by adding a group of single-character "markers" to the paddle and projectile display. When the projectile passed over these objects, the player would win points. Next, I hit on the idea that some of these markers also could act as "bumpers," changing the projectile's direction. The pattern of markers and bumpers added some interest to the display, as well. The variety of the whole scenario could be increased by having some bumpers and markers appear randomly as the game went on.

But then a couple of problems cropped up. At this point, the game was played across the entire screen, which was a long way to move a paddle in BASIC. The bumpers introduced so much randomness into the projectile's direction that I knew players would have problems anticipating what it would

do, and might have trouble reaching it in time to keep it in play. So I added four rails to confine the projectile and focus the action of the game in a smaller area. Since play occurred over a smaller area, the game seemed to move faster as well—a bonus!

The screen looked good and the game played well, but there was no real way to lose, and that was boring. In the process of refining the code that printed the rails on the screen, however, I saw an opportunity to add this challenge. Since the top and bottom rails were simply strings of characters, they could be printed on the screen very quickly in position. So why not make one rail a trap, one rail a target, and then,

during the game, switch them back and forth randomly so that the player would have to respond correctly to a constantly changing situation? The HIT and MISS rails were born in that moment of inspiration. I think they really make the game unique.

If you'd like to read more about the process of designing a computer game, I'd suggest you pick up a copy of Chris Crawford's book, *The Art of Computer Game Design* (Osborne/McGraw-Hill, 1984, $14.95). Chris is a master programmer, author of the award-winning games *Eastern Front* and *Legionnaire*, and has lots of sharp things to say about how a really good game should be put together.

Apple/*Hit or Miss*

```
10 TEXT:HS = 0:SS = CHR$(32)
20 L$ = SS:FOR X = 1 TO 22:L$ = L$+S$:NEXT X
30 B$ = "0":FOR X = 2 TO 28
40 B$ = B$+CHR$(43+((X < 13)+(X > 16))*36):NEXT X
50 M$ = "///////////////MISS///////////////"
60 H$ = "=============HIT!============="
70 Q$ = "X":P$ = "---":N$ = S$+S$+S$
80 CX = INT(RND(1)*25)+9:IF CX > 20 AND CX < 25 THEN 80
90 RX = 11:FL = 1:DR = -1:DC = -1:SC = 0
100 HC = CX:HR = RX:NP = 22:LP = 19:M = 0
110 HOME:NORMAL
120 VTAB 6:PRINT "YOUR":PRINT "SCORE:":PRINT:PRINT SC
130 VTAB 13:PRINT "HIGH":PRINT "SCORE:":PRINT:PRINT HS
140 VTAB 11:PRINT TAB(12);"PRESS ANY KEY TO BEGIN."
150 INVERSE:FOR X = 2 TO 20:VTAB X:HTAB 8:PRINT S$;
160 IF X > 9 AND X < 13 THEN 180
170 NORMAL:PRINT B$;:INVERSE
180 HTAB 37:PRINT S$:NEXT X:NORMAL
190 VTAB 23:PRINT TAB(17);"PADDLE KEYS:"
200 PRINT TAB(13);"B = LEFT    N = RIGHT";
210 GOSUB 1030
220 K = PEEK(-16384):IF K < 128 THEN 220
230 POKE -16368,0:VTAB 11:HTAB 12:PRINT L$
240 IF RND(1) > 0.05 THEN 290
250 CH = 42:IF M > 300 AND RND(1) > 0.5 THEN CH = 43
260 XR = INT(RND(1)*16)+3
270 IF XR > 9 AND XR < 13 THEN 260
280 VTAB XR:HTAB INT(RND(1)*21)+10:PRINT CHR$(CH)
290 CX = CX+DC:RX = RX+DR
300 GOSUB 3000
310 IF PE = 43 OR PE = 79 THEN SC = SC+20:M = M+1
320 IF PE = 42 THEN SC = SC+500:C = 5:GOSUB 4000
330 GOSUB 2000:IF PE = 43 THEN DC = -DC:GOTO 440
340 IF CX > 8 AND CX < 37 THEN 370
350 DC = -DC:C = 3:GOSUB 4000
360 CX = CX+DC:GOSUB 3000
370 IF RX > 1 AND RX < 21 AND PE+128 <> 45 THEN 440
380 DR = -DR:C = 3:GOSUB 4000
390 IF RX < 2 THEN RX = 3:IF FL = 0 THEN 550
400 IF RX > 20 THEN RX = 19:IF FL THEN 550
410 IF PE+128 = 45 THEN RX = RX+2*DR:GOTO 440
420 SC = SC+M:GOSUB 2000
430 IF RND(0) > 0.7 THEN GOSUB 1000
440 VTAB HR:HTAB HC:PRINT S$;
450 VTAB RX:HTAB CX:INVERSE:PRINT Q$;:NORMAL
460 HC = CX:HR = RX:IF RX = 11 THEN 240
470 K = PEEK(-16384)-128
480 NP = NP+((K = 78)-(K = 66))*2:POKE -16368,0
490 IF LP = NP THEN 240
500 IF NP < 9 THEN NP = 9
510 IF NP > 34 THEN NP = 34
520 VTAB 11:HTAB LP:PRINT N$
530 VTAB 11:HTAB NP:INVERSE:PRINT P$:NORMAL
540 LP = NP:GOTO 240
550 FOR DE = 1 TO 45:C = 3:GOSUB 4000
560 VTAB HR:HTAB HC:INVERSE
570 PRINT CHR$(INT(RND(1)*2)+42)
580 NEXT DE:NORMAL:VTAB 23:SPEED= 175
590 FOR DE = 1 TO 10:PRINT:NEXT DE
600 SPEED= 255:PRINT "SORRY, YOU MISSED."
610 PRINT:PRINT "YOUR SCORE WAS ";SC;" POINTS."
620 IF SC > HS THEN HS = SC:PRINT:PRINT "A NEW RECORD!
"
630 PRINT:PRINT "THE HIGH SCORE IS ";HS;" POINTS."
640 PRINT:PRINT:PRINT " PLEASE SELECT:":PRINT
650 PRINT " <R>EPLAY":PRINT " <Q>UIT"
660 PRINT:PRINT:PRINT:PRINT
670 K = PEEK(-16384):IF K = 81 THEN END
680 IF K = 82 THEN 80
690 POKE -16368,0:GOTO 670
1000 PRINT CHR$(7);:FL = NOT FL:IF FL THEN 1030
1010 VTAB 1:HTAB 8:INVERSE:PRINT M$
1020 VTAB 21:HTAB 8:PRINT H$:NORMAL:RETURN
1030 VTAB 1:HTAB 8:INVERSE:PRINT H$
1040 VTAB 21:HTAB 8:PRINT M$:NORMAL:RETURN
2000 VTAB 9:HTAB 1:PRINT SC:RETURN
3000 PE = SCRN(CX-1,2*(RX-1))+16*SCRN(CX-1,2*(RX-1)+1)
3010 PE = PE-128:RETURN
4000 FOR S = 1 TO C:A = PEEK(-16336):NEXT S:RETURN
```

Atari/*Hit or Miss*

```
10 DIM S$(1),L$(28),B$(28),C$(4),M$(30),H$(30),Q$(1),P$(
3),N$(3)
20 OPEN #1,4,0,"K:":GRAPHICS 0:POKE 82,1:POKE 752,1
30 SETCOLOR 1,0,0:SETCOLOR 2,8,10:SETCOLOR 4,0,10
40 HS=0:S$=CHR$(32):L$=S$:L$(28)=L$:L$(2)=L$
50 B$=CHR$(20):B$(28)=B$:B$(2)=B$
60 C$=CHR$(19):C$(4)=C$:C$(2)=C$:B$(13,16)=C$
70 M$="///////////////MISS///////////////"
80 H$="=============HIT!============="
90 FOR X=1 TO 30:M$(X,X)=CHR$(ASC(M$(X))+128)
100 H$(X,X)=CHR$(ASC(H$(X))+128):NEXT X
110 Q$="X":N$=L$
120 P$=CHR$(146):P$(2)=P$:P$(3)=P$
130 CX=INT(RND(1)*25)+9:IF CX>20 AND CX<25 THEN 130
140 FL=1:DR=-1:DC=-1:SC=0:RX=11:HC=CX:HR=RX:NP=22:HP=19:
M=0
150 PRINT CHR$(125):POSITION 1,6:PRINT "YOUR":PRINT "SCO
RE:":PRINT :PRINT SC
160 POSITION 1,13:PRINT "HIGH":PRINT "SCORE:"
170 PRINT :PRINT HS
180 FOR X=2 TO 20:POSITION 8,X:PRINT CHR$(160);
190 IF X>9 AND X<13 THEN PRINT L$;:GOTO 210
200 PRINT B$;
210 PRINT CHR$(160):NEXT X
220 POSITION 12,11:PRINT "PRESS ANY KEY TO BEGIN."
230 POSITION 9,23:PRINT "PADDLE KEYS: B=LEFT N=RIGHT";
240 GOSUB 1030
250 GET #1,K
260 POSITION 9,11:PRINT L$
270 IF RND(0)>0.05 THEN 310
280 CH=42:IF M>300 AND RND(1)>0.5 THEN CH=19
290 XR=INT(RND(0)*16)+3:XC=INT(RND(0)*21)+10:IF XR>9 AND
 XR<13 THEN 290
300 POSITION XC,XR:PRINT CHR$(CH);
310 CX=CX+DC:RX=RX+DR
320 LOCATE CX,RX,PE:POSITION CX,RX:PUT #6,PE
330 IF PE=19 OR PE=20 THEN SC=SC+20:M=M+1
```

```
340 IF PE=42 THEN SC=SC+500:C=15:GOSUB 3000
350 GOSUB 2000:IF PE=19 THEN DC=-DC:GOTO 460
360 IF CX>8 AND CX<37 THEN 390
370 DC=-DC:C=100:GOSUB 3000:CX=CX+DC
380 LOCATE CX,RX,PE:POSITION CX,RX:PUT #6,PE
390 IF RX>1 AND RX<21 AND PE<>146 THEN 460
400 DR=-DR:C=200:GOSUB 3000
410 IF RX<2 THEN RX=3:IF NOT FL THEN 570
420 IF RX>20 THEN RX=19:IF FL THEN 570
430 IF PE=146 THEN RX=RX+2*DR:GOTO 460
440 SC=SC+M:GOSUB 2000
450 IF RND(0)>0.7 THEN GOSUB 1000
460 POSITION HC,HR:PRINT S$;
470 POSITION CX,RX:PRINT Q$;
480 HC=CX:HR=RX:IF RX=11 THEN 270
490 POKE 555,1:POKE 753,0:K=PEEK(764):POKE 764,255:SOUND
    0,0,0,0
500 NP=NP+2*((K=35)-(K=21))
510 IF HP=NP THEN 270
520 IF NP<9 THEN NP=9
530 IF NP>34 THEN NP=34
540 POSITION HP,11:PRINT N$;
550 POSITION NP,11:PRINT P$;
560 HP=NP:GOTO 270
570 FOR DE=1 TO 25:SOUND 0,INT(RND(0)*255),10,8
580 POSITION HC,HR:PRINT CHR$(INT(RND(0)*4)+42):NEXT DE:
    SOUND 0,0,0,0
590 FOR DE=1 TO 30:PRINT :NEXT DE
600 PRINT "SORRY, YOU MISSED."
610 PRINT :PRINT "YOUR SCORE WAS ";SC;" POINTS."
620 IF SC>HS THEN HS=SC:PRINT :PRINT "A NEW RECORD!"
630 PRINT :PRINT "THE HIGH SCORE IS ";HS;" POINTS."
640 PRINT :PRINT :PRINT " PLEASE SELECT:":PRINT
650 PRINT " <R>EPLAY"
660 PRINT " <Q>UIT"
670 PRINT :PRINT :PRINT :PRINT
680 GET #1,K:IF K=81 THEN POKE 752,0:POKE 82,2:END
690 IF K<>82 THEN 680
700 GOTO 130
1000 SOUND 0,100,10,10:FL= NOT FL:IF FL THEN 1030
1010 POSITION 8,1:PRINT M$
1020 POSITION 8,21:PRINT H$:RETURN
1030 POSITION 8,1:PRINT H$
1040 POSITION 8,21:PRINT M$:RETURN
2000 POSITION 1,9:PRINT SC;:RETURN
3000 SOUND 0,C,10,10:FOR S=1 TO 10:NEXT S:RETURN
```

Commodore 64/*Hit or Miss*

```
10 SN=54272:SB=1024:CB=55296:HS=0:SD=0:R=214
20 POKE 650,128:POKE 53281,0:POKE 53280,0
30 FOR X=SN TO SN+24:POKE X,0:NEXT X
40 POKE SN+5,128:POKE SN+6,128:POKE SN+24,15
50 S$=CHR$(32):L$=S$:FOR X=1 TO 22:L$=L$+S$:NEXT X
60 B$=CHR$(113):FOR X=2 TO 28
70 B$=B$+CHR$(113-10*(X>12 AND X<17)):NEXT X
80 M$=CHR$(18)+"/////////////MISS/////////////"
90 H$=CHR$(18)+"=============HIT!============="
100 Q$=CHR$(5)+CHR$(118):E$=CHR$(144)+S$
110 P$=CHR$(18)+CHR$(156)+"---":N$=CHR$(144)+S$+S$+S$
120 CX=INT(RND(1)*25)+9:IF CX>20 AND CX<25 THEN 120
130 RX=11:FL=-1:DR=-1:DC=-1:SC=0
140 HC=CX:HR=RX:NP=22:LP=19:M=0
150 PRINT CHR$(147):POKE SN,198:POKE SN+1,45
160 POKE R,5:PRINT:PRINT CHR$(5);" YOUR":PRINT " SCORE:"
    :PRINT:PRINT SC
170 POKE R,12:PRINT:PRINT " HIGH":PRINT " SCORE:"
180 PRINT:PRINT CHR$(5);HS
190 POKE R,10:PRINT:PRINT TAB(12);"PRESS ANY KEY TO BEGI
    N.";CHR$(19)
200 K1=INT(RND(1)*3)+152:K2=INT(RND(1)*7)+149:K0=K1
210 PRINT:FOR X=1 TO 19:PRINT TAB(8);CHR$(18);CHR$(156);
    S$;
220 IF X<9 OR X>11 THEN PRINT CHR$(146);CHR$(K0);B$;
230 PRINT TAB(37);CHR$(18);CHR$(156);S$
240 IF X=11 THEN K0=K2
250 NEXT X
```

```
260 POKE R,22:PRINT:PRINT TAB(18);"PADDLE KEYS:"
270 PRINT TAB(13);"B = LEFT     N = RIGHT";CHR$(19)
280 GOSUB 1030
290 GET K$:IF K$="" THEN 290
300 POKE R,10:PRINT:PRINT TAB(12);L$
310 IF RND(0)>0.05 THEN 360
320 CH=42:IF M>300 AND RND(1)>0.5 THEN CH=123
330 XR=INT(RND(1)*16)+3
340 IF XR>9 AND XR<13 THEN 330
350 POKE R,XR-1:PRINT:PRINT TAB(INT(RND(1)*21)+10);CHR$(
    5);CHR$(CH)
360 CX=CX+DC:RX=RX+DR
370 PE=PEEK(SB+CX+RX*40)
380 IF PE=81 OR PE=91 THEN SC=SC+20:M=M+1
390 IF PE=42 THEN SC=SC+500:SD=33:POKE SN+4,SD
400 GOSUB 2000:IF PE=91 THEN DC=-DC:GOTO 520
410 IF CX>8 AND CX<37 THEN 440
420 DC=-DC:SD=129:POKE SN+4,SD:CX=CX+DC
430 PE=PEEK(SB+CX+RX*40)
440 IF RX>1 AND RX<21 AND PE<>173 THEN 520
450 DR=-DR:SD=129:POKE SN+4,SD
460 IF RX<2 THEN RX=3:IF NOT FL THEN 620
470 IF RX>20 THEN RX=19:IF FL THEN 620
480 IF PE=173 THEN RX=RX+2*DR:GOTO 520
490 IF RX=11 THEN PRINT PE:STOP
500 SC=SC+M:GOSUB 2000
510 IF RND(1)>0.7 THEN GOSUB 1000
520 POKE R,HR-1:PRINT:PRINT TAB(HC);S$
530 POKE R,RX-1:PRINT:PRINT TAB(CX);Q$
540 HC=CX:HR=RX:IF RX=11 THEN 310
550 GET K$:NP=NP+2*((K$="B")-(K$="N")):IF SD THEN POKE S
    N+4,SD-1:SD=0
560 IF LP=NP THEN 310
570 IF NP<9 THEN NP=9
580 IF NP>34 THEN NP=34
590 POKE R,10:PRINT:PRINT TAB(LP);N$
600 POKE R,10:PRINT:PRINT TAB(NP);P$
610 LP=NP:GOTO 310
620 POKE SN+4,33:FOR DE=1 TO 25
630 POKE R,HR-1:PRINT:PRINT TAB(HC);CHR$(INT(RND(1)*2)+1
    18)
640 POKE SN,38:POKE SN+1,INT(RND(1)*69)+1:NEXT DE
650 POKE SN+4,0
660 POKE R,23:PRINT
670 FOR DE=1 TO 10:PRINT CHR$(13):NEXT DE
680 PRINT CHR$(158);"SORRY, YOU MISSED."
690 PRINT:PRINT "YOUR SCORE WAS";SC;"POINTS."
700 IF SC>HS THEN HS=SC:PRINT:PRINT CHR$(159);"A NEW REC
    ORD!";CHR$(158)
710 PRINT:PRINT "THE HIGH SCORE IS";HS;"POINTS."
720 PRINT:PRINT:PRINT:PRINT CHR$(150);" PLEASE SELECT:":
    PRINT
730 PRINT " <R>EPLAY"
740 PRINT " <Q>UIT"
750 PRINT:PRINT:PRINT:PRINT
760 GET K$:IF K$="Q" THEN END
770 IF K$<>"R" THEN 760
780 GOTO 120
1000 POKE SN+4,17:FL=NOT FL:IF FL THEN 1030
1010 POKE R,1:PRINT:PRINT CHR$(19);CHR$(28);TAB(48);M$
1020 POKE R,158:PRINT:PRINT TAB(8);H$:RETURN
1030 POKE R,1:PRINT:PRINT CHR$(19);CHR$(158);TAB(48);H$
1040 POKE R,20:PRINT:PRINT CHR$(28);TAB(8);M$:RETURN
2000 POKE R,8:PRINT:PRINT CHR$(5);SC:RETURN
```

IBM PCs/*Hit or Miss*

```
10 CLS:KEY OFF:SCREEN 0,1:WIDTH 40:LOCATE ,,0
20 HS=0:V$=CHR$(176):S$=CHR$(32)
30 L$=S$:FOR X=1 TO 22:L$=L$+S$:NEXT X
40 FOR X=1 TO 28
50 B$=B$+CHR$(43-((X<13)+(X>16))*36):NEXT X
60 M$="/////////////MISS/////////////"
70 H$="=============HIT!============="
80 Q$=CHR$(127):P$=STRING$(4,219):N$=STRING$(4,32)
90 CX=INT(RND*25)+9:IF CX>20 AND CX<25 THEN 90
100 FL=-1:DR=-1:DC=-1:SC=0:RX=11
```

```
110 HC=CX:HR=RX:NP=21:LP=19:M=0
120 CLS
130 COLOR 3:LOCATE 6,1:PRINT "YOUR":PRINT "SCORE:":PRINT:PRINT SC
140 COLOR 10:LOCATE 13,1:PRINT "HIGH":PRINT "SCORE:":PRINT:PRINT HS
150 KO=3:FOR X=2 TO 20:LOCATE X,8:COLOR 5:PRINT V$;
160 IF X>9 AND X<13 THEN PRINT SPC(28);V$:GOTO 180
170 COLOR KO:PRINT B$;:COLOR 5:PRINT V$
180 IF X=12 THEN KO=2
190 NEXT X
200 COLOR 15:LOCATE 11,12:PRINT "PRESS ANY KEY TO BEGIN."
210 COLOR 7:LOCATE 23,17:PRINT "PADDLE KEYS:"
220 PRINT TAB(12);"B = LEFT    N = RIGHT";
230 GOSUB 1030
240 K$=INKEY$:IF K$="" THEN 240
250 LOCATE 11,12:PRINT L$
260 IF RND>.05 THEN 310
270 CH=42:IF M>300 AND RND>.5 THEN CH=43
280 XR=INT(RND*16)+3
290 IF XR>9 AND XR<13 THEN 280
300 LOCATE XR,INT(RND*21)+10:COLOR 7:PRINT CHR$(CH);
310 CX=CX+DC:RX=RX+DR
320 PE=SCREEN(RX,CX,0)
330 IF PE=43 OR PE=79 THEN SC=SC+20:M=M+1:GOSUB 2000
340 IF PE=42 THEN SOUND 550,1:SC=SC+500:GOSUB 2000
350 IF PE=43 THEN DC=-DC:GOTO 460
360 IF CX>8 AND CX<37 THEN 390
370 DC=-DC:SOUND 100,5
380 CX=CX+DC:PE=SCREEN(RX,CX,0)
390 IF RX>1 AND RX<21 AND PE<>219 THEN 460
400 DR=-DR:SOUND 90,5
410 IF RX<2 THEN RX=2:IF NOT FL THEN 570
420 IF RX>20 THEN RX=20:IF FL THEN 570
430 IF PE=219 THEN RX=RX+2*DR:GOTO 460
440 SC=SC+M:GOSUB 2000
450 IF RND>.7 THEN GOSUB 1000
460 LOCATE HR,HC:PRINT S$;
470 LOCATE RX,CX:COLOR 15:PRINT Q$:COLOR 7
480 HC=CX:HR=RX:IF RX=11 THEN 260
490 K$=INKEY$
500 NP=NP+((K$="B")-(K$="N"))*2
510 IF LP=NP THEN 260
520 IF NP<9 THEN NP=9
530 IF NP>33 THEN NP=33
540 LOCATE 11,LP:PRINT N$:LP=NP
550 LOCATE 11,NP:PRINT P$
560 GOTO 260
570 FOR DE=1 TO 45:SOUND 300,.2:SOUND 800,.4
580 LOCATE HR,HC:PRINT CHR$(INT(RND*2)+42)
590 NEXT DE:LOCATE 23,1
600 FOR DE=1 TO 10:FOR DL=1 TO 20:NEXT DL
610 PRINT:NEXT DE:PRINT "SORRY, YOU MISSED."
620 PRINT:PRINT "YOUR SCORE WAS";SC;"POINTS."
630 IF SC>HS THEN HS=SC:PRINT:PRINT "A NEW RECORD!"
640 PRINT:PRINT "THE HIGH SCORE IS";HS;"POINTS."
650 PRINT:PRINT:PRINT:PRINT " PLEASE SELECT:":PRINT
660 PRINT " <R>EPLAY":PRINT " <Q>UIT"
670 PRINT:PRINT:PRINT:PRINT
680 K$=INKEY$:IF K$="Q" THEN END
690 IF K$="R" THEN 90 ELSE 680
1000 SOUND 400,2:SOUND 800,3:FL=NOT FL:IF FL THEN 1030
1010 LOCATE 1,8:COLOR 5:PRINT V$;:COLOR 4:PRINT M$;:COLOR 5:PRINT V$
1020 LOCATE 21,8:PRINT V$;:COLOR 14:PRINT H$;:COLOR 5:PRINT V$:RETURN
1030 LOCATE 1,8:COLOR 5:PRINT V$;:COLOR 14:PRINT H$;:COLOR 5:PRINT V$
1040 LOCATE 21,8:PRINT V$;:COLOR 4:PRINT M$;:COLOR 5:PRINT V$:RETURN
2000 COLOR 3:LOCATE 9,1:PRINT SC;:RETURN
```

TRS-80 Color Computer/Hit or Miss

```
10 CLEAR 1000:HS=0:S$=CHR$(32)
20 L$=S$:FOR X=1 TO 21:L$=L$+S$:NEXT X
30 B$="0":FOR X=2 TO 22
40 B$=B$+CHR$(43-((X<10)+(X>13))*36):NEXT X
50 A$=CHR$(159):FOR X=1 TO 8:A$=A$+CHR$(159):NEXT X
60 H$=CHR$(255)+A$+CHR$(104)+CHR$(105)+CHR$(116)+CHR$(127)+A$+CHR$(255)
70 A$=CHR$(191):FOR X=1 TO 8:A$=A$+CHR$(191):NEXT X
80 M$=CHR$(255)+A$+CHR$(109)+CHR$(105)+CHR$(115)+CHR$(115)+A$+CHR$(255)
90 Q$="X"
100 P$=CHR$(175)+CHR$(175)+CHR$(175)+CHR$(175):N$=S$+S$+S$+S$
110 CX=RND(20)+8:IF CX>16 AND CX<20 THEN 110
120 RX=8:FL=-1:DR=-1:DC=-1:SC=0
130 HC=CX:HR=RX:NP=17:HP=16:M=0
140 CLS
150 PRINT@64,"YOUR":PRINT "SCORE":PRINT:PRINT SC
160 PRINT@288,"HIGH":PRINT "SCORE":PRINT:PRINT HS
170 PRINT@232,"PRESS ANY KEY TO BEGIN";
180 FOR X=1 TO 13
190 PRINT@7+X*32,CHR$(255);
200 IF X>5 AND X<9 THEN 220
210 PRINT B$;
220 PRINT@30+X*32,CHR$(255)
230 NEXT X
240 PRINT@490,"B=LEFT       N=RIGHT";
250 GOSUB 1030
260 K$=INKEY$:IF K$="" THEN 260
270 PRINT@232,L$;
280 IF RND(10)>0.5 THEN 320
290 CH=42:IF M>150 AND RND(10)>5 THEN CH=43
300 XR=RND(13):IF XR>5 AND XR<9 THEN 300
310 XC=RND(22)+7:PRINT@XC+XR*32,CHR$(CH);
320 CX=CX+DC:RX=RX+DR:PE=PEEK(1024+CX+RX*32)
330 IF PE=107 OR PE=79 THEN SC=SC+20:M=M+1:PRINT@160,SC;
340 IF PE=106 THEN SC=SC+500:PRINT@160,SC;:SOUND 50,1
350 IF PE=107 THEN DC=-DC:GOTO 460
360 IF CX>8 AND CX<30 THEN 390
370 DC=-DC:CX=CX+DC:SOUND 200,1
380 PE=PEEK(1024+XC+XR*32)
390 IF RX>0 AND RX<14 AND PE<>175 THEN 460
400 DR=-DR:SOUND 244,1
410 IF RX<1 THEN RX=2:IF NOT FL THEN 590
420 IF RX>13 THEN RX=12:IF FL THEN 590
430 IF PE=175 THEN RX=RX+2*DR:GOTO 460
440 SC=SC+M:PRINT@160,SC;
450 IF RND(10)>7 THEN GOSUB 1000
460 PRINT@HC+HR*32,S$;
470 PRINT@CX+RX*32,Q$;
480 HC=CX:HR=RX:IF RX=7 THEN 280
489 REM --TO USE JOYSTICK, REMOVE REM FROM LINE 490--
490 REM JO=JOYSTK(0)
499 REM --TO USE JOYSTICK, REMOVE REM FROM LINE 500--
500 REM NP=NP-3*((JO>20)-(JO<43))
510 K$=INKEY$
520 NP=NP+3*((K$="B")-(K$="N"))
530 IF NP=HP THEN 280
540 IF NP<8 THEN NP=8
550 IF NP>26 THEN NP=26
560 PRINT@HP+7*32,N$;
570 PRINT@NP+7*32,P$;:HP=NP
580 GOTO 280
590 FOR DE=1 TO 25:SOUND RND(244),1:PRINT@HC+HR*32,CHR$(RND(110)+128);:NEXT DE
600 PRINT@478," ":FOR L=1 TO 16:PRINT:FOR DE=1 TO 35:NEXT DE:NEXT L
610 PRINT "SORRY, YOU MISSED."
620 PRINT:PRINT "YOUR SCORE WAS";SC;"POINTS."
630 IF SC>HS THEN HS=SC:PRINT:PRINT "A NEW RECORD!"
640 PRINT:PRINT "THE HIGH SCORE IS";HS;"POINTS."
650 PRINT:PRINT:PRINT:PRINT " PLEASE SELECT:":PRINT
660 PRINT " <R>EPLAY"
670 PRINT " <Q>UIT"
680 PRINT
690 K$=INKEY$:IF K$="Q" THEN END
700 IF K$="R" THEN 110 ELSE 690
1000 SOUND 2,2:FL=NOT FL:IF FL THEN 1030
```

```
1010 PRINT@7,M$;
1020 PRINT@455,H$;::RETURN
1030 PRINT@7,H$;
1040 PRINT@455,M$;:RETURN
```

TRS-80 Model III/*Hit or Miss*

```
10 CLEAR 1000:CLS:HS=0:S$=CHR$(32):V$=CHR$(191)
20 L$=S$:FOR X=1 TO 22:L$=L$+S$:NEXT X
30 B$=V$:FOR X=1 TO 28
40 B$=B$+CHR$(43-((X<13)+(X>16))*68):NEXT X
50 M$=V$+"/////////////MISS/////////////"+V$
60 H$=V$+"============HIT!============="+V$
70 B$=B$+V$:Q$="X":P$=STRING$(4,179):N$=STRING$(4,32)
80 CX=RND(25)+17:IF CX>20 AND CX<25 THEN 80
90 RX=8:FL=-1:DR=-1:DC=-1:SC=0
100 HC=CX:HR=RX:NP=28:LP=20:M=0
110 CLS
120 PRINT@128,"YOUR":PRINT "SCORE:":PRINT:PRINT SC
130 PRINT@576,"HIGH":PRINT "SCORE:":PRINT:PRINT HS
140 FOR X=1 TO 13
150 IF X>5 AND X<9 THEN PRINT@16+X*64,V$;TAB(45);V$;:G
OTO 170
160 PRINT@16+64*X,B$;
170 NEXT X:PRINT@468,"PRESS ANY KEY TO BEGIN.";
180 PRINT@435,"PADDLE KEYS:";
190 PRINT@561,"B=LEFT  N=RIGHT";
200 GOSUB 1020
210 K$=INKEY$:IF K$="" THEN 210
220 PRINT @468,L$;
230 IF RND(20)>1 THEN 280
240 CH=42:IF M>200 AND RND(10)>5 THEN CH=19
250 XR=RND(12)+1
260 IF XR>5 AND XR<9 THEN 250
270 PRINT@RND(27)+17+XR*64,CHR$(CH);
280 CX=CX+DC:RX=RX+DR
290 PE=PEEK(15360+CX+RX*64)
300 IF PE=43 OR PE=111 THEN SC=SC+20:M=M+1:GOSUB 2000
310 IF PE=42 THEN SC=SC+500:GOSUB 2000
320 IF PE=43 THEN DC=-DC:GOTO 430
330 IF CX>16 AND CX<44 THEN 360
340 DC=-DC:CX=CX+DC
350 PE=PEEK(15360+CX+RX*64)
360 IF RX>0 AND RX<14 AND PE<>179 THEN 430
370 DR=-DR
380 IF RX<1 THEN RX=1:IF NOT FL THEN 540
390 IF RX>13 THEN RX=13:IF FL THEN 540
400 IF PE=179 THEN RX=RX+2*DR:GOTO 430
410 SC=SC+M:GOSUB 2000
420 IF RND(10)>7 THEN GOSUB 1000
430 PRINT@HC+HR*64,S$;
440 PRINT@CX+RX*64,Q$;
450 HC=CX:HR=RX:IF RX=7 THEN 230
460 K$=INKEY$
470 NP=NP+((K$="B")-(K$="N"))*2
480 IF LP=NP THEN 230
490 IF NP<17 THEN NP=17
500 IF NP>41 THEN NP=41
510 PRINT@LP+448,N$;
520 PRINT@NP+448,P$;:LP=NP
530 GOTO 230
540 FOR DE=1 TO 50:PRINT@HC+HR*64,CHR$(RND(3)+32);
550 NEXT DE:PRINT@960,""
560 FOR L=1 TO 16:PRINT:FOR DE=1 TO 5:NEXT DE:NEXT L
570 PRINT "SORRY, YOU MISSED."
580 PRINT:PRINT "YOUR SCORE WAS";SC;"POINTS."
590 IF SC>HS THEN HS=SC:PRINT "A NEW RECORD!"
600 PRINT "THE HIGH SCORE IS";HS;"POINTS."
610 PRINT:PRINT:PRINT "PLEASE SELECT:":PRINT
620 PRINT "<R>EPLAY":PRINT "<Q>UIT":PRINT
630 K$=INKEY$:IF K$="Q" THEN END
640 IF K$="R" THEN 80 ELSE 630
1000 FL=NOT FL:IF FL THEN 1020
1010 PRINT@16,M$;:PRINT@912,H$;:RETURN
1020 PRINT@16,H$;:PRINT@912,M$;:RETURN
2000 PRINT@320,SC;:RETURN
```

PGRAPH!

BY MARK GILMAN

ATARI PLAYER/ MISSILE GRAPHICS MADE EASY

When the Statue of Liberty was a "young lady" in her 20s, she welcomed all four of my grandparents to America. She is 98 now—wind and time have exacted their toll. On July 4, 1984, her famous torch was lowered as part of a major overhaul. The general public will have to wait until July 4 of next year to see the torch raised aloft again. But *you* don't have to wait that long. With your joystick and our demonstration program, *Miss Liberty*, you can set the torch on high well ahead of schedule!

This snazzy special effect is produced with one of the Atari's "players" (referred to as "sprites" on other systems; see Dr. Kursor's Klinic, p. 59) and *PGraph!*, a utility package that makes Atari player/missile graphics easy to use. Player/missile (or "P/M") graphics may be one of the Atari's least understood, but most powerful, features.

Players are graphic objects that are completely independent of everything else on the screen, and "missiles" are narrow players, useful to represent things like bullets. Both can be superimposed on any screen and moved around rapidly without affecting what's displayed underneath. Special sensors detect when they collide with each other or with parts of the background. "Priorities" can be set so that players or missiles seem to move in front of, or behind, other things on the screen. For these reasons, P/M graphics are used heavily by Atari game, graphics, and animation programmers.

Unfortunately, Atari BASIC provides no direct way of using players or missiles. Let's take a closer look at how P/M graphics work.

BIT-MAPPING

A simple way to think of a player is to visualize a grid, such as a narrow strip of graph paper, eight blocks wide by some number of blocks high. By coloring in some of the blocks on this grid and leaving others blank, you can make a picture: a spaceship, a happy face, etc.

If you were to convert each of the blank blocks in the grid to a "0" and each of the colored blocks to a "1," you'd end up with a representation of your picture that could be stored conveniently in computer memory. Each eight-block line of the grid would be converted into eight bits, or one byte. In fact, this method—called bit-mapping—is exactly how the Atari stores the shapes of its players. The block of memory that contains those bytes, one byte for each line of the grid, is called the "player bit map." (Missiles are similar grids that are only two blocks, or bits, wide instead of eight. In the rest of this article, we'll talk only about players.)

The Atari displays a player bit map as a vertical strip eight pixels wide, running from just above the visible top of the screen to below the visible bottom of your display. Each "1" in the bit map appears as a lit pixel; the zeroes are transparent.

The size and shape of a player will be the same regardless of what graphics mode your Atari is in. You can display players one of two ways. When P/M graphics are set to "single-line resolution," each pixel of a player is the height of a TV scan line and looks squat and rectangular. In "double-line resolution," pixels appear squarish. In single-line resolution, the bit map can contain up to 256 bytes; in double-line, only 128.

THE PLAYER TABLE

Player bit maps are stored in a "player table." You have to put the maps into the table in a well-defined way, and store the table in an area of RAM that's "fenced off" from intrusions by BASIC or the operating system. It'll be 2048 or 1024 bytes long, depending on whether you're using single-line or double-line resolution.

PLAYER/MISSILE CONTROL

Once you've set up your player table, you have to "turn on" P/M graphics. Without *PGraph!*, this is done with a series of BASIC POKE statements. You choose the width and color with more POKEs; then you're ready to make the players appear on your screen.

Choosing a player's horizontal position on the screen is simple: You just POKE a number between 0 and 227 inclusive into a special memory location associated with that player. Since you can't later read the value in that location with a BASIC PEEK statement, you'll probably want to use a variable to remember where you've put each player.

The hard part is moving players vertically. The only way to do so is actually to change the grid pattern of the player, shifting parts of the bit map up and down within the player table.

ENTER *PGRAPH!*

With all these details and techniques to master, it's not surprising that many Atari users have trouble with player/missile graphics. That's where our *PGraph!* program comes in. When you've loaded and run *PGraph!*, you'll have most of the player/missile commands that BASIC lacks—in an easy-to-use and consistent form.

PUTTING *PGRAPH!* TO WORK

PGraph! is a BASIC program that reads five machine-language subroutines from BASIC DATA statements and puts them into a section of memory below the area used by BASIC programs. After running *PGraph!*, you can use the USR command in BASIC to perform any of a number of P/M functions. It's as if your BASIC suddenly acquired a set of special player/missile graphics commands!

Here's how to get *PGraph!* up and running on your Atari:

1. Format a new disk, and copy DOS onto it.
2. Type in the *PGraph!* BASIC program and SAVE it onto your disk.
3. RUN the program. *PGraph!* will check itself to make sure you haven't made any typing errors. If you have, correct them, and SAVE the program again before RUNning it.

If everything is OK, *PGraph!* will create a new file called AUTORUN.SYS on your disk that will run whenever you boot that disk. Then, whenever you want to write or use a program that contains *PGraph!* commands, just boot your Atari with this disk to put all the *PGraph!* commands into your machine. Then LOAD and RUN your BASIC programs as usual.

PGRAPH! FUNCTIONS

PGraph! contains routines that let you . . .

- Create a player table and "turn on" P/M graphics.
- Design players on the screen and move them into the player table.
- Control the widths and colors of your players.
- Move players vertically and horizontally.

You access each routine by using a single BASIC statement of the form

A = USR(*address, parameters*)

where *address* is the number that determines which function will be performed and *parameters* is one or more additional numbers (separated by commas) needed by the routine to do its job. We'll cover each of *PGraph!*'s functions in detail; here's a handy summary before we start.

COMMAND FORMAT	FUNCTION
A = USR(8246, *resolution, graphics-mode*)	Set up player table; turn on P/M graphics
A = USR(8710, *player-number, ADR(PLAYERS), LEN(PLAYERS)*)	Load player into table
A = USR(8495, *player-number, width, color-number*)	Set player's color & width
A = USR(8551, *player-number, horizontal-position*)	Move player horizontally
A = USR(8583, *player-number, direction, steps*)	Move player vertically

Set Up a Player Table and "Turn On" P/M Graphics: A = USR(8246, *resolution, graphics-mode*)

This *PGraph!* function fences off an area of memory for a player table, clears it, and turns on the Atari's P/M graphics functions. This command must appear before any other *PGraph!* commands in your program.

Resolution may be 1 (for single-line resolution), 2 (for double-line), or 0 (to "turn off" P/M graphics and restore the area of memory occupied by the player table for use by BASIC programs). Any other value will cause an error.

This command also clears the screen and puts the computer in graphics mode number *graphics-mode*. As with the normal GRAPHICS command in Atari BASIC, adding 16 to mode values 1 through 8 eliminates the four-line text window at the bottom of the screen.

(Note to Atari hackers: This command does not enable the fifth player or the missiles. Players are given priority over the screen background, but this may be changed by POKEing the appropriate value to GPRIOR [location 623].)

Load a Player into the Table: A = USR(8710, *player-number, ADR(PLAYERS), LEN(PLAYERS)*)

This function is used to define how a particular player should look. For *player-number*, use 0, 1, 2, or 3. PLAYERS is a string of 1s and 0s, describing the player. The

most convenient way to define PLAYERS is to use the cursor movement and screen editing keys to "draw" a bit map in DATA statements and then READ these items of data into a string. For example, you can type in the following program fragment and then try changing some of the 1s and 0s until you have the grid pattern you want on the screen.

```
10 DIM T$(8),PLAYER$(112)
20 FOR X=1 TO 14
30 READ T$
40 PLAYER$(X*8-7)=T$
50 NEXT X
1000 DATA 00000010
1010 DATA 00001110
1020 DATA 00111100
1030 DATA 00111100
1040 DATA 00011000
1050 DATA 11111111
1060 DATA 11111111
1070 DATA 01111110
1080 DATA 11111111
1090 DATA 00011000
1100 DATA 00011000
1110 DATA 00011000
1120 DATA 00011000
1130 DATA 00011000
```

Finally, put these lines into your program at the point where you want to put your players into memory. This is the method I used to define the bit map for *Miss Liberty*'s torch.

Note that a PLAYERS must not be longer than the number of *bits* permitted in a player (2048 for single-line resolution, 1024 for double); otherwise, you'll get an error.

(*Note to Atari hackers: If you've already created a player shape using a utility program, you may want to POKE the player data directly into the player table, which starts at location* (PEEK(106)+4)*256).)

Set a Player's Color and Width: A = USR(8495, *player-number, width, color-number*)

This sets the color and width for player number *player-number*, which may range from 0 to 3. *Width* may be 1 (for normal width), 2 (for double width), or 4 (for quadruple width). Any other value will cause an error.

Color-number may range from 0 to 255 and is computed by multiplying the desired hue value (from 0 to 15) by 16 and adding the luminance value (from 0 to 15). Check your manual for a table of what colors these values represent.

Move a Player Horizontally: A = USR(8551, *player-number, horizontal-position*)

This command moves player number *player-number* to horizontal position *horizontal-position*. This number may range from 0 to 227, though values less than 40 or more than 190 may place the player off the edge of your screen.

Move a Player Vertically: A = USR(8583, *player-number, direction, steps*)

This moves player number *player-number* up or down the number of pixels designated by *steps*. *Steps* may range from 0 to 127 or 255, depending on whether you're using double- or single-line resolution. Use the value 0 for *direction* to move the player downward and the value 1 to move upward. Other values will cause an error.

ABOUT ERRORS

Since the USR command communicates with the Atari at a very low level, if you mistype the *address* portion of a USR command (the first number following the parenthesis), unpredictable things will happen. So be *sure* to SAVE any programs that use USR commands before RUNning

them . . . and be especially careful when typing any program lines that contain USR.

If you make an error in the *parameter* portion of a command, you will get a BASIC error message. Here are the meanings of the error numbers produced by *PGraph!*:

ERROR NUMBER	MEANING
172	Wrong number of parameters
173	Value too large
174	Out of memory
175	No player table has been set up
176	PLAYERS is the wrong size

**Atari w/32K RAM, disk drive, and DOS 2.0/
PGraph!**

```
10 DIM CODE$(816)
20 POKE 752,1:PRINT CHR$(125)
30 FOR L=1000 TO 1780 STEP 10
40 POSITION 4,0
50 PRINT "NOW PROCESSING DATA IN LINE ";L;"."
60 READ X:IF X>255 THEN 90
70 CK=CK+X
80 CODE$(LEN(CODE$)+1)=CHR$(X):GOTO 60
90 IF X<>CK THEN 160
100 CK=0:NEXT L
110 PRINT CHR$(125);:OPEN #1,8,0,"D:AUTORUN.SYS"
120 PRINT #1;CODE$;:CLOSE #1
130 POKE 752,0:PRINT "PGraph! IS NOW SAVED ON DISK"
140 PRINT "AS AUTORUN.SYS.":PRINT
150 PRINT "REBOOT TO INSTALL IN MEMORY.":END
160 PRINT CHR$(253);"DATA ERROR IN LINE ";L;".":PRINT
170 PRINT "PLEASE CORRECT THE ERROR, THEN SAVE"
180 PRINT "A NEW COPY OF THIS PROGRAM BEFORE"
190 PRINT "RUNNING IT AGAIN.":POKE 752,0:END
1000 DATA 255,255,0,32,251,32,32,40,32,169,246,1344
1010 DATA 141,231,2,169,34,141,232,2,160,11,169,1292
1020 DATA 0,153,226,34,136,16,250,169,48,133,1165
1030 DATA 93,160,13,162,10,189,43,32,145,88,136,1071
1040 DATA 202,16,247,76,0,160,39,114,97,112,104,1167
1050 DATA 1,0,54,17,14,16,104,201,2,240,3,76,145,873
1060 DATA 34,104,208,7,104,48,4,201,3,48,3,76,149,989
1070 DATA 34,141,228,34,104,240,3,76,149,34,162,1205
1080 DATA 24,104,201,16,144,2,162,8,41,15,142,859
1090 DATA 234,34,141,235,34,173,226,34,240,20,1371
1100 DATA 133,106,32,247,32,169,34,141,47,2,169,1112
1110 DATA 4,141,111,2,169,0,141,29,208,173,228,1206
1120 DATA 34,208,1,96,170,165,106,141,226,34,1181
1130 DATA 202,142,228,34,56,253,241,34,141,227,1558
1140 DATA 34,24,105,4,141,229,34,173,227,34,133,1138
1150 DATA 106,32,254,32,192,1,240,5,169,174,76,1281
1160 DATA 151,34,173,229,34,141,7,212,169,42,1192
1170 DATA 174,228,34,224,1,240,2,169,58,141,47,1318
1180 DATA 2,169,2,141,29,208,169,1,141,111,2,165,1140
1190 DATA 106,133,204,169,0,133,203,166,106,1220
1200 DATA 160,0,169,0,145,203,136,208,251,230,1502
1210 DATA 204,173,226,34,197,204,208,240,169,1655
1220 DATA 0,160,3,153,192,2,153,0,208,153,8,208,1240
1230 DATA 136,16,244,96,169,0,141,236,34,252,1324
1240 DATA 32,247,33,240,6,173,235,34,141,236,1377
1250 DATA 34,169,12,141,162,3,162,96,32,86,228,1125
1260 DATA 169,3,141,162,3,173,234,34,141,170,1230
1270 DATA 3,173,236,34,141,171,3,169,243,141,1314
1280 DATA 164,3,169,34,141,165,3,162,96,32,86,1055
1290 DATA 228,96,32,166,34,104,201,3,240,3,76,1183
1300 DATA 145,34,32,125,34,104,240,3,76,149,34,976
1310 DATA 104,201,1,240,11,201,2,240,7,201,4,240,1452
1320 DATA 3,76,149,34,168,136,152,174,231,34,1157
1330 DATA 157,8,208,104,240,3,76,149,34,104,157,1240
1340 DATA 192,2,96,32,166,34,104,201,2,240,6,76,1151
1350 DATA 145,34,76,149,34,32,125,34,104,208,941
1360 DATA 247,104,201,228,176,242,172,231,34,1635
1370 DATA 153,0,208,96,32,166,34,104,201,3,240,1237
1380 DATA 6,76,145,34,76,149,34,32,125,34,104,815
1390 DATA 208,247,104,240,4,201,1,208,240,141,1594
```

```
1400 DATA 232,34,104,208,234,104,141,233,34,1324
1410 DATA 174,228,34,221,239,34,240,5,144,3,76,1398
1420 DATA 149,34,32,177,34,173,232,34,240,33,1138
1430 DATA 174,233,34,172,234,34,177,203,141,1402
1440 DATA 235,34,136,177,203,200,145,203,136,1469
1450 DATA 136,192,255,208,245,200,173,235,34,1678
1460 DATA 145,203,202,208,227,96,238,234,34,1587
1470 DATA 174,233,34,160,0,177,203,141,235,34,1391
1480 DATA 200,177,203,136,145,203,200,200,204,1668
1490 DATA 248,33,243,34,234,34,208,244,136,173,1587
1500 DATA 235,34,145,203,202,208,227,96,32,166,1548
1510 DATA 34,104,201,3,240,3,76,145,34,32,125,997
1520 DATA 34,104,133,209,104,133,208,104,133,1162
1530 DATA 206,104,133,205,24,101,206,176,7,208,1370
1540 DATA 5,169,176,76,151,34,162,3,102,206,102,1186
1550 DATA 205,202,208,249,174,228,34,240,8,165,1713
1560 DATA 205,240,233,201,129,176,229,169,0,1582
1570 DATA 141,236,34,32,177,34,166,205,160,7,1192
1580 DATA 169,0,141,235,34,177,208,24,201,49,1238
1590 DATA 208,1,56,110,235,34,136,16,242,172,1210
1600 DATA 236,34,173,235,34,145,203,238,236,1534
1610 DATA 34,202,240,13,165,208,24,105,8,133,1132
1620 DATA 208,144,212,230,209,208,208,96,104,1619
1630 DATA 170,104,168,104,208,17,104,201,4,176,1256
1640 DATA 12,141,231,34,152,72,138,72,96,169,1117
1650 DATA 172,208,2,169,173,133,185,162,162,1366
1660 DATA 236,226,168,208,3,76,64,185,76,52,185,1479
1670 DATA 173,226,34,208,5,169,175,76,151,34,1251
1680 DATA 96,173,229,34,133,204,169,0,133,203,1374
1690 DATA 189,239,34,141,234,34,24,189,237,34,1355
1700 DATA 101,204,133,204,172,231,34,208,1,96,1384
1710 DATA 24,165,203,109,234,34,105,1,133,203,1211
1720 DATA 165,204,105,0,133,204,136,208,238,1393
1730 DATA 96,0,0,0,0,0,0,0,0,0,4,2,255,357
1740 DATA 127,16,8,83,244,478
1750 DATA 34,245,34,58,155,0,6,29,6,165,12,744
1760 DATA 141,1,32,165,13,141,2,32,169,0,133,12,841
1770 DATA 169,32,133,13,169,1,133,9,169,0,141,969
1780 DATA 68,2,76,0,32,226,2,227,2,0,6,641
```

MISS LIBERTY

Miss Liberty demonstrates all of *PGraph!*'s functions in a simple, joystick-driven program. Line 40 sets up a player table and turns on player/missile graphics. In lines 110–180, Miss Liberty's torch is defined as player number 0, using a string called PLAYERS assembled from DATA statements in the manner shown above. (Players 1, 2, and 3, for the arm, head, and body, are defined similarly.) The torch is moved onto and around the screen via the move commands, in response to the position of the joystick. Color-control functions are used to light the torch and create a flashing display.

If you want to delve further into player/missile graphics, try the following reference books:

Your Atari Computer, by Lon Poole, Martin McNiff, and Steven Cook (Osborne/McGraw Hill, 1982).

De Re Atari by Chris Crawford *et al* (Atari Press, 1981).

Atari w/32K RAM, disk drive, joystick, DOS 2.0, and *PGraph!/Miss Liberty*

```
10 DIM T$(8),PLAYERS$(320),PLEN(3)
20 DIM HORI(3),VERT(3),WID(3),COL(3)
30 H0=50:LIT=0
39 REM --SET UP PLAYER TABLE AND DO "GRAPHICS 3"--
40 X=USR(8246,2,3)
50 SETCOLOR 0,12,10:SETCOLOR 1,1,10:SETCOLOR 4,8,2
60 POKE 752,1
69 REM --DRAW BASE OF STATUE--
70 COLOR 2:PLOT 14,17:DRAWTO 20,17
80 PLOT 13,18:DRAWTO 21,18:PLOT 12,19:DRAWTO 22,19
89 REM --READ IN PLAYER PARAMETERS AND SHAPES--
90 FOR X=0 TO 3:READ L,H,V,W,C:PLEN(X)=L:HORI(X)=H
```

```
100 VERT(X)=V:WID(X)=W:COL(X)=C:NEXT X
110 FOR PLYR=0 TO 3:PLAYERS$=""
120 FOR Y=1 TO PLEN(PLYR):READ T$
130 PLAYERS$(Y*8-7)=T$:NEXT Y
139 REM --INITIALIZE PLAYERS--
140 X=USR(8710,PLYR,ADR(PLAYERS$),LEN(PLAYERS$))
150 X=USR(8551,PLYR,HORI(PLYR))
160 X=USR(8583,PLYR,1,VERT(PLYR))
170 X=USR(8495,PLYR,WID(PLYR),COL(PLYR))
180 NEXT PLYR
190 PRINT "USE JOYSTICK TO POSITION TORCH."
200 PRINT "USE FIRE BUTTON TO LIGHT TORCH."
209 REM --MOVE TORCH AS JOYSTICK MOVES--
210 S=STICK(0)
220 IF S=13 OR S=14 THEN X=USR(8583,0,(S=13),1)
230 H0=H0-(S=11)+((S=7)*2)
240 IF H0<40 THEN H0=227
250 IF H0>227 THEN H0=40
260 X=USR(8551,0,H0)
270 IF STRIG(0)=0 THEN LIT= NOT LIT:X=USR(8495,0,1,46-
(LIT*23))
280 GOTO 210
290 END
999 REM --TORCH--
1000 DATA 14,58,50,1,23
1009 REM --ARM--
1010 DATA 26,100,26,1,202
1019 REM --HEAD--
1020 DATA 15,104,32,2,204
1029 REM --BODY--
1030 DATA 40,108,44,4,200
1999 REM --PLAYER$ FOR TORCH--
2000 DATA 00000010
2010 DATA 00001110
2020 DATA 00111100
2030 DATA 00111100
2040 DATA 00011000
2050 DATA 11111111
2060 DATA 11111111
2070 DATA 01111110
2080 DATA 11111111
2090 DATA 00011000
2100 DATA 00011000
2110 DATA 00011000
2120 DATA 00011000
2130 DATA 00011000
2999 REM --PLAYER$ FOR ARM, HEAD, AND BODY--
3000 DATA 11000000,10010000,11110000,01110000,01110000
3010 DATA 01110000,01110000,01110000,01110000,01110000
3020 DATA 01110000,01111000,01111000,01111000,01111100
3030 DATA 00111100,00111100,00011110,00011110,00011110
3040 DATA 00001111,00001111,00001111,00000111,00000011
3050 DATA 00000001,01010101,01010101,00101010,00111110
3060 DATA 01001001,01101011,01111111,01111111,00111111
3070 DATA 00110111,00011101,00011101,00000001,00000001
3080 DATA 00000001,11000000,11100000,11100000,11111000
3090 DATA 11111000,11111000,11111000,11111000,11111000
3100 DATA 11111000,11111110,11111110,11111110,11111110
3110 DATA 11111100,11111100,11111100,11111100,11111100
3120 DATA 11111100,11111100,11111100,11111100,11111000
3130 DATA 11111000,11111000,11111000,11111000,11111000
3140 DATA 11111000,11111000,11111000,11111000,11111000
3150 DATA 11111000,11111000,11111000,11111000,11111000
3160 DATA 11111000
```

K-POWER

Edited by Anne Krueger

FOR THE COMPUTER GENERATION
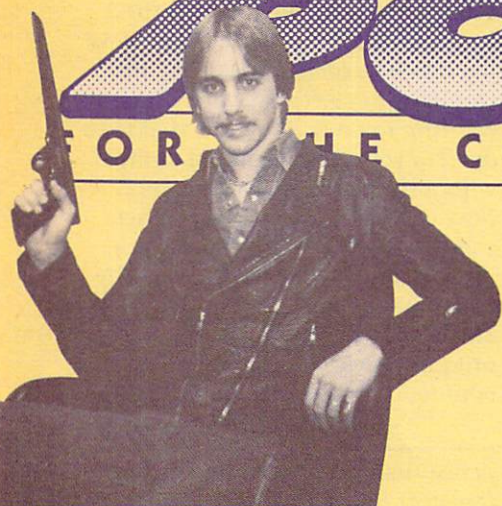
Designer Lord British Stalks The 'Ultimate' Ultima

K-POWER *reporters Steven Horowitz, 18, and brother Daniel, 16, discovered that visiting the Origin Systems office in Manchester, New Hampshire, was risky business. Midway during an interview with 23-year-old Lord British (alias Richard Garriott—the creator of the Ultima series), rubber bands began pinging and careening around the room! It's an Origin Systems tradition: At 5 p.m. each day the entire staff pulls out their "rubaser" guns ($75 graphite-and-steel rubberband shooters) and declare "rubaser" war. It's a free-for-all! To make sure he's never short of ammunition, the crafty Lord British owns four of the guns.*

Steven and Daniel were surprised that the prolific Lord British was so young, and that the blue-jeaned, leather-jacketed designer looked more like a punk rock star than a Lord. During their interview they found out how Lord British got his name, and they got the scoop on new Origin Systems games: Ultima IV, AUTODUEL, Moebius I, *and* Ogre. *Read on!*

K-POWER: How did you get the name Lord British?

LORD B.: I was born in Cambridge, England, but my "title" was the brainchild of my sophomore-year roommates at the University of Oklahoma. When I met them for the first time, I said "Hello." They looked at me like I was crazy and one of them said "Hello!? Nobody around here says 'Hello'! You must be from England . . . We'll call you 'British.'" The name stuck and I decided to use Lord British as my professional name.

K-POWER: How is *Ultima IV* different from *Ultima III*?

LORD B.: *Ultima IV* is an involving game which is much more user-friendly than the other *Ultima*s. It's easier to get into the game and your information choices can be seen on the screen, so you don't have to use the fact sheet. *Ultima III* takes two or three months of part-time play to finish. *Ultima IV* will take about four times longer to play, and the map is exactly 16 times the size of the others. It's divided into eight quest groups, and each group is almost equal in size to an entire *Ultima III* game.

Ultima IV is also very different in *feeling* from the other *Ultima*s. I got a lot of mail after *Ultima III* became a hit, and I suddenly realized that I was having a real impact on the people who played my games. I didn't want this to be a negative impact, making them think the bad guys always win. In the previous *Ultima*s, there was always one big bad guy to defeat; in *Ultima IV* you aren't up against an evil force—it's a personal conquest.

K-POWER: How many *Ultima*s do you see in your future?

LORD B.: That's hard to say. I'm still striving for the "ultimate" *Ultima*. I learn more each time I write one, but I'm still in the "scrap it all and start over" phase. I won't be happy until I've learned how to cram as much as possible into the system. (*Lord British designs on an Apple computer.*) I'd like to create an internal data structure which would let me change scenarios, instead of having to write a new *Ultima* each time.

K-POWER: Besides the *Ultima*s, do you plan to publish any other games?

LORD B.: Origin Systems is about to release three games which are completely different from *Ultima*. *AUTODUEL* is one of them. It's an action/strategy game where you build your own battle car and take it out on different missions. There's a lot of strategy in *AUTODUEL* because you

Software Scoop!

Have you heard . . . that designer **Tom Snyder** of *Agent USA* and *Trains* fame is working on a new simulation game? K-POWER's heard it's a **sailing simulation**, of all things . . . . Through the grapevine comes big news from **First Star Software** . . . a sequel to the much-loved *Spy vs. Spy* is in the works! Also from First Star . . . look for C 64 and Apple games based on DC Comics' **Wonder Woman**, **Superman**, and **Darkseid**. First Star just got the rights, so the games won't be out until Christmas . . . We can't wait!

have to choose the right combination of tires, body style, weapons, etc. in order to build a winning machine.

Moebius is another new game. It's a fantasy/role-playing game that includes segments of martial-arts combat. We've used some unusual graphics to make the game seem more realistic. A Kung-Fu expert and a Japanese sword fighter were photodigitized in real combat positions. The images are so large that sometimes they fill up more than half the screen. We're also doing a futuristic strategy game called *Ogre*.

K-POWER: When did you begin to turn your computer ideas into dollars?

LORD B.: After I finished high school I got a job in a computer store. I also had just written my first adventure game, *Akalabeth: World of Doom*,

after 28 smaller games on my school's computer. The store sold Apple computers so I used them to add neat graphics to *Akalabeth*. The owner of the store saw my game, liked it, and convinced me to try to sell it. I invested $200 of my hard-earned money to publish *Akalabeth* myself. Not long after that, a company in California called and wanted to take over the publishing. I liked the idea and sold the rights to them.

K-POWER: How do your parents feel about your computer career?

LORD B.: At first they weren't very happy. I was the only college dropout in a family that's very education oriented. I have a brother who's a doctor and another who has multiple college degrees. My mother is an artist and my dad is an astronaut who went on a two-month mission aboard the Skylab II. Before he be-

came an astronaut, he was a professor at Stanford University in California. Naturally they were very much against my decision to quit school, but they've learned to accept it.

K-POWER: Do you have any advice for kids who want to make a career out of game design?

LORD B.: When I got started, the computer field was wide-open. Now it's much harder to break in, and you have to be very serious about wanting to do it. The first step is to develop your programming ability with lots of hands-on experience. Next comes creative ability. When you think you're ready, look for a project that you'll enjoy doing. The idea must be visually dynamic, state-of-the-art, have audio, and be very unique. It has to be a combination of animation, action, and fantasy.
—DANIEL AND STEVEN HOROWITZ

The Special Ks: We are *not* a cereal!

You've read their strategy tips, you've run their programs, you may even have spoken with them on the phone . . . but who *are* these Special Ks?! In a rare and candid interview, the Special Ks reveal their mysterious identity. Better known to their family and friends as David Langendoen, 16; Damon Osgood, 17; and Alex Shakar, 17; the Special Ks give K-POWER mini-magazine editor Anne Krueger a hand in getting things together every month.

All three hail from Brooklyn, New York and attend Stuyvesant High School, a math- and science-oriented public school for New York City's brightest. "We are the personification of the computer generation—we eat, sleep, and talk computers!" Damon says. "Well, actually, most hackers at school are pretty nerdy except us; we're just average guys. Our best asset is our incredible modesty," he points out.

The Special Ks, of course, took programming courses in school: Pascal last semester and BASIC before that. Alex and Damon have Commodore 64s at home and David has access to both an Atari 800XL and an Apple IIe.

Stuyvesant is tough, but the Special Ks still found time to put in about 15 to 20 hours a week at the magazine. That was *before* they were hired! They hung around so much that the staff had to give them some-

Meet the mysterious Special Ks (left to right): Alex Shakar, 17; Damon Osgood, 17; and David Langendoen, 16.

thing useful to do to get them out of its hair. Their responsibilities now include writing and editing the Strategy and Hint Hotline sections, supervising the photography of screen shots, devising and helping judge many of the K-POWER contests, and some general clerical tasks (including opening all of your reader mail). K-BASE (K-POWER's computer pen pal network) is a particular favorite with the guys. "We're holding in our hands the destiny of hundreds of kids! We may even be setting up some successful marriages!" jests David.

When asked why they like working for K-POWER, Alex confesses, "The deli across the street has the best potato chips." David likes to see his name in print, and Damon admits that "working for a magazine impresses the girls." It must be mere coinci-

dence that all three have a strong interest in computing and publishing.

When pressed, David will admit he has aspirations of building a publishing empire, whereas Alex has less ambitious dreams of becoming a successful writer. Damon would like to find his niche in the world writing software.

When these guys aren't playing computer games (their favorites right now are the *Wizardry* series, *Karateka*, *Lode Runner*, and almost any Electronic Arts game), they're playing music. "Our favorite music is computer-generated," David says. "Depèche-Mode, Howard Jones, and Kraftwerk are a few favorites." Damon and Alex are pretty good musicians. Damon plays the trumpet and Alex plays the bassoon in the school band. The most talented of the three is David: He plays the stereo.

Yes, the Special Ks are great kidders, but there is one part about their job that they find most distressing—their name! None of them likes it. One day, while joking around, Alex penciled in "Special Ks" on the name plate over their desk in the office. Somehow the name caught on, and they got stuck with it. "Until now," pipes in Alex. "Anybody who has any suggestions, please write. The winner and *her* two friends could win a date with us. But seriously, folks, we do need a new name. Enter the Rename the Special Ks contest (page 64), and you could win $25!" —SUZETTE HARVEY

DOCTOR KURSOR'S KLINIC

CRACKLE!

SNAP!

POP!

©SAM VIVIANO 1985

What is a sprite?

DR. KURSOR: Hmmm . . . "scribble" . . . "southern corn rootworm" . . . "splotch" . . . ah, here it is. Gasp! "Sprite. n. (from *spirit*) A ghost, elf, or fairy." Is my computer haunted?

Actually, there's nothing supernatural about computer sprites—though it seems like they do have magical powers! They're little characters that have been programmed to glide around on your screen. In fact, in a fast-action arcade game, it's usually sprites that enable objects to whiz around.

The special hardware built into computers with sprites (ADAM, Atari, Commodore 64 and 128, and TI-99/4A) lets them move independently of anything else being displayed. Clear the screen? That won't stop sprites! Switch to text mode? They'll dance right through the words on your screen until your program stops them.

You can create your own sprites using machine language or a series of POKES. Special sprite commands are built into TI Extended BASIC and the new Commodore 128.

First you design what you want the sprite to look like. (You can do this on paper or use a special program called a "sprite editor.")

Then you choose its color, size, position on the screen, and whether it should go over or under other objects. Some micros also let you set the direction and speed of a sprite's motion.

Commodore and TI manuals have the details. And there's lots more about the Atari's sprites
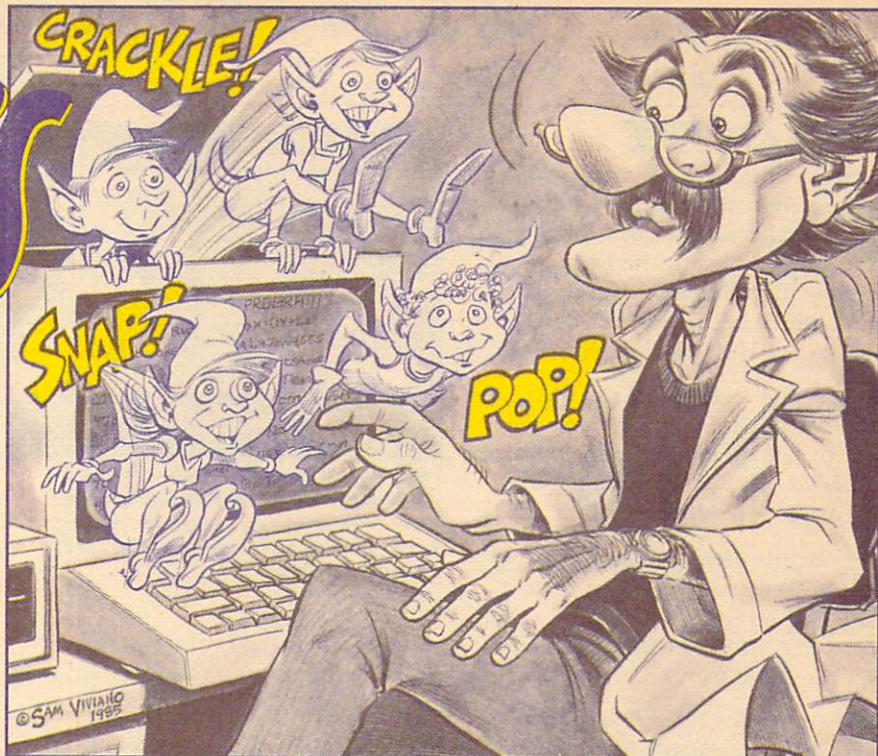
(called "players" and "missiles") in The Programmer this month (page 53).

Although info about the ADAM's sprites is hard to come by, both ADAMs and Apples have less-powerful animation aids called "hi-res shapes," which are written up in their BASIC manuals.

Doing animation on other computers can be *agonizing* by comparison. Without the sprite hardware to do most of the work for you, you have to "draw" objects onto a bit-mapped screen yourself.

What is a bit-mapped computer?

DR. KURSOR: When your computer PRINTS or PLOTS something on the screen, what it actually does is store numbers in a special block of memory called "screen RAM." Many times each second, the contents of screen RAM are translated into patterns of dots, which are then turned into a video signal that goes to your TV or monitor.

The way stuff is stored in screen RAM, and the way it's turned into pictures, depends on how your computer was designed. On most inexpensive computers, text is stored and translated one way, and various graphics modes in other ways, all of which are incompati-

ble. This makes it difficult or impossible to mix them on the same screen but saves memory and microprocessor time.

Computers with lots of screen memory and more powerful processors (the Macintosh is a good example) store all graphics and text in a uniform way called *bit-mapping* (thus the expression "bit-mapped computer"). Each dot (pixel) on a bit-mapped screen is represented in screen RAM by a single bit, which may be set to 0 or 1. When the bit is set to 1, the corresponding pixel is turned on; when it's set to 0, the pixel is turned off. Mathematicians call this one-bit-to-one-pixel relationship a "mapping" or "map."

Less-expensive computers often have a bit-mapped graphics mode like this but can't "draw" text letters on that screen automatically for you.

Need an answer to a hi-tech question?

Send your questions to Dr. Kursor's Klinic, c/o K-POWER, 730 Broadway, New York, NY 10003.
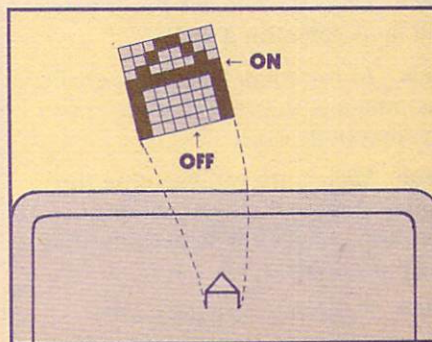
STRATEGY

FIELD OF FIRE

Strategic Simulations. Tactical/role-playing. Your mission: To lead Easy Company through a series of battles, from North Africa to the Rhine river. You may play single battles or play a campaign game using your own characters. (Hints for Atari, C 64.)

🔑 Never lead an attack with a tank unless you're absolutely sure there are *no* enemy tanks or bazookas about. They have a knack for destroying you with one shot.

🔑 Before assaulting an enemy position (except a tank), it's a good idea to soften the unit up a bit. Quite often you'll lose if you try to assault a fresh unit.

🔑 In the scenario "Night of St. Anne," a good strategy is to concentrate the bulk of your forces in the town proper. Keep a tank and couple

FIRE ORDER PHASE 1

SGT. SPROCK
READY FOR ORDERS

TIME T-PLUS 00:08

Work your way up the Roeher river and attempt to find the best crossing point. Make sure you keep firing your mortar, even at empty squares—you might shake out some enemies.

of infantry at the bottom of the screen to mop up any units trying to break through.

🔑 In the "Ardennes Dawn" scenario, place your AT (Antitank) guns and tanks on the hilltops and have

them target on the enemy tanks. Don't change the fire orders until some of the tanks are destroyed. In this way you prevent them from moving and weaken them considerably.

🔑 In the "Roeher Crossing" scenario, unless you can move extremely fast, it's best to send your troops to the small bridge at the top of the screen. Otherwise you're probably going to lose time and men when the other bridges explode just as you reach them.

🔑 Keep an eye on the number of men in each unit, and if it gets down to one or two men, have your unit retreat if at all possible (except in scenarios such as "Forever Road," where you *must* keep advancing) or you'll lose a lot of victory points when your unit gets destroyed. —DAVID LANGENDOEN, 16, *Brooklyn, New York*

MASK OF THE SUN

Broderbund. Graphic adventure. Your mission: To find the mystical Mask of the Sun in order to cure your fatal disease. (Hints and game for Apple, Atari, C 64.)

Ah... It feels good to stretch the legs.
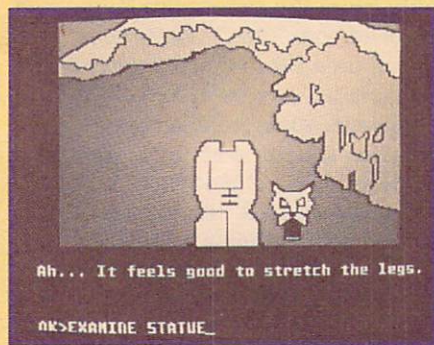
AK>EXAMINE STATUE_

Examine the statue here or else you'll miss something vitally important to solving the game.

🔑 Don't go into the pit or you will miss something vital.

🔑 In the room filled with green gas, make sure you try going in every direction.

🔑 Make sure you examine the jaguar statue when you get out of the Jeep. You'll find something that you'll need later.

🔑 Fight the skeletons with something as ancient as they are.

🔑 Don't settle for an alternative; what is in the altar will alter your appearance.

🔑 After getting past the gas room, make sure you save the game, because you might die crossing the lava pit.

🔑 If you can't answer the idol's first riddle, don't worry. Just stumble around in the dark for awhile. We'd like to disclose the answer to

the second riddle, but that's a topic too hot to handle.

🔑 Ignore anybody at the side of the road. None of them will help you at all.

🔑 To complete the game, remember what the old woman said to you. —JEFF CHAPMAN, 13, *Melbourne, Florida;* JASON ANDERSON, 15, *Redondo Beach, California;* GREG OBERFIELD, 14, *Princeton, New Jersey*

Alpha Attack Nabs Third Prize!

In our March issue we announced the long-awaited winners of K-POW-ER's Game-Design Contest. As we said then, the job of choosing three winning games from the thousands that piled into the K-POWER office was really tough. So many of the game entries were outstanding—it boggled our minds!

Unfortunately, we made a mistake when we announced the third-place winner. The third prize ($100 in software) should have gone to Bhargav Upender, 17, of Niantic, Connecticut. Bhargav submitted a great Atari game called *Alpha Attack*. We extend him our sincerest congratulations! And we'd like to thank the

many eagle-eyed readers who pointed out our third-place judging mistake.

XXXXXX ALPHA ATTACK!! XXXXXX

SCORE!
000120

HIGH
000000

WAVE
1

Letter
Pressed

R
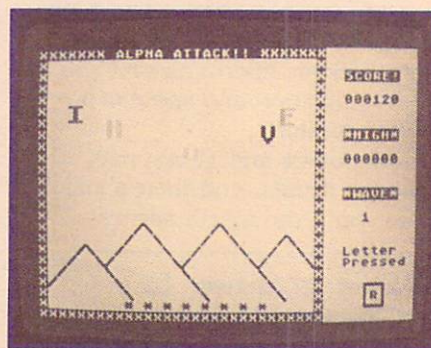
Third place in K-POWER's Game-Design Contest goes to *Alpha Attack*, an Atari game created by Bhargav Upender.

SPACE TAXI, Muse Software (Apple, C 64). Arcade/skill. Your mission: To carry people to and from the various hot-spots in your 23rd-century metropolis.

🔑 In the beginning of your game (or whenever you're out of money), keep running people down until you get a big tip on your tip-meter.

🔑 Never get gas when you have a passenger in your cab, or you'll lose the tip. Get gas before you pick someone up.

🔑 Don't buy more gas than you think you'll need to clear the screen.

🔑 In the "Interference" level, have your landing gear down while passing through the interference. This way you'll be able to maintain your horizontal position.

🔑 In the "Puzzler" level, if there appears to be no way to solve it, landing on a pad may open doors for you. —SPECIAL Ks
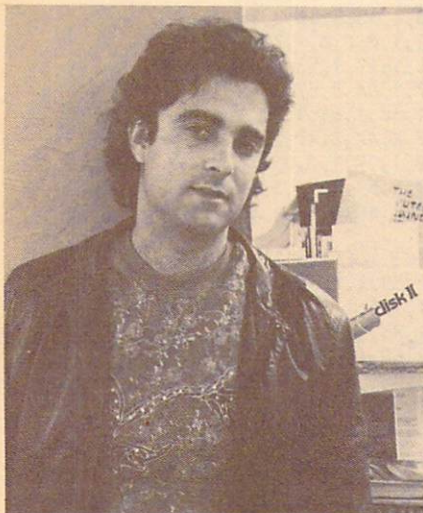
Russell Lieblich stopped by the K-POWER office to drop some hints.

MASTERS OF THE LAMP, Activision (C 64). Arcade/skill. Your mission: To lure three Genies back into their lamps and return to your throne.

🔑 When traveling through the tunnel, ignore the closer diamonds and concentrate on flying toward the most distant one.

🔑 Keep a light touch on the joystick when flying. If you make one radical turn, it becomes incredibly difficult to retain control. —RUSSELL LIEBLICH, *32, codesigner of* Masters of the Lamp

WEB DIMENSION, Activision (C 64). Arcade/skill. Your mission: To paralyze dastardly denizens of the light-web, and hear all the music.

🔑 Watch enemies' patterns before moving, and plant yourself in the best position to stop them.

🔑 On the color-trail screens, work from the perimeter inward, so as not to retrace your steps.

🔑 Tap the joystick lightly, and let go. This will move you to the next node without overstepping it. —RUSSELL LIEBLICH, *designer and programmer of* Web Dimension

GALACTIC ADVENTURES, Strategic Simulations (Apple, Atari). Role-playing adventure. Your mission: To hire a team and go off exploring in an effort to gain the title of Independent Adventurer.

🔑 When you defeat a group of Gorsai, extend an offer to "J"oin command, and if your leadership allows, add one or more Gorsai. Not only do Gorsai have nonweapon skills (unlike other special species) but they won't betray you in *Galactic Adventures* as they do in *Galactic Gladiators*. —DAVID LANGENDOEN, *16, Brooklyn, New York*

ALI BABA AND THE 40 THIEVES, Quality Software (Apple, Atari). Role-playing adventure. Your mission: In addition to collecting treasure and fighting monsters, you must find and rescue the Princess Buddir.

🔑 To prevent the magic water chests (such as the one in the Aquarius room) from drying up, press the RESET key immediately whenever the message that tells you it's dried up is displayed. You'll return to the title screen. Start a new game then, and you'll continue where you left off and the chest will still be there. —GEORGE KING, *13, and* IVANS CHOU, *12, Alhambra, California*

ALPINER, Triton Products (TI-99/4A). Arcade/skill. Your mission: To climb the highest mountains in the world while avoiding various obstacles.

🔑 If you are cornered by an obstacle (excluding trees) and a landslide is coming, touch the obstacle. This way you'll lose only ground and points rather than your life.

🔑 At the beginning of each board, move your alpiner to the far right of the screen to avoid the skunk. —JAMES MANCE JR., *14, Accord, New York*

General hint for TI games:

🔑 Typing SHIFT 838 gives you access to a test mode which lets you select various game parameters. It works for *Munch Man, Alpiner, Chisolm Trail,* and possibly others. —ROBBIE WAYNE, *14, Louisville, Kentucky;* MICKEY BRYANT, *Butler, Alabama;* DAVID WHITLOCK, *13, Houston, Texas*

CASTLE WOLFENSTEIN, Muse Software (Apple, Atari, C 64, IBM PC/PCjr). Arcade adventure. Your mission: To escape from a German POW prison with the secret plans.

🔑 Here is a list of directions that will get you out of any castle: Up stairs, up, up, right, up stairs, down, left, left, up, left, down, down, right, right, right, down, down, left, up stairs, up, right, right, down, right, up, up, left, left, left, up, right, up stairs, down, down, right, up, up, right, down, down, right, and you're out. Although you may have to search around for the plans, you can always get yourself back on the right track. —VERNON VESEY III, *14, Oakdale, Connecticut*

We're looking for a few good hints! Help K-POWER readers be all that they can be by sending us hints for your favorite games. We have all the *Zork* and *Pac-Man* hints we can handle, but we'll be glad to publish and pay $10 for hints we've not heard of. Send them to Hint Hotline, c/o K-POWER, 730 Broadway, New York, NY 10003. (Note: the computer systems listed in brackets indicate the computer versions the hints work for.)

MICROTONES

MUSIC PROGRAMS
BY JOEY LATIMER

The last time I saw Kenny Lee Lewis and Gary Mallaber was at a 24-track recording studio. I was called in to engineer the overdubs of a record they were producing. The first thing I knew, Kenny and Gary had me hooking up almost every computerized-effects unit in the place! It became clear to me then that these veteran musicians were also members of the computer generation.

When K-POWER Editor Anne Krueger came to me recently and asked if I knew any pop songwriters who might write a song for K-POWER, I thought of these guys. They swiftly went into action and composed our Microtones feature this month, called *The Curly Calypso*. Says co-writer Kenny: "We just did it and it came out sounding like a combination calypso band . . . along with Curly of the *Three Stooges*!"

HACKER NOTES: *The Curly Calypso* was composed by Kenny and Gary using a synthesizer sequencer. Technical Editor John Jainschigg translated the song into Atari note tables by looking at a lead sheet provided by Kenny and Gary (a lead sheet shows a musical staff with notes on it), and by listening to a tape of the original sequenced version. Arrays, or strings, were added to store the notes, and note drivers to play them. The result is a very interesting song in 6/4 time. Would Curly like it? "Nuk, nuk, nuk. Why, certainly!"

ATARI/ THE CURLY CALYPSO

```
10 DIM A$(122),B$(144),C$(288),D$(416),E$(86)
20 POKE 752,1:PRINT CHR$(125);"TUNING UP ... PLEASE WA
IT."
30 FOR I=203 TO 209:POKE I,0:NEXT I
40 SOUND 0,0,10,10:SOUND 1,0,10,10:SOUND 2,0,10,10
50 FOR I=1536 TO 1622:READ A:POKE I,A:NEXT I:A=USR(153
6)
```

```
60 FOR I=1 TO 122:READ A:A$(LEN(A$)+1)=CHR$(A):NEXT I
70 FOR I=1 TO 144:READ A:B$(LEN(B$)+1)=CHR$(A):NEXT I
80 FOR I=1 TO 22:READ A:E$(LEN(E$)+1)=CHR$(A):NEXT I:E
$(23)=E$(3,22)
90 E$(43)=CHR$(0):E$(44)=CHR$(48)
100 E$(45)=E$(3,22):E$(65)=E$(3,22)
110 E$(85)=CHR$(0):E$(86)=CHR$(104)
120 FOR I=1 TO 12:READ A,B:C$(LEN(C$)+1)=A$(A,B):NEXT
I
130 FOR I=1 TO 12:READ A,B:D$(LEN(D$)+1)=B$(A,B):NEXT
I
140 PRINT CHR$(125):POSITION 11,10:PRINT "-THE CURLY C
ALYPSO-"
150 POSITION 13,11:PRINT "BY KENNY LEWIS":POSITION 12,
12:PRINT "AND GARY MALLABER"
160 P1=-1:P2=-1:P3=-1:T1=0:T2=0:T3=0
170 IF T1=0 THEN P1=P1+2:POKE 203,ASC(C$(P1)):T1=ASC(C
$(P1+1))*5
180 IF T2=0 THEN P2=P2+2:POKE 204,ASC(D$(P2)):T2=ASC(D
$(P2+1))*5
190 IF T3=0 THEN P3=P3+2:POKE 205,ASC(E$(P3)):T3=ASC(E
$(P3+1))*5
200 T1=T1-1:T2=T2-1:T3=T3-1
210 IF P1=287 AND T1=0 THEN 160
220 GOTO 170
999 REM --MACHINE LANGUAGE FOR VIBRATO EFFECT--
1000 DATA 104,162,6,160,11,169,6,32,92,228
1010 DATA 96,216,198,208,16,10,169,3,133,208
1020 DATA 165,207,73,255,133,207,160,6,162,3
1030 DATA 181,203,208,7,189,87,6,240,40,208
1040 DATA 14,157,87,6,72,169,0,149,203,169
1050 DATA 175,157,91,6,104,24,101,207,153,0
1060 DATA 210,222,91,6,189,91,6,153,1,210
1070 DATA 201,160,208,5,169,0,157,87,6,136
1080 DATA 136,202,16,202,76,95,228
1999 REM --NOTES, DURATION, AND PHRASING DATA--
2000 DATA 60,2,57,1,53,3,50,1,47,3
2010 DATA 45,2,47,2,50,1,53,3,57,1
2020 DATA 60,1,0,8,0,2,37,1,42,1
2030 DATA 47,2,50,2,53,2,50,2,53,2
2040 DATA 50,1,42,1,0,8,0,1,76,1
2050 DATA 72,1,64,1,57,1,53,2,47,2
2060 DATA 53,2,57,1,64,2,57,1,64,1
2070 DATA 0,8,0,1,68,1,64,1,57,1
2080 DATA 50,1,47,2,42,2,47,2,50,1
2090 DATA 57,2,50,1,57,1,0,8,68,2
2100 DATA 64,1,60,3,57,1,53,3,50,2
2110 DATA 53,2,57,1,60,3,64,1,68,1
2120 DATA 0,8
3000 DATA 173,2,162,1,153,3,144,3,136
3010 DATA 3,173,1,85,1,136,2,144,1,153
3020 DATA 3,162,1,173,1,0,1,173,1,85
3030 DATA 1,173,1,85,1,173,1,173,1,173
3040 DATA 1,128,2,64,1,128,1,50,2,128
3050 DATA 1,42,3,50,1,64,1,173,2,68
3060 DATA 1,173,1,57,2,173,1,42,3,57
3070 DATA 1,68,1,144,2,72,1,144,1,57
3080 DATA 2,144,1,47,3,57,1,72,1,195
3090 DATA 2,76,1,195,1,64,2,195,1,47
3100 DATA 3,64,1,76,1,195,2,182,1,173
3110 DATA 3,162,1,153,3,195,1,96,1,153
3120 DATA 2,162,1,173,3,182,1,195,1,0
3130 DATA 1,195,1,96,1,195,1,96,1,193
3140 DATA 1,193,1,193,1
4000 DATA 0,56,0,2,50,1,57,1,50,2,0,4,64,2
4010 DATA 68,2,57,1,43,1,0,8
5000 DATA 1,24,1,24,25,46,25,46,47,72,47
5010 DATA 72,25,46,25,46,47,72,73,98,99
5020 DATA 122,99,122
6000 DATA 1,40,1,40,41,72,41,72,73,104
6010 DATA 73,104,41,72,41,72,73,104,41,72
6020 DATA 105,144,105,144
```

COMMODORE 64/THE CURLY CALYPSO

```
10 DIM A(183),B(216),C(435),D(627),E(135)
20 PRINT CHR$(147);"TUNING UP ... PLEASE WAIT."
30 S=54272:W1=S+4:W2=S+11:W3=S+18
40 FOR I=S TO S+24:POKE I,0:NEXT I
50 POKE S+5,31:POKE S+6,133:POKE S+12,31:POKE S+13,133
60 POKE S+19,31:POKE S+20,133:POKE S+24,15
70 FOR I=1 TO 183:READ A(I):NEXT I
80 FOR I=1 TO 216:READ B(I):NEXT I
90 FOR I=1 TO 33:READ E(I):NEXT I:FOR P=4 TO 33:E(P+30
)=E(P):NEXT P
100 E(64)=0:E(65)=0:E(66)=48:FOR P=4 TO 33:E(P+63)=E(P
):NEXT P
110 FOR P=4 TO 33:E(P+93)=E(P):NEXT P:E(127)=0:E(128)=
0:E(129)=104
120 X=1:FOR I=1 TO 12:READ A,B:FOR P=A TO B:C(X)=A(P):
X=X+1:NEXT P,I
130 X=1:FOR I=1 TO 12:READ A,B:FOR P=A TO B:D(X)=B(P):
X=X+1:NEXT P,I
140 POKE 53281,0:PRINT CHR$(147)
150 POKE 214,10:PRINT:POKE 211,10:PRINT "-THE CURLY CA
LYPSO-"
160 PRINT:PRINT TAB(4);"BY KENNY LEWIS AND GARY MALLAB
ER"
170 P1=-2:P2=-2:P3=-2:T1=0:T2=0:T3=0
180 IF T1=0 THEN P1=P1+3:POKE W1,33:POKE S+1,C(P1):POK
E S+0,C(P1+1):T1=C(P1+2)
190 IF T2=0 THEN P2=P2+3:POKE W2,33:POKE S+8,D(P2):POK
E S+7,D(P2+1):T2=D(P2+2)
200 IF T3=0 THEN P3=P3+3:POKE W3,33:POKE S+15,E(P3):PO
KE S+14,E(P3+1):T3=E(P3+2)
210 T1=T1-1:T2=T2-1:T3=T3-1:POKE W1,32:POKE W2,32:POKE
W3,32
220 FOR T=1 TO 35:NEXT T
230 IF P1=430 AND T1=0 THEN 170
240 GOTO 180
1000 DATA 33,135,2,35,134,1,37,162,3,39,223,1,42,62,3
1010 DATA 44,193,2,42,62,2,39,223,1,37,162,3,35,134,1
1020 DATA 33,135,1,0,0,8,0,0,2,53,57,1,47,107,1,42,62
1030 DATA 2,39,223,2,37,162,2,39,223,2,37,162,2,39,223
1040 DATA 1,47,107,1,0,0,8,0,0,1,26,156,1,28,49,1,31
1050 DATA 165,1,35,134,1,37,162,2,42,62,2,37,162,2,35
1060 DATA 134,1,31,165,2,35,134,1,31,165,1,0,0,8,0,0
1070 DATA 1,29,223,1,31,165,1,35,134,1,39,223,1,42,62
1080 DATA 2,27,107,2,42,62,2,39,223,1,35,134,2,39,223
1090 DATA 1,35,134,1,0,0,8,29,223,2,31,165,1,33,135,3
1100 DATA 35,134,1,37,12,3,39,23,2,37,162,2,35,134,1
1110 DATA 33,135,3,31,165,1,29,223,1,0,0,8
2000 DATA 11,218,2,12,143,1,13,78,3,14,24,1,14,239,3
2010 DATA 11,218,1,23,181,1,14,239,2,14,24,1,13,78,3
2020 DATA 12,143,1,11,218,1,0,0,1,11,218,1,23,181,1,11
2030 DATA 218,1,23,181,1,11,218,1,11,218,1,11,218,1
2040 DATA 15,210,2,31,165,1,15,210,1,39,223,2,15,210
2050 DATA 1,47,107,3,39,223,1,31,165,1,11,218,2,29
2060 DATA 223,1,11,218,1,35,134,2,11,218,1,47,107,3
2070 DATA 35,134,1,29,223,1,14,24,2,28,49,1,14,24,1
```

MICRONOTES

This month's Microtones programs are based on a song written exclusively for K-POWER by **Steve Miller Band** members **Kenny Lee Lewis** and **Gary Mallaber**! The song, "**The Curly Calypso**," was created "on a keypad system that comprises a Roland MSQ-700 Digital Sequencer, two Yamaha DX-7 synthesizers, and one Oberheim Expander Module," explains Kenny, who's played guitar or bass with stars **Eddie Money**, **Billy Preston**, and **Melissa Manchester**.

Their association with K-POWER isn't Kenny and Gary's first step into the computer world. Band leader **Steve Miller** introduced them to computers. Steve uses an **Apple Lisa 2** for entering lyrics, planning tours, and doing record budgeting; and a **Compaq** computer on stage. "We use [the Compaq] on tour [to keep track of] stage positions, harmony parts, lights, instrument arrangements, sequence of songs," Kenny says. "It's an itinerary that's typed on stage as we rehearse it, like writing a script."

Steve Miller Band members Kenny Lee Lewis and Gary Mallaber took time out from rock 'n' rollin' to write "The Curly Calypso" for K-POWER.

Computers played a large role in the production of the latest Steve Miller album, **Italian Xrays**. Kenny explains, "Almost all of the overdubs, voices, guitar leads, etc. were done on a Synclavier 2 computer-controlled sampling FM synthesizer."

Gary (the Steve Miller Band drummer who also has recorded or toured with **Van Morrison**, **Peter Frampton**, **Jackson Browne**, **Barbra Streisand**, **Pablo Cruise**, and **Joe Walsh**) recently joined Kenny to form a new band, **Robby YuBop**, along with another Steve Miller regular, **John Massaro**. They expect to release their first album and some videos this fall, and think a computer would be useful in their studio.

"We're torn between the artistic applications of the **Macintosh** and the business uses of an **IBM PC**," Kenny says. "We could use the Macintosh (with *MousePaint*) for storing fragments of lyrics; we could form poems with pieces of lyrical phrases. A musical interface with the keyboard [would] allow us to store melodic phrases.

"I want to be able to listen to a melody, stop after three notes, and edit them with part of a different melody," Kenny says. "We could sit back, drinking lemonade, and have the computer play back phrases in chain sequence. And then, when [it sounds] right, *you* came up with the melody. If it's wrong, it's the *computer's* fault."

Gary adds he'd like to use the computer for word processing, but laments that it "won't write the songs for us!"

Gary and Kenny must have computers on the brain—the subject even comes up in one of the first Robby YuBop songs. " **The Big Beat**' is about video games that write their own music as the score goes higher," Kenny says. "The lyrics go, 'With all this knowledge, I should go to college, and whip the microchip, until eternity.' "

—LINDA WILLIAMS

```
2080 DATA 35,134,2,14,24,1,42,62,3,35,134,1,28,49,1
2090 DATA 10,143,2,26,156,1,10,143,1,31,165,2,10
2100 DATA 143,1,42,62,3,31,165,1,26,156,1,10,143,2
2110 DATA 11,48,1,11,218,3,12,143,1,13,78,3,10,143
2120 DATA 1,21,31,1,13,78,2,12,143,1,11,218, 3,11
2130 DATA 48,1,10,143,1,0,0,1,10,143,1,21,31,1,10
2140 DATA 143,1,21,31,1,10,143,1,10,143,1,10,143,1
3000 DATA 0,0,56,0,0,2,39,223,1,35,134,1
3010 DATA 39,223,2,0,0,4,31,165,2,29,223,2
3020 DATA 35,134,1,23,181,1,0,0,8
4000 DATA 1,36,1,36,37,69,37,69,70,108,70,108
4010 DATA 37,69,37,69,70,108,109,147,148,183,148,183
5000 DATA 1,60,1,60,61,108,61,108,109,156,109,156
5010 DATA 61,108,61,108,109,156,61,108,157,216,157,216
```

VIC-20/*THE CURLY CALYPSO*

```
10 DIM A%(122),B%(144),C%(288),D%(416):POKE 36878,8
20 PRINT CHR$(147);"TUNING UP ...":PRINT:PRINT TAB(10)
;"PLEASE WAIT."
30 FOR I=1 TO 122:READ A%(I):NEXT I
40 FOR I=1 TO 144:READ B%(I):NEXT I
50 X=1:FOR I=1 TO 12:READ A,B:FOR P=A TO B:C%(X)=A%(P)
:X=X+1:NEXT P,I
60 X=1:FOR I=1 TO 12:READ A,B:FOR P=A TO B:D%(X)=B%(P)
:X=X+1:NEXT P,I
70 PRINT CHR$(147):POKE 214,7:PRINT:PRINT " -THE CURLY
 CALYPSO-"
80 PRINT:PRINT "    BY  KENNY LEWIS"
90 PRINT "  AND GARY MALLABER"
100 A=-1:B=-1:C=0:D=0
```

```
110 IF C=0 THEN A=A+2:POKE 36876,C%(A)-200*(C%(A)<>0):
C=C%(A+1)
120 IF D=0 THEN B=B+2:POKE 36875,D%(B)-200*(D%(B)<>0):
D=D%(B+1)
130 C=C-1:D=D-1:IF A=287 AND C=0 THEN 100
140 FOR T=1 TO 65:NEXT T:GOTO 110
1000 DATA 24,2,25,1,27,3,28,1,30,3,31,2,30,2,28,1
1010 DATA 27,3,25,1,24,1,0,8,0,2,35,1,33,1,30,2
1020 DATA 29,2,28,2,29,2,28,2,29,1,33,1,0,8,0,1
1030 DATA 16,1,17,1,21,1,25,1,27,2,30,2,27,2,25
1040 DATA 1,21,2,25,1,21,1,0,8,0,1,19,1,21,1,25
1050 DATA 1,28,1,30,2,33,2,30,2,28,1,25,2,28,1
1060 DATA 25,1,0,8,21,2,23,1,25,3,27,1,28,3,29
1070 DATA 2,28,2,27,1,25,3,23,1,21,1,0,8
2000 DATA 33,2,34,1,35,3,36,1,37,3,10,1,33,1,37
2010 DATA 2,36,1,35,3,34,1,33,1,0,1,10,1,33,1
2020 DATA 10,1,33,1,10,1,10,1,10,1,22,2,38,1,22,1,42
2030 DATA 2,22,1,44,3,42,1,38,1,10,2,37,1,10,1,40
2040 DATA 2,10,1,44,3,40,1,37,1,17,2,36,1,17,1
2050 DATA 40,2,17,1,36,3,40,1,36,1,5,2,35,1,5,1
2060 DATA 38,2,5,1,35,3,38,1,35,1,30,2,31,1,33
2070 DATA 3,34,1,35,3,5,1,30,1,35,2,34,1,33,3,32,1
2080 DATA 31,1,0,1,5,1,30,1,5,1,30,1,5,1,5,1,5,1
3000 DATA 1,24,1,24,25,46,25,46,47,72,47,72
3010 DATA 25,46,25,46,47,72,73,98,99,122,99,122
4000 DATA 1,40,1,40,41,72,41,72,73,104,73,104
4010 DATA 41,72,41,72,73,104,41,72,105,144,105,144
```

WHAT'S IN STORE
NEW HARDWARE/MARKET UPDATE

MONITORS
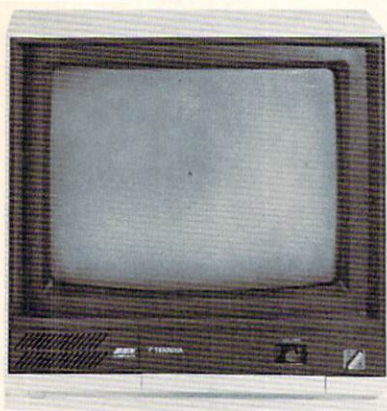
Teknika MJ-10
MANUFACTURER: Teknika Electronics Corp., 353 Route 46 W., Fairfield, NJ 07006; (800) TEK-NIKA
PRICE: $279

Teknika's MJ-10 monitor takes advantage of the separated video capability of the Atari and Commodore 64 computers, and also interfaces with the Apple II series, IBM PC/PCjr, VIC-20, and ADAM. With most computers, the video system is composite video. That means luminance (brightness), chroma (color), and sync (timing signals) are combined into a composite signal, and then fed into certain circuits in a monitor that separate out the signals again—often degrading the signal's quality. Separated video, the MJ-10's most striking feature, produces a better quality color picture by separating the chroma signal from the rest of the video signals, according to Teknika.

PRINTERS

Epson HomeWriter 10
MANUFACTURER: Epson America, Inc., 2780 Lomita Blvd., Torrance, CA 90505; (800) 421-5426
PRICE: $269 (HomeWriter 10); $349 (Spectrum LX-80)

Epson, known for its best-selling RX/FX series of dot-matrix printers, has introduced two new ones directed specifically at the home market. The HomeWriter 10 uses a Printer Interface Cartridge (PIC) to connect to most popular microcomputers. The PICs—combined ROM cartridges/cables—are available for $60 each for C 64, Atari 800XL, IBM PCjr, and Apple IIc computers. They plug into the computer as easily as an electrical cord plugs into a wall socket. PICs for other computers are forthcoming.

HomeWriter 10 prints in draft mode at 100 characters per second (cps), and in "near letter-quality" mode at 16 cps. Print styles include condensed, emphasized, double-strike, and near letter-quality. Without any programming, the user can choose these print styles simply by pushing buttons on the printer's control panel. Other features are a 1K memory buffer and typewriter-style friction-feed mechanism. Unlike most dot-matrix printers, Home-Writer 10 does not come with pin- or tractor-feed mechanisms, which accept computer fanfold paper. However, both tractor ($39) and cut-sheet ($99) feeders are optional.

HomeWriter 10
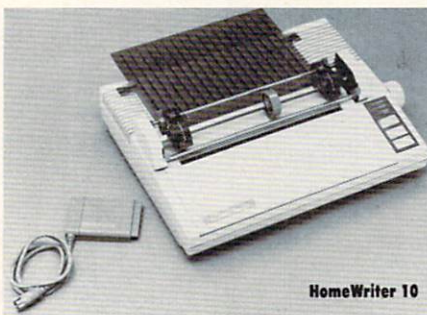
The Spectrum LX-80 offers the same general features, but has many more type styles (160) to choose from. It also has a built-in parallel interface and an optional 32K buffer board ($175). The buffer, important for business applications, allows you to "dump" a file to the printer, then continue to use your computer for another task while the file is printed.

Juki 6000
MANUFACTURER: Juki Industries 299 Market St., Saddle Brook, NJ 07662; (201) 368-3666
PRICE: $295

Prices for letter-quality printers have fallen drastically over the years, and the Juki 6000 is a case in point. The 6000 is compact and efficient; it comes with either an RS-232C or a Centronics-parallel interface, a 100-character daisywheel, and a friction-feed mechanism. At only 10 characters per second, it's not fast, so the 6000 definitely is for those who need letter-quality output. An optional interface for the Commodore 64 is available. Juki also makes the extremely well-respected Juki 6100 letter-quality printer ($599).

MARKET UPDATE

Apple has "enhanced" its IIe computer (already an "enhanced" II plus) by replacing four chips on the main logic board. The chip changes—available in newly produced IIes or via a IIe Enhancement Kit ($70) that dealers install on old IIes—include the 65C02 microprocessor used on the Apple IIc. The new processor makes the IIe (with 128K) and IIc completely compatible, and gives programmers additional programming instructions. The new IIe supports Apple's MouseText character set, the "inverse" lettering most often used in "pull-down" menus, windows, and graphic icons; and has improved "mouse response." Finally, on the new IIe, you can enter BASIC commands in uppercase or lowercase.

IBM now is selling a line of software written mostly by IBM employees. IBM calls its Personally Developed Software, which ranges in price from around $15 to $150, "affordable software developed by people like you with ease of use in mind." There are utility programs, such as *Phone Directory On-Line* and *DOS File Tracker*; games, such as *The StarProof Bridge* and *Blackjack*; and educational packages, such as *Algebra Tutor*, *Adventures With Whole Numbers*, and *Matrix Madness*. The software comes in a thin cardboard folder. There is no written documentation—it's all on the disk. Thus, the software is best suited for experienced users.

For a list of available titles and prices, get "The Directory" from Personally Developed Software, P.O. Box 3266, Wallingford, CT 06494; or by calling (800) IBM-PCSW. ▣

Scholastic Software is available at the following locations:

Alaska

Micro Methods
Bethel

Computer Express
Fairbanks

Arizona

Pafco Computer Services
Phoenix

California

Bardon Enterprises
Canoga Park

Teacher's Helper
Carson

The Software Solution
Chico

Computer Tutorial Center
Chula Vista

Warren's Educational Supply
Covina

Pacific Computers
Emeryville

The Software Place
Fairfield

Suzanne Seay
Hollister

E.I.S.I.
Los Altos

I-MED
Los Angeles

Barton's Software & More
Marysville

American Indian Systems Co., Inc.
Sacramento

Mariposa Micro
Sepulveda

Children's Books & Software
Torrance

The Cat
Vallejo

Colorado

The Learning Ladder
Boulder

Colborn School Supply Co., Inc.
Denver

Connecticut

The Computer Factory
Hamden

The Computer Factory
Stamford

The Computer Factory
Danbury

Child World
Milford

Child World
Enfield

Child World
Hamden

Child World
Westport

Child World
Waterbury

Child World
East Haven

Florida

Software Forum
Bay Harbor

The Program Store
Clearwater

Pyramid School Products
Tampa

Georgia

Rick's Educational Services
Atlanta

Software Forum
Atlanta

Friendly Solutions, Inc.
Columbus

Academic Software
Roswell

Scholastic Computers
Roswell

Illinois

Pafco Computer Services
Chicago

Video Etc., Inc.
Deerfield

Children's Palace
Peoria

Child World
Mt. Prospect

Child World
Chicago

Crown International
E. Peoria

Child World
Waukegan

Indiana

Filmcraft Audio-Visuals
Indianapolis

Kelso, Inc.
Muncie

Progressive Data Services
Winchester

Children's Palace
Ft. Wayne

Children's Palace
South Bend

Children's Palace
Clarksville

Iowa

Cedar Custom Computing
Cedar Rapids

Louisiana

H & S Educational Supplies, Inc.
Baton Rouge

Interstate Companies of Louisiana
Baton Rouge

School Aids
Baton Rouge

Computer Shoppe, Inc.
Metairie

Softwaire Centre International
Metairie

Software Mart
Metairie

Maryland

The Educational Software Co.
Baltimore

Massachusetts

Merrimack Education Center, Inc.
Chelmsford

Child World
Quincy

Child World
Medford

Child World
Dedham

Child World
Brockton

Child World
Chelmsford

Child World
Natick

Child World
Saugus

Child World
Shrewsbury

Child World
North Dartmouth

Child World
Hanover

Michigan

Strom Systems, Inc.
Plymouth

Pafco Computer Services
Watervliet

Missouri

Hoover Brothers
Kansas City

Hoover Brothers
St. Louis

Montana

Colburn School Supply Co., Inc.
Billings

New Jersey

AA Educational Software
Dumont

The Prep Center
Medford

Computer Encounter
Princeton

The Computer Factory
Paramus

The Computer Factory
East Hanover

New Mexico

Colburn School Supply Co., Inc.
Albuquerque

Computer Circle
Albuquerque

New York

Mindworks
Buffalo

Roslin Electronics
East Rochester

Compu-Tech Educational Services, Inc.
Garden City

Foress Systems, Inc.
Huntington Station

Casey Educational Aids
Lindenhurst

The Computer Factory
Nanuet

The Computer Factory
11 West 52nd Street
New York

The Computer Factory
485 Lexington Avenue
New York

The Computer Factory
Two Broadway
New York

The Computer Factory
150 East 47th Street
New York

The Computer Factory
Garden City

The Computer Factory
Huntington

The Computer Factory
Hauppauge

The Computer Factory
White Plains

The Computer Factory
Yonkers

Barnes & Noble Bookstores
105 Fifth Avenue
New York

The Computer Factory
Rego Park

The Computer Factory
Brooklyn

Oklahoma

Oklahoma School Supply
Muskogee

Ohio

Holcomb's
Cleveland

The Book Source, Inc.
Columbus

Pennsylvania

Computer Clinic of Bloomsburg
Bloomsburg

Kurtz Bros.
Clearfield

Nobel Software
Eighty Four

Abacus Computer Shoppe
Lebanon

A-Plus Software Co.
Merion

Nationwide Computer Products
Morrisville

The Computer Factory
Pittsburgh

PC Educational Center
Philadelphia

Rhode Island

Child World
Woonsocket

Child World
Rumford

Child World
Cranston

Tennessee

Grace Micro/Visual
Bristol

Texas

FTI
Kingwood

East Texas Educational Supplies
Longview

Computer Training & Software Centers
Lubbock

Hoover Brothers
Mesquite

W.B. Cole School Supply
South Houston

Hoover Brothers
Temple

Utah

Data Magic
Salt Lake City

Vermont

Future World
Montpelier

Virginia

Micro Source 2000, Inc.
Danville

Wisconsin

Parco Products, Inc.
Elm Grove

QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart. Unless otherwise noted, all programs are in disk format.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS/HOME MANAGEMENT

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	O	D	EH	GQ	EU	V
DESIGN YOUR OWN HOME/ARCHITECTURE Avant-Garde 37B Commercial Blvd. Novato, CA 94947 (415) 883-8083 $99 ©1984	Floor plan layout program does away with the tedium of drawing and redrawing walls and features in the planning phase of building a house or designing an addition.† —KRENGEL	Apple II series, 48K. Mouse, paddles, joystick, or graphics tablet. Planned for C 64, IBM PC/PCjr. Mouse, paddles, joystick, or graphics tablet.	30-day warranty; $12.50 fee thereafter.	★ ★ ★	★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
DESIGN YOUR OWN HOME/INTERIORS Avant-Garde 37B Commercial Blvd. Novato, CA 94947 (415) 883-8083 $69 ©1984	With a (well-tuned) joystick, mouse, or graphics pad, design rooms, arranging and rearranging furniture and fixtures with a few keystrokes. Plans may be used as rough blueprints or for design brainstorming.† —KRENGEL	Apple II series, 48K. Mouse, paddles, joystick, or graphics tablet. Planned for C 64, IBM PC/PCjr. Mouse, paddles, joystick, or graphics tablet.	30-day warranty; $12.50 fee thereafter.	★ ★ ★	★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
THE HOME ACCOUNTANT AND PERSONAL FINANCE MANAGER Arrays, Inc./Continental 11223 S. Hindry Ave. Los Angeles, CA 90045 (213) 410-9466 $150 ©1985	Comprehensive personal-finance package tracks up to 200 different accounts, writes checks, lets you better prepare for tax-time. Includes future-value/present-value calculator for loan and investment plans.† —AKER	Apple Macintosh, 128K; external disk drive.	90-day warranty (includes user-damaged); $20 fee to extend warranty for 1 year.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★	E	★ ★
PC-WRITE (Version 2.4) Quicksoft 219 First N., No. 224 Seattle, WA 98109 (206) 282-0452 $10 (disk only); $75 (disk plus support) ©1983	Word processor with more than the requisite features for home use (right-margin justify, underline, boldface, center text, and more) is doubly attractive because of its reasonable price and support policy.† —RASKIN	IBM PC/PCjr, 64K.	1-year warranty; $10 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★
SRA WRITER SRA Software 155 N. Wacker Drive Chicago, IL 60606 (312) 984-7234 $75 ©1985	Extra-easy-to-use word processor for home, small business, or professional needs uses clear menus and explicit prompts. No command-memorization or constant manual-reference necessary. —TAEZSCH	IBM PC/PCjr, 128K.	90-day warranty (includes user-damaged); $15 fee thereafter or for backup	★ ★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★ ★

RATINGS KEY O Overall performance: **D** Documentation: **EH** Error-handling: **GQ** Graphics quality: **EU** Ease of use: **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

WHAT'S IN STORE
SOFTWARE GUIDE

EDUCATION/FUN LEARNING

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
ASTRO-GROVER CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2500 $34 ©1984	Preschoolers count using a vinyl keyboard overlay, aided by lovable Grover from "Sesame Street." Five activities proceed from simple counting to adding and subtracting numbers up to 10. —RASKIN	Reviewed on Atari, 48K (d., cart., cass.). Also for Apple II series, 48K; C 64.	90-day warranty; $5 fee thereafter or if user-damaged.	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★
BLAZING PADDLES Baudville 1001 Medical Park Drive SE Grand Rapids, MI 49506 (616) 957-3036 $49 (Apple); $34 (C 64) ©1984	Computerized paint program lets kids as young as 6 create pictures, alter the design pixel by pixel, add text in a variety of fonts, and use preprogrammed sets of shapes.† —FRANK	Reviewed on Apple II series, 48K. Also for C 64. Mouse, graphics tablet, touchpad, or light pen.	90-day warranty; $5 for backup or if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★
GETTING READY TO READ AND ADD Sunburst Communications 39 Washington Ave., Room AB Pleasantville, NY 10570 (800) 431-6616 $39 ©1984	Prereading and math activities make for a good introduction to the computer keyboard, as well. Shape and letter-matching, simple counting, and left to right movement presented. —BUMGARNER	Reviewed on Apple II series, 48K. Also for Atari, 48K; C 64; IBM PC, 64K/PCjr, 128K.	Lifetime warranty (includes user-damaged); $10 fee for backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★
JUST IMAGINE Commodore 1200 Wilson Drive West Chester, PA 19380 (215) 431-9100 $34 ©1984	Kids 10 and up, younger with help, create colorful animated tableaux, and write an accompanying story with package that helps motivate kids to write.† —SUMMERS	C 64.	90-day warranty; $5 fee thereafter or if user-damaged.	★ ★ ★	★ ★	★	★ ★ ★ ★	A	★
KERMIT'S ELECTRONIC STORY MAKER Simon & Schuster 1230 Ave. of the Americas New York, NY 10020 (212) 245-6400 $29 (C 64); $34 (Apple) ©1984	Miss Piggy, Kermit, and friends fly, bounce, run, and cavort through a number of different scenes in a colorful, musical, introductory reading package.† —SUMMERS	Reviewed on C 64. Also for Apple II series, 48K.	30-day warranty; $5 fee thereafter or if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	E	★ ★ ★ ★
LETTER-GO-ROUND CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2500 $34 ©1984	Letter-recognition, uppercase and lowercase, and simple spelling reinforced for kids ages 3–6, with the help of the "Sesame Street" gang and a keyboard overlay. —RASKIN	Reviewed on Atari, 48K (d., cart., cass.). Also for C 64 (d., cart.).	90-day warranty; $5 fee thereafter or if user-damaged.	★ ★	★ ★	★ ★ ★	★ ★ ★ ★	A	★ ★
MEMORY MANOR Fisher Price P.O. Box 1327 Cambridge, MA 02238 (617) 494-1222 $19 ©1984	Children ages 5–8 wash windows, earning points for washing those with prizes and birds in them, losing water for washing those with the grouchy face, in a game intended to reinforce memory. —SUMMERS	Reviewed on C 64 (cart.) Also for Atari (cart.); Coleco ADAM.	30-day warranty; $5 fee thereafter or if user-damaged.	★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★
MICROZINE NO. 7 Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3567 $39 ©1984	Magazine on a disk includes a mystery space adventure, a survey-taking program, a city scene building set, plus puzzles and cartoons for ages 10+. —FRANK	Apple II series, 48K.	60-day warranty; $10 fee for 10 subsequent months.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★ ★	E	★ ★ ★
THE MUSIC SHOP Broderbund Software 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 $44 ©1985	Write, edit, print, and play music. Fun, versatile tool lets you enter your piano lessons, for instance. Use joystick, keyboard, or combination of both to enter notes, change voices, and more. —SUMMERS	C 64.	90-day warranty (includes user-damaged); $5 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★

RATINGS KEY O Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	O	D	PS	GQ	EU	V
ADVENTURE CONSTRUCTION SET Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 $39 (C 64); $49 (Apple, IBM) ©1984	Innovative build-it-yourself role-playing adventure lets you create an unlimited number of your very own fantasy challenges. Clumsy design system makes this best for serious role-playing fans, ages 10+.†	C 64. Planned for Apple II series; IBM PC/PCjr.	90-day warranty; $7.50 thereafter or if user-damaged.	★★★	★★★	★★★	★	A	★★★
DREADNOUGHTS Avalon Hill 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 $30 ©1985	Excellent introductory strategy and tactics game for ages 10+, puts you in control of the great W.W. II German vessel, *Bismarck*, as you prowl through the Atlantic in search of British convoys.†	Reviewed on Apple II series. Also for C 64.	Unlimited warranty; $10 fee if user-damaged.	★★★★	★★★	★★	★	E	★★★★
H.E.R.O. Activision 2350 Bayshore Frontage Rd. Mountain View, CA 94043 (415) 960-0410 $24–$39 ©1984–85	Explore caverns, using dynamite, phasers, special lamps, and more in colorful maze/flying game. Fun and easily played by ages 10+.	Reviewed on C 64. Also for Apple II series, 48K; Atari, 32K (cass.).	1-year warranty.	★★	★★	★★★	★★★	A	★★★
INCUNABULA Avalon Hill 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 $30 ©1985	Trade goods, forge alliances, wage war by controlling a pre-Christian culture in a superb historical/economic/financial game for 1–7 players, ages 12+.†	IBM PC/PCjr, 128K.	Unlimited warranty; $10 fee if user damaged.	★★★★	★★★★	★★★	★	D	★★★★
INFIDEL Infocom 55 Wheeler St. Cambridge, MA 02138 (617) 492-1031 $39–$44 ©1983	Set off across the desert in search of a lost tomb in this challenging text adventure—filled with the usual Infocom puzzles and dry humor. Good intermediate level challenge for adventurers, ages 12+.	Reviewed on Apple II series, 48K. Also for Atari, 48K; Macintosh, 128K; C 64; IBM PC, 64K/PCjr, 128K; TI-99/4A, 48K; TRS-80 Models I/III, 48K.	90-day warranty; $5 fee thereafter or if user-damaged.	★★★	★★★	★★★	N/A	D	★★
ON-FIELD FOOTBALL Gamestar 1302 State St. Santa Barbara, CA 93101 (805) 963-3487 $31 ©1985	1–2 players each control fully animated 4-man teams in knockout football simulation. Run, kick, pass, receive, intercept, and more in excellent challenge for ages 10+.	C 64. Joystick.	90-day warranty.	★★★★	★★★	★★★★	★★★	D	★★★★
POGO JOE Screenplay 1095 Airport Road Minden, NV 89423 (800) 334-5470 $29 ©1983	Hop around a wide variety of screens from precipice to precipice, avoiding bouncing foes in compelling game, especially good for young joystick pros, ages 8+.	Reviewed on Atari, 48K. Also for C 64. Joystick.	90-day warranty; $12.50 fee thereafter, if user-damaged, or for backup.	★★★	★★	★★★	★★★	A	★★★
ROCK N' BOLT Activision 2350 Bayshore Frontage Rd. Mountain View, CA 94043 (415) 960-0410 $29 ©1985	Fun, nonviolent, building game requires 1–2 players, ages 5+, to connect moving girders to complete a 100-floor building.	C 64.	1-year warranty.	★★	★★	★★★	★★★	E	★★
SPY HUNTER Coleco Industries 999 Quaker Lane S. West Hartford, CT 06110 (203) 725-6660 $29 ©1984	Drive your Bond-like supercar across a dangerous stretch of road, avoiding innocent motorists while eliminating the bad guys. Use machine guns, missiles, smokescreens, and go on to a boat chase. For ages 8+.	Coleco ADAM.	90-day warranty.	★★★	★★	★★★	★★★★	A	★★★
STARCLASH II Baen Software 8 West 36th St. New York, NY 10018 (212) 947-8244 $29 ©1984	Try to gain control of a corner of the universe in flexible, outerspace strategy and tactics game for 1–2 players, ages 12+.	IBM PC, 64K.	30-day warranty; $5 fee thereafter; user makes backup.	★★★	★★★	★★★	★★★	A	★★★

RATINGS KEY O Overall performance; **D** Documentation; **PS** Play system; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent (@ ★★★ to ★★★★ depending on price; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

WHAT'S IN STORE
SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 68 for information such as backup policies and addresses of software manufacturers.

HOME BUSINESS/ HOME MANAGEMENT

Design Your Own Home: Architecture
Design Your Own Home: Interiors
HARDWARE REQUIREMENTS: Apple II series. Planned for C 64, IBM PC/PCjr.
MANUFACTURER: Avant-Garde
PRICE: $69–$99

It took me three and a half years to build my house. Three years to plan and a half year to build! If I were to do it all over again, I'd make use of these two entries from the *Design Your Own Home* series.

Tackle the basic floor plan with the *Architecture* package. Move walls about at will. I don't know how many times I had to draw and re-draw the same wall when I wanted to make a simple adjustment to my own plans manually. Use the joystick or mouse to lay down prepro-grammed architecture symbols indi-cating bathroom fixtures and other details.

The *Interiors* program lets you work in detail on one room at a time. Select sinks, beds, bookcases, even baby grand pianos, from over a hundred different symbols. If you need furnishings other than those provided, use a special utility pro-gram to draw your own. I particular-ly liked the feature that lets you "step into" a room you've designed and view any of the walls head on.

In both packages, your finished plan is suitable as a draft for a blue-print. You won't be able to use it as an actual on-site building plan. But the feature that generates wall views will help you visualize how the rooms should look. Have a contrac-tor or specialist go over floor plans for such critical features as electrical wiring and plumbing specifications.

The program's drawbacks include excessive disk-swapping (for one-drive systems) and, as a result, a lot of waiting around. Plus, make sure your joystick or mouse is in tip-top shape. A joystick that isn't perfectly

tuned will cause endless frustration when setting down and moving around symbols. Finally, be prepared to spend hours familiarizing yourself with the program. You won't be able to sit down and design in a snap.

Designing a house requires inge-nuity and sweat. You're on your own in the ingenuity department. When it comes to sweat, however, this se-ries should help out. —LARRY KRENGEL

The Home Accountant and Financial Planner
HARDWARE REQUIREMENTS: Apple Mac-intosh, external disk drive.
MANUFACTURER: Arrays /Continental
PRICE: $150

I cringed when I read that *Home Ac-countant* uses a "double-entry sys-tem." But several hours with the program showed me that with this package, the emphasis is on *home* rather than on *accountant*. Set up as many as 200 budget categories, enter your payments and receipts, and then let the computer take care of the rest.

Home Accountant isn't a difficult program to learn. But it will take time, because you have so many op-tions at your disposal. Master your checkbook, various bank accounts, outstanding loans, and/or credit-card purchases. Graph and chart your data. Figure out the potential value of an IRA account with the package's future-value/present-value calculation option.

You can do a lot and you can do it easily. When maintaining your checkbook, for instance, you just click on a name in the special names "window," and the payee and the ID code you've assigned it previously are filled in on the check. (ID codes will help you track specific items, such as tax-deductible child-care ex-penses for later use.) Because the Mac's internal clock always is tick-ing, even with the computer turned off, it starts any session with *Home Accountant* by notifying you of any automatic transactions you're sched-uled to pay.

On the whole, this package makes good use of the Mac's unique capa-bilities. It's important, however, to keep in mind that using accounting software takes an investment of time on your part. Keeping your records current means putting in a good couple of hours of keyboard time ev-

ery month. If you're the type who is, needs to be, or wants to be really in charge of your finances, the time will be worth it, and *Home Accoun-tant* will be worth a look.
—SHARON ZARDETTO AKER

PC-Write (Version 2.4)
HARDWARE REQUIREMENTS: IBM PC/PCjr.
MANUFACTURER: Quicksoft
PRICE: $10 (disk alone); $75 (regis-tration w/manual and service)

"Use it first, then buy it." That's the philosophy behind *PC-Write*, a pow-erful word processor, and one of the best of a genre of software called "shareware." A disk without a manual costs only $10 (there is on-screen documentation). The makers of *PC-Write* encourage you to copy the program and pass it on to friends. If they like it they can pay $75 for registration, which enti-tles them to documentation, en-hanced versions, and telephone sup-port. There are no losers in the shareware game. You get an inex-pensive, but high-powered word pro-cessor, and the opportunity to share it with friends (and even make a $25 commission if they decide to buy it and register).

As for the package's capabilities—it's not the PC's fastest, or the slick-est. But it *does* cover all the bases, and then some. I can't think of any program that does as much for as low a price tag. The function keys control basic editing features—marking text to be moved about or deleted—and send you to the help screens. A split-screen feature lets you work on two parts of your text simultaneously. Some users may yearn to see on-screen what will ap-pear on the final printed page—"the what you see is what you get" ap-proach found in many fancier, friendlier word processors. *PC-Writ-ers* must use "dot commands"—in-structions about page width, length, and more—which they enter in the course of typing in text and don't see until the final product.

Plenty of help, tutorials, plus tele-phone assistance for registered us-ers compensate for a program that may take some time to get comfort-able with. All in all, it's a solid pack-age and a great alternative to the "buy now, see if you like it when you get home" approach. —ROBIN RASKIN

WHAT'S IN STORE
SOFTWARE REVIEWS

EDUCATION/FUN LEARNING

Blazing Paddles

HARDWARE REQUIREMENTS: Apple II series. Also for C 64; mouse, graphics tablet, touchpad, or light pen
MANUFACTURER: Baudville
PRICE: $34–$49
MANUFACTURER'S SUGGESTED AGE: 6 +

The computer as canvas—this isn't an application that automatically springs to mind. However, an enormous number of packages turn your computer into a painting/drawing/creativity tool. *Blazing Paddles* is one of the best. My 9- and 11-year-old daughters, already familiar with painting programs, hopped into it immediately, without the benefit of instructions. Our 8-year-old neighbor, a newcomer to this breed, needed only minimal instruction.

He's a frequent after-school visitor to our house, and whereas once he'd head straight for the video games, for the last several weeks he's devoted his computing time to painting pictures. Using different brushstrokes and color patterns, he sketches, draws lines, and automatically creates boxes, circles, and more. A cut-and-paste option lets you remove, duplicate, or transfer part of your picture to another one you're working on. You use a menu to select operations such as initializing disks, saving pictures, and loading shape tables.

Often with computerized paint sets, it's difficult to draw a shape precisely with the joystick or mouse. *Blazing Paddles* is no exception. It does compensate, however, by letting you zoom into the drawing and execute detail pixel by pixel, as if you were working on a microscope.

One of my children painted a delightful farm scene complete with barn, tractor, chicks, and cows. She used the preprogrammed shapes that came on the disk, plus the three shape libraries you can buy for an additional $20 each. And with the pixel editor, she easily turned the generic cows into black and white Holsteins. She could add text in one of five fonts and print out her work in black and white.

—CATHY FRANK

Just Imagine

HARDWARE REQUIREMENTS: C 64/128.
MANUFACTURER: Commodore
PRICE: $34
MANUFACTURER'S SUGGESTED AGE: 4–14

Cross a video game with a word processor and you have *Just Imagine*, a package perfect for elementary-schoolchildren to use for illustrated stories. Kids watch their writing come to life with animated scenes accompanied by music and sound effects. They can print out the stories, too.

Choose one of nine beautiful background scenes. Add stationary objects (from a library of 48) and choose up to three characters to animate. By coordinating timing and action, you can make the characters interact like a short cartoon. Finally, you type in your story using a scaled-

down word processor with limited editing features. This draw-first-then-describe procedure is especially good for kids afflicted with the all-too-common kidwriter's block. Our kids competed to see who could come up with the best animation and the most unbelievable stories.
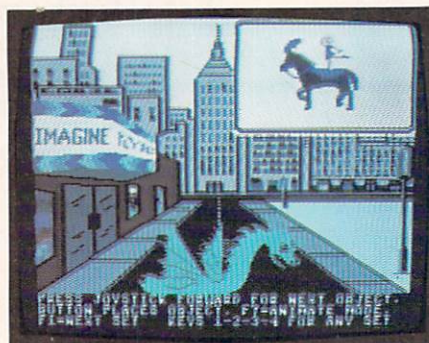
You won't be able to use *Just Imagine* like a regular word processor, but it is a fine introduction to writing with the computer. Our children use it over and over again.

—TAN SUMMERS

Kermit's Electronic Story Maker

HARDWARE REQUIREMENTS: Reviewed on C 64. Also for Apple II series.
MANUFACTURER: Simon & Schuster
PRICE: $29–$34
MANUFACTURER'S SUGGESTED AGE: 4–8

"It's a book!" exclaimed 3-year-old Todd when we opened the *Story Maker* package. Sure enough, it was a hardcover book with 20 pages of bright Muppet cartoons illustrating the 60 or so words that make up the program's vocabulary. Tucked in the pocket at the end of the book was the Kermit-green disk.

It turned out to be too tough for Todd, but 5-year-old Celia loved it. She clicked the joystick button, and Kermit, Miss Piggy, the banana, and other characters danced, bounced, and spun through a variety of scenes. The clever animation and music soon attracted an audience of older children who read the story as it unfolded at the top of the screen.

"What do you do next?" they demanded.

"That's all it does," I replied.

"Boring!" they said, and wandered off.

Celia, however, was captivated. "Listen while I read my story," she begged. And that's what *Kermit's Electronic Story Maker* is all about: stimulating early readers to dive in and play with words.

Using the joystick, early readers like Celia select words and insert them into the blanks of a dozen preset sentences. A sentence that starts out, WHILE THE _____ _____ _____, THE _____ _____, could wind up, WHILE THE BATHTUB BOUNCES ON THE MOON, THE TUBA BARKS. As each new word is added, the picture changes correspondingly. Words match their pictures and actions on a one-to-one basis. This is the essence of learning how to read. Parents can help out by reading the accompanying book with the child.

Fluent readers will tire of *Kermit's Story Maker* before long. This workbook-brought-to-life is best for beginning readers of any age. It's a

beautifully planned and executed learning tool—the ideal way to get the family member who's verging on literacy to dive right in.

—TAN SUMMERS

GAMES

Adventure Construction Set

HARDWARE REQUIREMENTS: C 64. Planned for Apple, IBM.
MANUFACTURER: Electronic Arts
PRICE: $39
CRITIC'S SUGGESTED AGE RANGE: 12 +
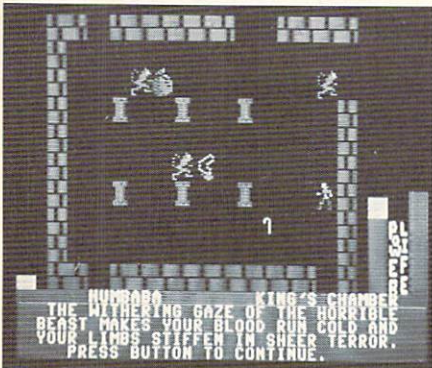
Role-playing adventures are among the most involving of all computer games. But after they're completed, there's not much fun in going through them again. Until now.

Electronic Arts, a pioneer in the construction-set field (see "Leisure Time" special report in this issue), has compiled a set of terrains, oddball creatures, magic weapons, and so on, which you can combine into an endless variety of different adventures. There's a full-length adventure built in, but the real fun's in doing it yourself.

You begin by altering an existing adventure from one of a batch of different scenarios—a sword-and-sorcery adventure, a spy thriller, and historical fiction, to name a few. If you're really game, you have the option to start a game from scratch.

Place people, objects, clues (including text messages), magic items, even tunes, on each of the map's squares. Stack objects or spells—so that one square might contain a stone, which, when moved, would reveal a magic item and a genie to tell you what to do with it, along with a little soundtrack to spice up the proceedings.

Unfortunately, in spite of its novelty, the design system you have to use is clumsy and time-consuming. It can take as long as 10 to 20 minutes to make backup disks, which

you should do if you're planning to test your game. A special feature thankfully finishes the adventure-building for you if you get tired. Also, while you can execute very interesting and playable games, you can play each one only once.

Altogether, this set gets an "A" for effort and originality. I'd recommend it chiefly to insatiable intermediate-to-expert adventure players blessed with long concentration spans.

Incunabula

HARDWARE REQUIREMENTS: IBM PC/PCjr.
MANUFACTURER: Avalon Hill
PRICE: $30
CRITIC'S SUGGESTED AGE RANGE: 12 +

Gamers longing for complex, computerized political/economic/historical conflicts traditionally haven't had more than a few packages to choose from. Incunabula is a remarkable addition to the field—a superb political simulation for 1–7 human and/or computer players.

Set on a mythic pre-Christian continent, this flexible challenge requires you to trade goods, forge (and break) alliances, conduct military campaigns, and live a nomadic existence. It's like an ancient version of the games Civilization and Diplomacy, with Monopoly overtones.
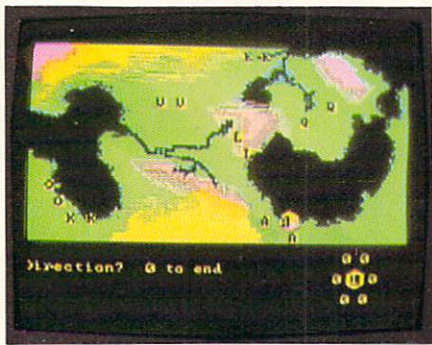
Start out by using a menu to select computer-controlled neighboring cultures from dozens of possibilities, including isolationist farming communities, wordly power-brokers, or expansionist empire-builders. Next choose the kind of game you want to play—a straight military scenario; a trade-oriented encounter based on economic growth and resource-management; a combination of the above: a socio-economic military simulation that's the most fascinating role-playing game I've played.

For your community to grow and

prosper, you must form alliances, nonagression pacts, and verbal and written agreements. But you don't just grow and build. A host of other factors affect the course of your civilization. Population growth, natural resources, military prowess, technological advances, international trade all figure in your nation's rise (or fall).

Playtesters went wild over this one, our first session lasting from Friday afternoon to Saturday morning! A must for any serious gamer, Incunabula sets a standard for political games to come.

Dreadnoughts

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for C 64.
MANUFACTURER: Avalon Hill
PRICE: $30
CRITIC'S SUGGESTED AGE RANGE: 10 +

Bismarck is a classic boardgame that introduced many of us to the field of war games. Its computerized counterpart admirably captures the excitement of strategy and tactics.

You control the German war vessel, the Bismarck, the most powerful ship ever to sail the seas, trying to break into North American shipping lanes without being detected by the British fleet. Your aim is to hunt down and sink the British convoys crucial to that nation's survival.

If you're caught by one or more ships, or if you spot the enemy and choose to engage in combat, the game switches to a separate battle mode. The combat system is very easy to use. Cross sections of your ship and the enemy's show where you've been hit or where you've damaged your opponent. Combat ceases only if either you or your enemy sails out of sight.

Advanced and expert players may find the game too easy. On my third try, I won the war in North Africa for Rommel because I sank four British convoys and assorted warships without sustaining any damage to the Bismarck, or my escort ship, the Prinz Eugen.

A second game on the disk is a limited construction program which lets you assemble up to 10 ships in combat from a selection of 44 international W.W.II vessels. The resulting campaign still isn't very complex, but it is a lot fun. Overall, advanced players might find this entertaining as a "beer and pretzels" diversion, but it's the beginning and intermediate players who'll really enjoy it.

—REVIEWS BY JAMES DELSON

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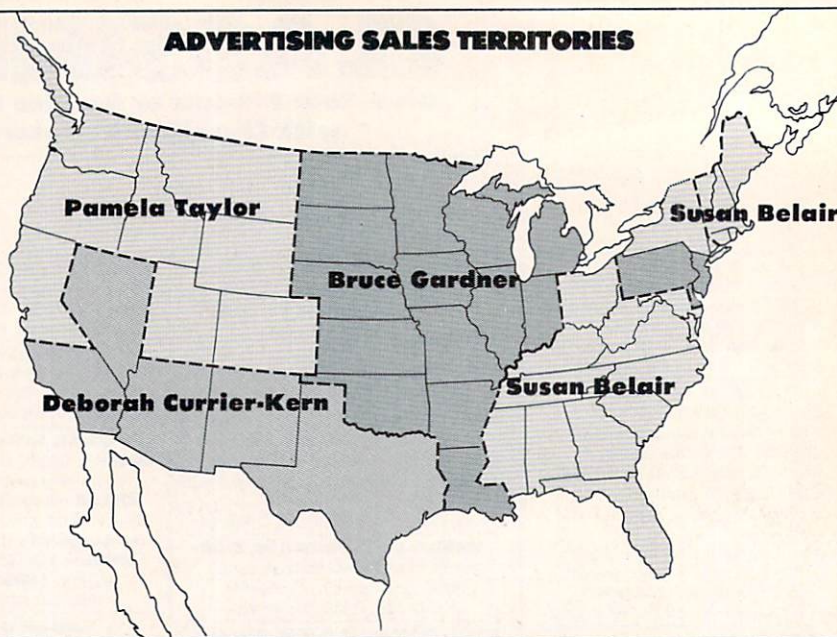
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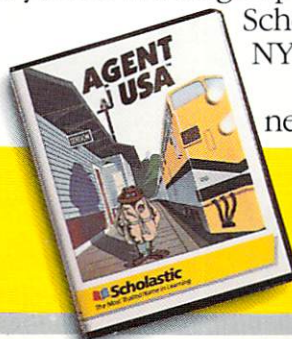And Agent U.S.A. can't stop the devious plague spreader without your help.

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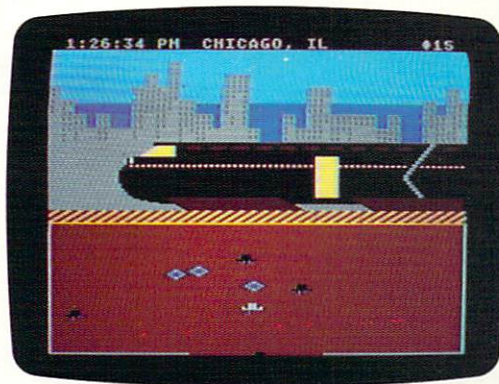
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