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RUN

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May 1985

Bob Adkins

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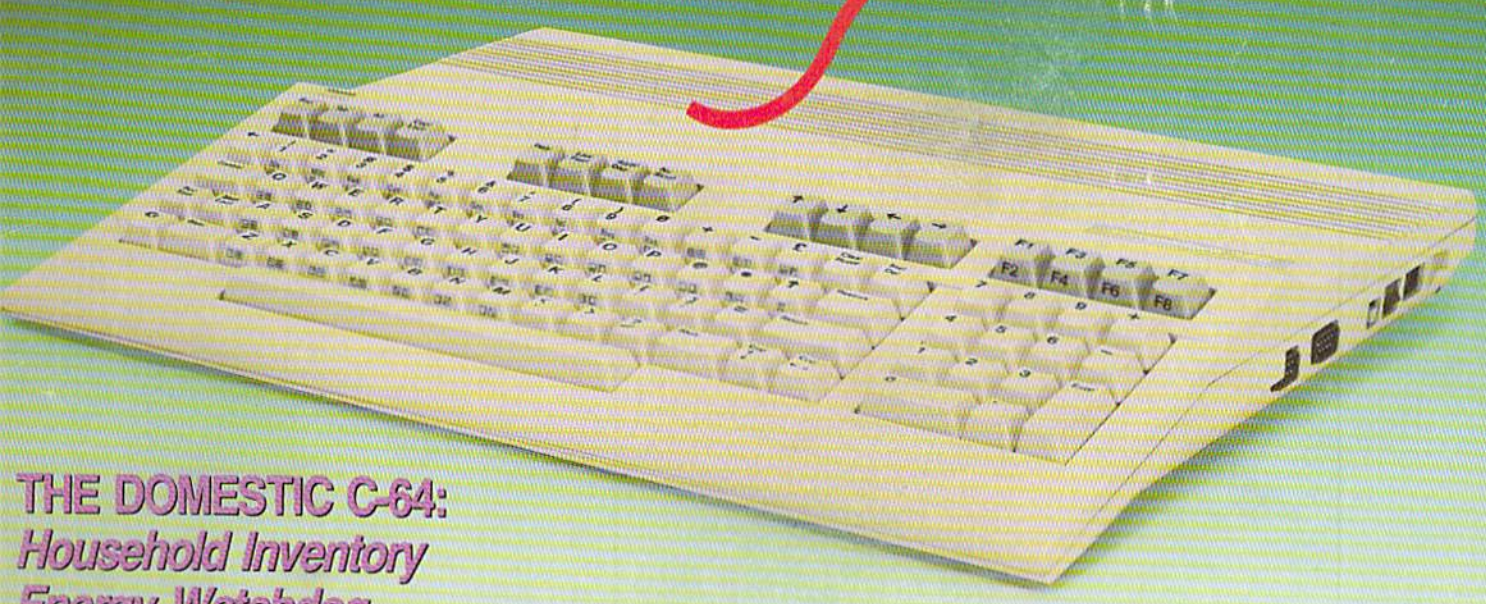

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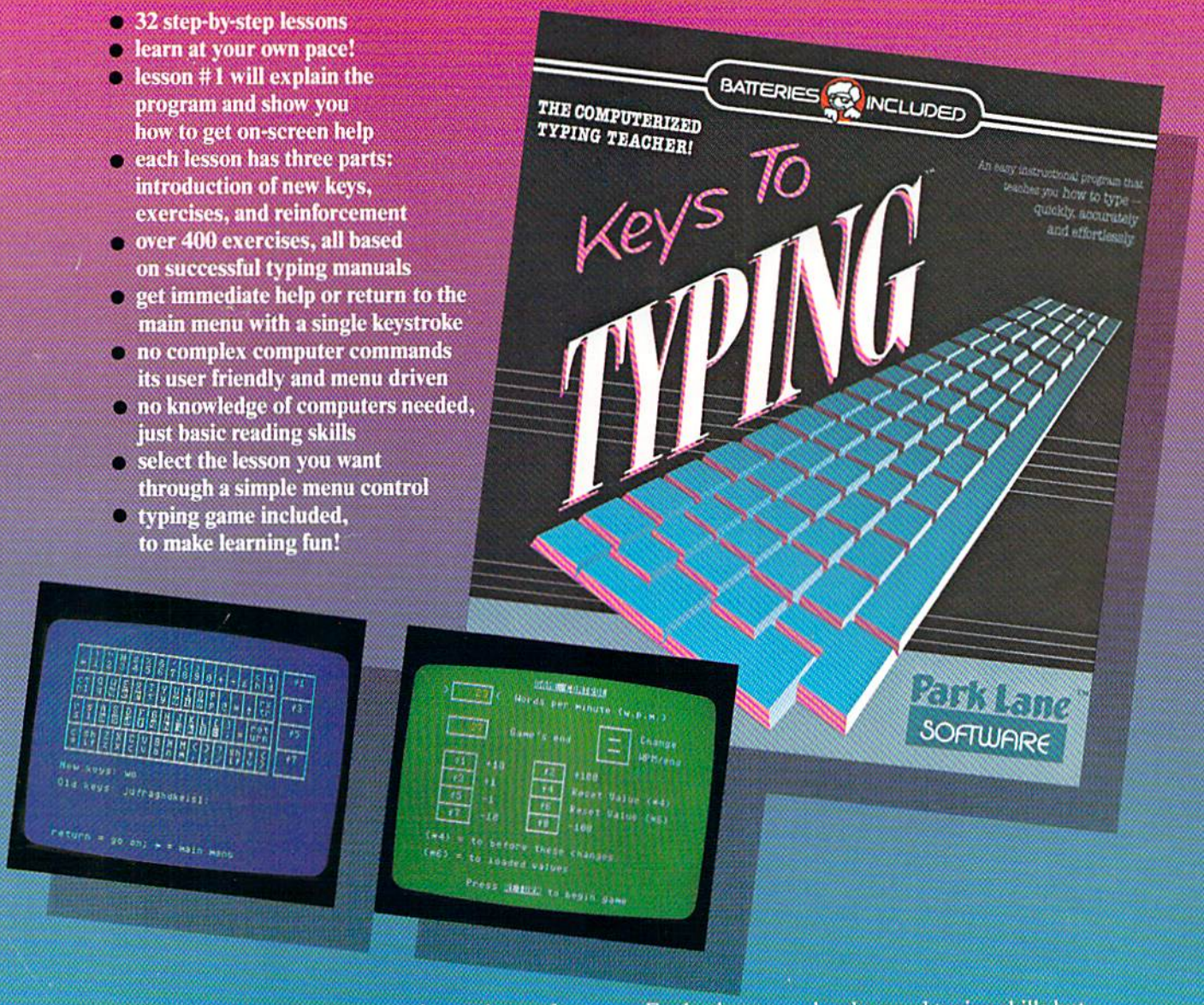

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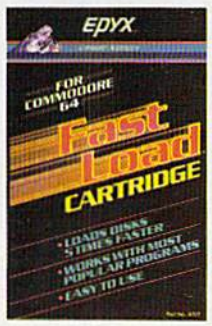

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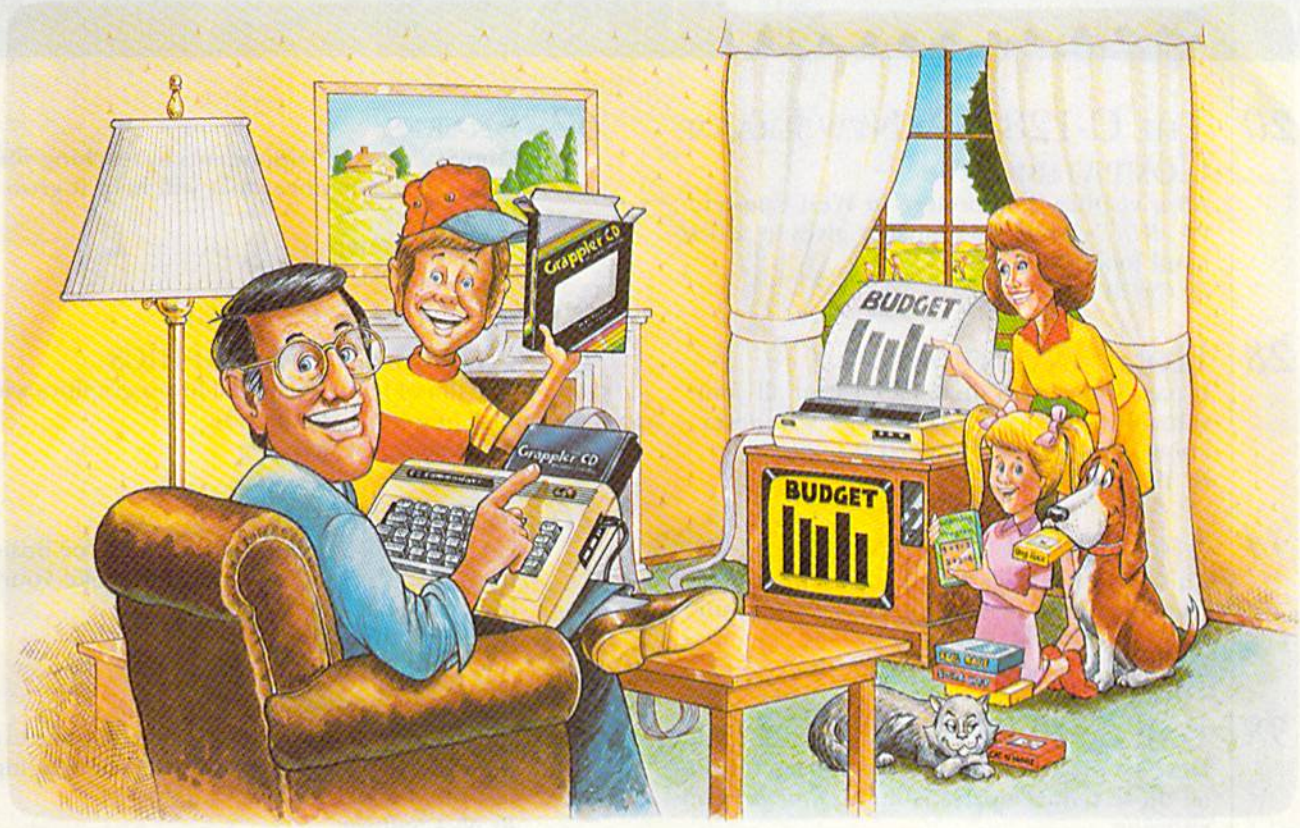

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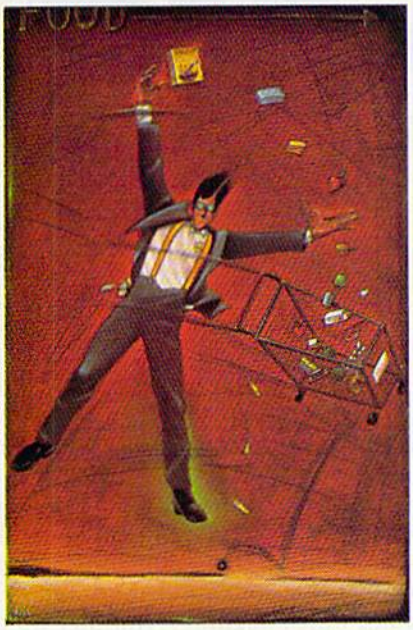

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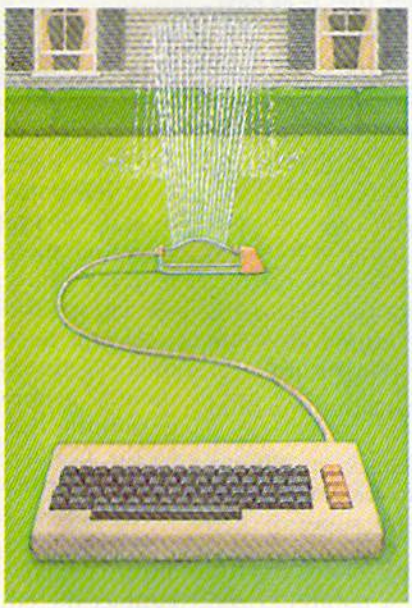

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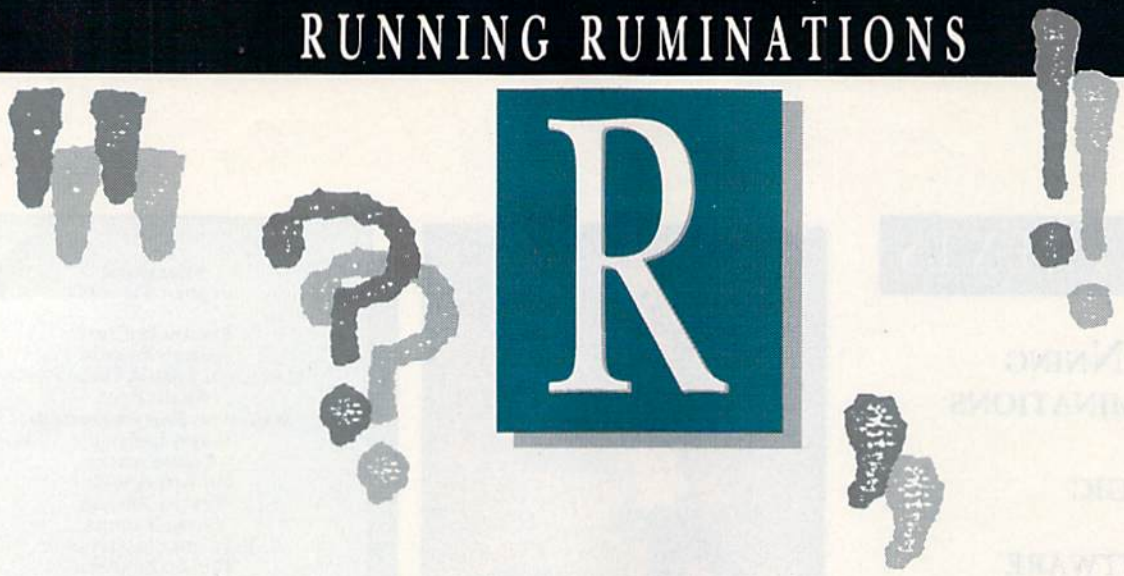

In This Issue...

A lot of hoopla is being made about the as-yet-to-be-released Commodore 128. Is it justified?

Well, to find out we sent *RUN*'s resident skeptic, technical manager Guy Wright, to West Chester, PA, to get a first-hand look at this highly touted new machine.

The results of his visit form the basis for this month's lead story about the C-128. His observations, which begin on p. 20, make for interesting reading, as he takes a hard look at the answers to such questions as:

—how C-64-compatible is it?
—what existing peripherals and software will work with the new machine?
—what new peripherals does Commodore have planned for the C-128?
—what about CP/M? How will it work on the 128?
—will software be readily available for it? Or will C-128 owners, like the early C-64 owners, have to wait for years before a large software base is established?

Any doubts Guy may have had about Commodore's new personal computer before the visit were erased after several hours of hands-on experience with the C-128.

His conclusion? The C-128 is "a perfect clone of the C-64 and a very powerful CP/M computer." Also, in the C-128 mode, programmers will find a computer that is as easy, if not easier, to operate than the C-64.

* * *

One of the fears that I hear many VIC-20 owners frequently express is that they are stuck with an obsolete machine. Well, for some applications, the VIC-20 is ideally suited, as Annette Hinshaw reveals in "VIC Patrol," beginning on p. 76. She'll tell you how you can put your VIC to work as a control system for your home or business to control lights, appliances, thermostats and so on.

This issue also supports the old adage that "Home is where the C-64 is." We present several unique ways you can put your C-64 to use in your home. For example:

—to monitor your electrical-energy consumption and compute the average daily cost
—to maintain an inventory of valuable items in your home
—to serve as a shopping companion to help you keep track of the items you should pick up at the supermarket.

The May issue also features interesting games for the C-64—a strategy game ("Snakes") and a computerized version of the old pea and shell game ("Con Game").

For an analytical look at a new phenomenon in C-64 computing, be sure to read Christine Adamec's review of psychological software (p. 50). These commercially available programs purport to help you get in touch with your feelings and help you become a better person.

Another noteworthy article in this month's issue is the review of CompuServe (p. 56), written by *RUN*'s technical editor, Margaret Morabito. This article begins a monthly series that focuses on the electronic services available for on-line users.

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Have you tried the RUNning Board yet? *RUN*'s new bulletin board is at your disposal 24 hours a day with useful computing information, the latest happenings around the industry and updates to articles and columns published in RUN.

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Wanted: C-128 Articles

In the coming months, *RUN* will be beefing up its coverage of the C-128. But we need your help.

If you're a new C-128 owner, or have access to this new machine, we invite you to consider submitting an article.

At the outset, C-128-related articles should be tutorial in nature, that is, introducing users to the C-128, instructing them how to use the machine, exploring its features and capabilities and informing readers about the latest C-128 software and hardware developments.

As you become more familiar with the machine and uncover its undocumented capabilities, articles should include general hints about using the machine or programming tips that you may have found valuable. Also, as the C-128 gains in popularity and is being used in homes, businesses and schools, *RUN* will be interested in articles about these applications or other unique uses.

If you have other article proposals not mentioned above, feel free to send them in for consideration or contact the editorial offices to discuss them. **db**

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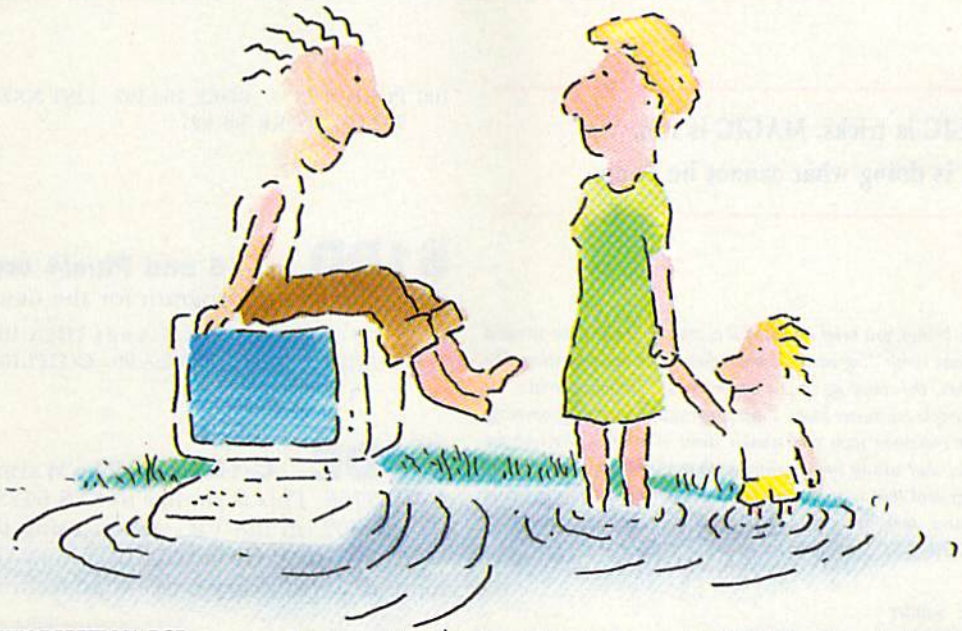

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Compiled by LOUIS F. SANDER

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Every month, Magic brings you brief and useful computer tricks from around the world—tricks to make computing easier, more enjoyable or more exciting. We number our tricks in hex, the counting system of sorcerers and computerists.

Magic solicits your simple hardware ideas, short programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that can be implemented with a minimum of time, effort or theoretical knowledge and that is of current value to Commodore computerists (Plus/4 and C-16 owners, too). We typically pay $10 for each trick accepted. Really super ones get $20–$50. Send your tricks to:

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$1DB Glaring nerdhood—Don't have a glare screen for your monitor? Just wear polarized sunglasses whenever you're computing. Your family may think you're withdrawing further into the tube, but you're really just saving money.

Mike Rogalski
Monrovia, CA

$1DC Program executable List—This lets you use the List command within a C-64 program, without halting the program's execution. Substitute line numbers for the Xs or leave them out entirely.

```
100 POKE 768,174 : POKE 769,167 : LIST XXXX – XXXX : POKE
    768,139 : POKE 769,227
```

Randy Thompson
Eugene, OR

$1DD C-16 and Plus/4 organ—Here's a rudimentary organ program for the new 3.5 Basic.

```
10 VOL 8 : A = PEEK(198) : IF A = 64 THEN 10 : ELSE A = A*15 :
   SOUND 1,A,20 : SOUND 2,A,20 : GOTO 10
```

Jerry W. Jarvis
Spokane, WA

$1DE C-16 tips—The Warm Start command is SYS 32768. This is similar to SYS 64738 on the C-64 and SYS 64802 on the VIC. When using the Else command, you must precede it with a colon. All in all, the Commodore 16 is a very nice little machine.

Bob Underdown
Fayetteville, AR

$1DF Directory printer—This program loads and prints a disk directory, with no keyboard input from you.

```
100 PRINT " {SHIFT CLR}{3 CRSR DNs} LOAD" CHR$(34) "$"
    CHR$(34) ",8"
110 PRINT " {4 CRSR DNs} OPEN4,4:CMD4:LIST"
120 PRINT "PRINT#4:CLOSE4 {HOME}"
130 POKE 198,5 : FOR J = 1 TO 5 : POKE 630 + J,13 : NEXT : END
```

Alan Sperling, Esq.
Mount Lebanon, PA

$1E0 Automatic appender—Use this program to append other ones, with no Direct mode Pokes to fool around with.

```
1 INPUT "PROGRAM TO APPEND";A$ : INPUT "DRIVE 8 OR 9";U
2 A = PEEK(44) : PRINT " {SHIFT CLR}{3 CRSR DNs} LOAD"
  CHR$(34) A$ CHR$(34) CHR$(44) U CHR$ (141);
3 PRINT " {4 CRSR DNs} POKE 43,1 : POKE 44, " A " {HOME} "
4 POKE 632,13 : POKE 633,13 : POKE 634,13 : POKE 198,3
5 IF PEEK(45) < 2 THEN POKE 43,PEEK(45) – 2 + 255 : POKE
  44,PEEK(46) – 1 : END
6 POKE 43,PEEK(45) – 2 : POKE 44,PEEK(46) : END
```


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Make sure your disk has a copy of your main program and the programs you wish to append. Run this program, entering the name of your main program in response to the first prompt. (The first line number in the main program must be higher than 6.) Then enter the device number of the drive your disk is in.

To append to the main program, run the automatic appender again, this time answering the first prompt with the name of the next program to append. Its line numbers must all be higher than the last line number in the main program. You may continue to append as many programs as you wish, provided their line numbers are all higher than those in the program currently in memory.

When you've finished, remove lines 1–6, then save your combined programs.

Alan Leish
Address unknown

$1E1 Debugging tip—Debugging a routine that follows several Input statements can be the ultimate in tedium, since you must make all the inputs each time you run the program. Avoid this useless repetition by temporarily changing the Input statements to Read statements, and providing data for them to read. For example, instead of

```
100 INPUT A,B,C
110 Rest of program
```

you can temporarily use

```
100 REM INPUT A,B,C
102 READ A,B,C : DATA 12,34,56
110 Rest of program
```

This will quickly get you into the more troublesome parts of your program.

Peter L. Rasco, Jr.
Address unknown

$1E2 Programming tip—When developing a program, you can save time by making the last step a List rather than an End. Then when the program is run, you can see the results and easily make any needed changes. When the program is right, just change List to End, then save it.

John P. Oprea
Kirkland, WA

$1E3 Simplest trace—Whenever the C-64 executes a SYS 48578, it prints the word IN and the line number in which the command appears. By including these SYS calls at various points in your program, you can find what has been executed and when. An even slicker method is to set T = 48578, and execute SYST any time you want to trace.

Dennis J. Spranger
Eland, WI

$1E4 Named subroutines—They are easy. Just do this:

```
100 GOSUB 1000:SUBROUTINE NAME : Rest of line goes here
```

It works because, when Basic returns from the subroutine, it looks for the next colon or line number, ignoring the subroutine name. It's useful because it lets you put a remark inside a program line, while eliminating the need for the REM statement.

Richard Murray
Red Deer, Alberta
Canada

$1E5 No-question-mark Input—Here's an easy way to get it:

```
10 POKE 631,154 : POKE 198,1 : INPUT"PROMPT {CTRL 7}";IN$
```

The {CTRL 7} changes the print color to dark blue, so the question mark, though printed, is invisible. The two Pokes put a light-blue character into the keyboard buffer, so your response to the prompt will be visible. If you aren't using these screen and print colors, change the {CTRL 7} and the CHR$(154) to the appropriate values, found in your user's manual.

Steve Freedkin
East Lansing, MI

$1E6 For...Next statements—These initialize the loop variable before they compute the loop's end. You can use this to your benefit, especially if you're working in Direct mode. Take, for instance, the clearing of C-64 color memory, where it's common to remember the start as 1024 + 54272:

```
FOR I = 1024 + 54272 TO 1024 + 54272 + 1024 : POKE I,PEEK(646)
: NEXT
```

can be shortened to

```
FOR I = 1024 + 54272 TO I + 1024 : POKE I,PEEK(646) : NEXT
```

Curtis Sieber
Somerville, AL

$1E7 Program overlays—When the Load command is used in Program mode, the loaded program must be shorter than the one that loads it. As soon as it loads, the second program is automatically executed, and any variables set by the first program retain their values.

For string variables, however, things are not so simple. Their values will be lost unless the first program has concatenated them to something. If A$ = "TEXT", just use A$ = "TEXT" + "", and the necessary condition will have been met.

Reinhard Ruscher
Szekesfehervar, Hungary

$1E8 Decimal flags—Here's an easy way to put six flags in one integer variable. It uses the first six prime numbers (2, 3, 5, 7, 11 and 13) as flags for six conditions. Multiply together the prime numbers corresponding to each "ON" condition, and put the result in an integer variable. For example, if conditions 3, 4 and

Continued on p. 103.

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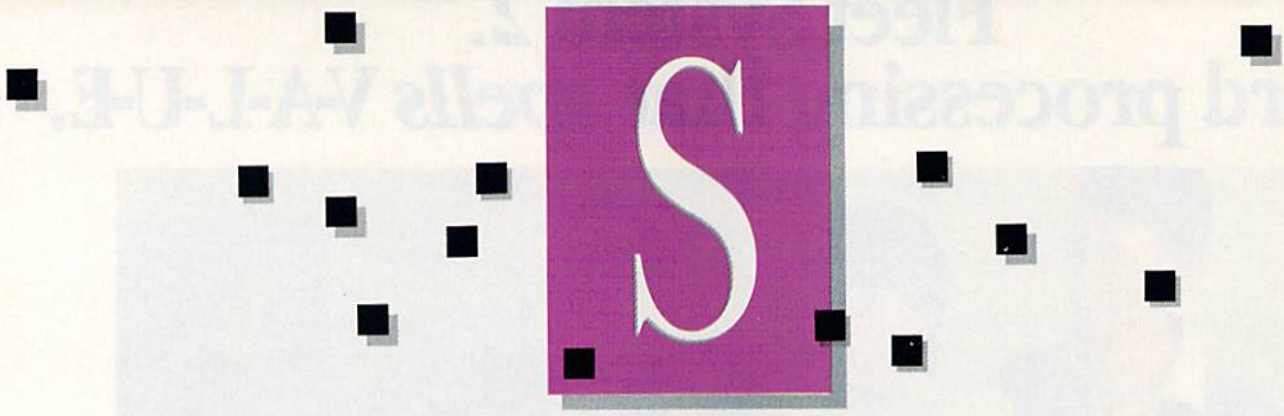

Compiled by SUSAN TANONA

Plantin' Pal

B

Everything You Need to Make this Year's Garden A Healthy Success

It's time to plant your vegetable garden, so get out your equipment, beginning with your C-64. You can plan your entire vegetable garden by using an exciting and comprehensive new program called Plantin' Pal, which is written and adapted for garden hobbyists in each of the 50 states.

Plantin' Pal shows you exactly how to lay out your garden, gives you the earliest and latest dates that you can plant each vegetable and much more. You can also print out your garden, complete with detailed instructions on when to plant each vegetable, whether to use plants or seeds and how far apart to plant.

Plantin' Pal is also designed to increase your yield considerably, by using wide rows of 20-inch planting spaces that run the length of your garden, from west to east.

You begin by typing in the dimensions of your garden. With this information, the computer rapidly calculates the number of rows available to you.

Next, enter the vegetables you would like to plant, and the program will tell you how they should be planted, from north to south.

The computer will next display your garden, laid out with some clever graphics representing each type of vegetable you've chosen.

The Tips section of the program offers information on pests and diseases, as well as on the ideal climate for a particular vegetable. Plantin' Pal also offers options that deal with what you plan to do with your vegetables—how many people you want to feed, whether you will serve the vegetables fresh or will can them, and so on.

The manual accompanying Plantin' Pal is outstanding. It not only explains the program, but also includes a wealth of helpful information—best soil types for various plants, the right pH and so on.

Although I think this program is a remarkable and unique application of the C-64, I have a few suggestions. First, I wish I could have saved my data. What if I lost my printout, or I don't even have a printer? (You really *do* need a printer to get maximum value from the program.) Or perhaps I'd like to modify what I previously put into the program without starting over from the beginning.

Plantin' Pal offers considerable value for the price, and I'd recommend it to home gardeners, as well as to local garden clubs. The program is easy to follow and it's tremendous fun. I'm meticulously following my plan, and expect great results very soon. *(Home and Hobby Software, 4936 Morgan Ave. South, Minneapolis, MN 55409. C-64/$29.95 disk.)*

Christine Adamec
Palm Bay, FL

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

Raid on Bungeling Bay

A

Challenging Action That Will Keep You Coming Back for More

If you're bored with computer games, get ready to break out of your rut. Raid on Bungeling Bay may be the best mixture of strategy and arcade action yet to surface. If an arcade game can be judged as a classic, this one passes the test.

When the game begins, you are sitting on the deck of an aircraft carrier off-shore from several very hostile islands. These islands contain six

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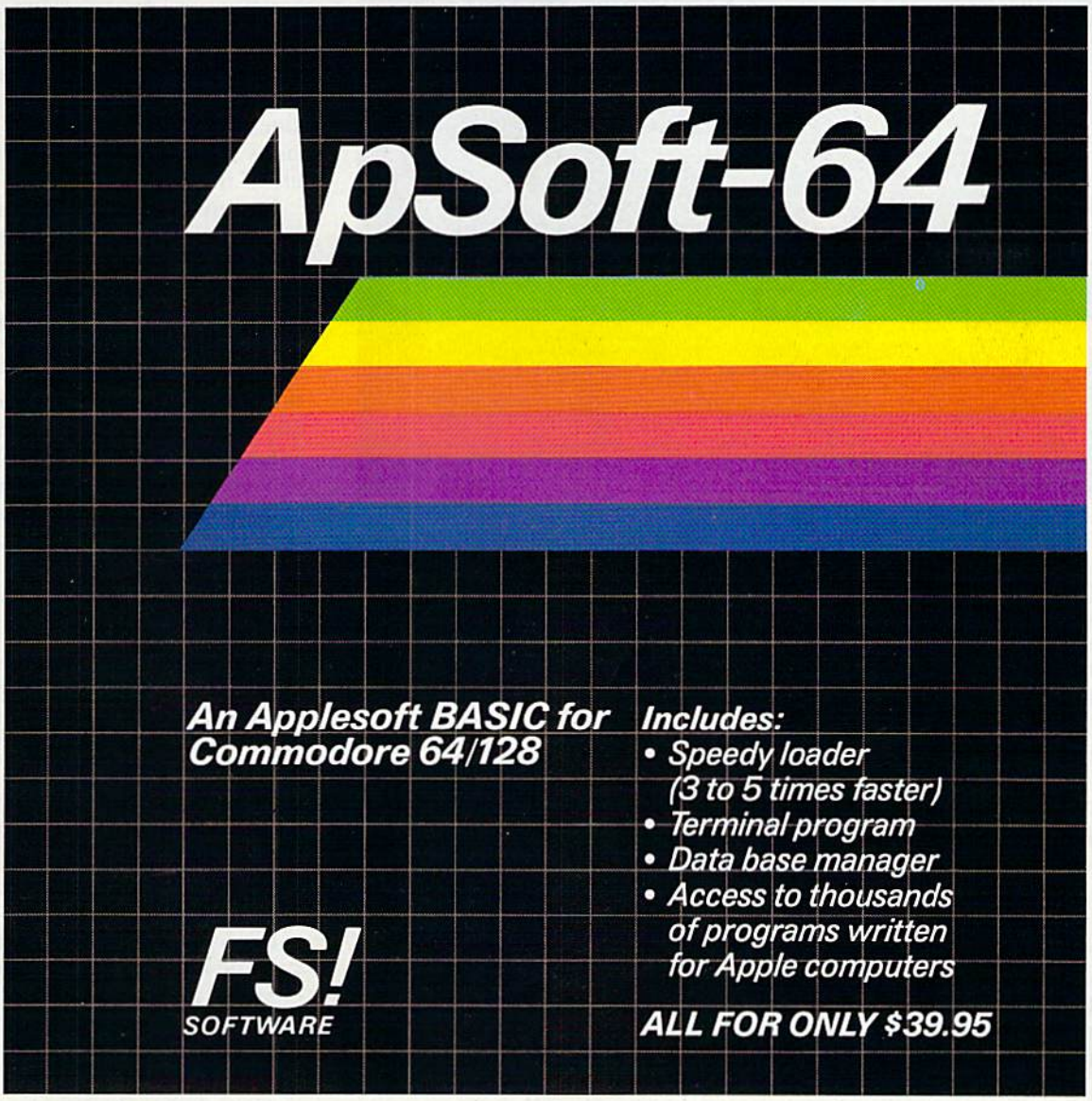

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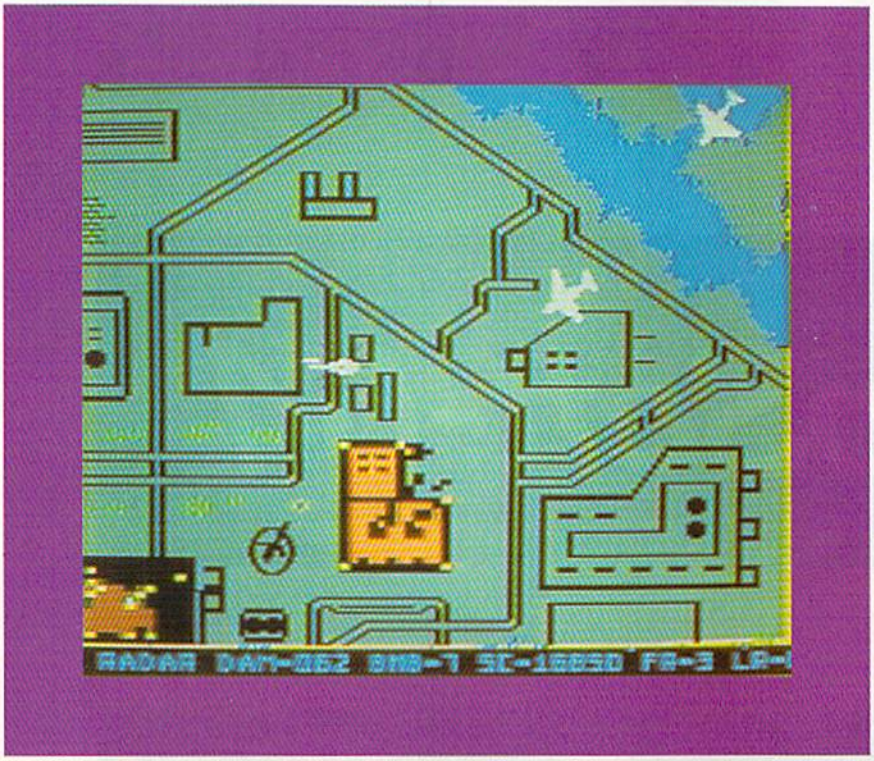

factories that churn out war materiel and are protected by tanks, anti-aircraft batteries, radar, bombers, gunboats and fighter planes. Also, in a hidden harbor, workers are feverishly building a battleship that is armed with missiles.

Your mission is to stop this war machine from destroying the earth, and your only vehicle is a super-powered helicopter. As you lift off the carrier's deck, you are treated to a bird's-eye view of the planet. As your chopper flies, the detail below is outstanding. In any direction that you move, the ocean and islands below scroll with amazing detail.

Raid on Bungeling Bay has no boundaries. The game spans 100 screens and since the planet is a sphere, if you fly long and far enough, you will return to where you began.

Welcome to the challenge of Raid on Bungeling Bay. To win, you must destroy all six factories, protect your carrier, prevent the battleship from putting to sea and survive. Beware, this game may be addictive. The challenge remains, game after game.

There were two things I did not like about Raid on Bungeling Bay. The program causes the red read/write light on the 1541 disk drive to remain on at all times, as it continually updates the file containing top scores of the game. This could cause the heat-sensitive disk drive to overheat.

Also, there is no Quit option. To stop playing, you must turn off the computer. However, this is only a minor drawback.

If you like arcade or strategy games, you should love this program. It's fast, always changing and a constant challenge. Raid on Bungeling Bay has the qualities of a genuine classic. *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/$29.95 disk.)*

Gary Fields
Asheville, NC

SpryteByter

B

This Handy Utility Puts the Byte On Sprites

Designing sprites for the Commodore 64 is a simple concept, but implementing the designs is complex and quite tedious. Many times, what seems like a good design on paper doesn't make it on the screen.

That's where SpryteByter comes in: It lets you quickly and easily design your sprite, using the left side of your display for the 24 × 21 grid of a sprite work board, the upper-right corner to display the sprite (in all four possible configurations) and the lower-right corner as an options menu.

When you first enter the program, the work area is filled with plus signs, and the cursor is in the upper-left corner. The sprite work area is considered to be blank, and the plus signs signify that the individual pixels of the sprite are off.

You maneuver around the grid using the cursor keys (or a joystick) and draw by pressing the space bar (or joystick fire-button). Pressing the space bar changes the plus symbol under the cursor to a reverse plus symbol (dark background). Pressing the space bar a second time restores the plus to its normal off mode.

Each plus symbol that you turn on is echoed by the corresponding pixel in each of the sprites in the upper-right corner of the display. Thus, as you create your sprite, you can see precisely how it looks and can adjust your creation in progress, as you desire.

This isn't all that you can do, however, because the sprite menu in the lower-left corner gives you five more capabilities, as well as access to other options menus.

When your sprite is completed, you can switch to one of the other seven menus (Shift, Rotate, Data, Review, Color, Color submenu 1 and Color submenu 2).

For creating sprites, SpryteByter can't be beat. It cuts the time used in creating a sprite to almost nothing, letting you concentrate on the sprite itself and not the mechanics of making it.

One problem I've had with the program is that the Disk Option menu doesn't match the one listed in the documentation: The manual states that the menu has a Read Directory option, whereas the program simply prompts for a disk command.

The only other complaint I have is that there isn't a way to save the sprite information to disk as standard Basic data statements. Instead, you must copy the information into your program by hand.

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To offset these complaints, SpryteByter includes a Game-Maker program that you can integrate into your Basic programs. This special program lets you have 31 different sprites in memory simultaneously, with options to review the sprites in sequence while programming. When your program is completed, you can save it, the sprites and the Game-Maker module as one program.

If you like to experiment with graphics, SpryteByter is an excellent way to jazz up your programs without taking a prohibitively long time to do it. *(Microtechnic Solutions, PO Box 2940, New Haven, CT 06515. C-64/ $34.95 disk.)*

Terry Kepner
Peterborough, NH

Ghostbusters

B

Open Your Own Ghostbusting Business. Don't Get Slimed!

Activision's Ghostbusters is a game that successfully combines the essence of the movie, *Ghostbusters*, with the challenge of monetary strategy that you find in games such as Monopoly.

The object of Ghostbusters is for you to earn as much money as possible trapping slimers (little green ghosts that hover above certain buildings), while stopping roamers (spirits that haunt the city streets) from making their way to the Zuul Building, or coming together to form the very destructive Marshmallow Man.

When the game begins, you receive $10,000 from the bank, as an advance to set up your ghost-extermination franchise.

The first thing you'll need is a vehicle to transport you around the city. You have four models of automobile to choose from, each with its varying prices, advantages and disadvantages.

Next, you must choose equipment to help you locate, capture and hold the pesty little spirits of the game. These items range from a PK energy detector, which warns of the presence of ghosts in a structure, to a portable laser confinement system that will store up to ten slimers at one time in your automobile.

Graphics in the program are well designed, as they closely resemble characters from the movie *Ghostbusters*, and provide a graphic freshness not commonly found in computer games.

The program offers detailed screens that complicate the game and really challenge you. Each screen displays excellent movement, exceptional graphics and a touch of genuine imagination.

Sound effects in the program come in various forms. The *Ghostbusters*' theme is authentically done, has multiple voices and plays throughout the game. Phrases such as "I've been slimed," as well as an eerie, sinister laugh, contribute greatly to the quality of the program.

I found Ghostbusters to be a unique product. It contains superior graphics, original sound effects and challenges that I've not found in other computer games. The very imaginative extra features in the program place it a notch above many others.

I did discover a few limitations to the game. The program should have been constructed so that two or more players could compete at one time. Also, the musical score could use some variation, as it tends to become monotonous.

Overall, Ghostbusters is an excellent game that should keep you busy for quite some time. It provides a refreshing change of pace for adults who are tired of playing games that are designed for youngsters. This is a program that will capture the hearts of C-64 game players everywhere. *(Activision, Inc., PO Box 7287, Mountain View, CA 94039. C-64/$34.95 disk.)*

John Jermaine
Taylorville, IL

Pascal-64

B

An Updated Development System for Your Programming Pleasure

Pascal-64, the newest Pascal release from Abacus Software, is a definite improvement over its predecessor, Zoom Pascal. It provides a full compiler that supports a complete range of standard Pascal features. For the price and the ease of use, this compiler is a safe buy for those who want to learn Pascal and develop programs.

Pascal-64's full compiler supports such standard Pascal features as If...Then...Else, Repeat...Until, While...Do and Goto. Data types

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handled by Pascal-64 include real, integer, Boolean, set, array, packed array and sequential or relative files. Input/output commands include Read, Readln, Write, Writeln, Get and Close.

As for memory availability, the compiler itself takes up very little space. You can compile a single program of up to 38K. Additionally, Pascal-64 can be used with the Assembler/Monitor-64, also from Abacus, which lets you run two programs concurrently. Programs created on the Pascal-64 compiler will execute 10 to 20 times faster than their Basic counterparts because they are compiled into actual 6502 machine code.

With Pascal-64, you can use the C-64's Basic editor for program development. All you have to do is begin typing after powering up, rather than loading in a strange editor with new commands. This is very helpful to people just learning Pascal.

All the regular editing keys work as in Basic. Line numbers are used as well, but this does not negate the possibility of practicing standard Pascal formatting. You can make indentations just as you would in any other Pascal editor.

The Pascal-64 compiler takes your original program, which is in source code, and translates it into p-code (an intermediate code between English and pure machine code). A loader program translates the p-code into an actual machine language program, which can then be treated like any other Basic program that you are used to handling with Save, Load and Run.

Also included on the master disk is a linker program that allows you to insert external machine language routines into your Pascal programs. Anyone can run your compiled Pascal program on their C-64 without the presence of Pascal-64.

The 75-page Pascal-64 manual is one of the best you will come across for the C-64. It clearly explains the features of Pascal and how to implement them in your programs.

Another feature that is helpful in this manual is that it draws comparisons to Basic. A person with a working knowledge of Basic will like this, as it takes much of the mystery out of learning this new language.

For the price (and Abacus offers even lower rates for schools), you won't go wrong with Pascal-64. It has a strong manual and it is very easy to learn to use. *(Abacus Software, PO Box 7211, Grand Rapids, MI 49510. C-64/$39 disk.)*

Margaret Morabito
***RUN* staff**

U.S. Constitution Tutor

B

Let Your Commodore Quiz You on the Constitution

When the original U.S. Constitution was drafted almost 200 years ago, it outlined the structure of our federal government and briefly described the powers and rights of the states. Twenty-six amendments and 195 years later, the Constitution has grown to include guidelines on a wide range of legal issues. Because of the length and structure of today's Constitution, it is ideally suited to be studied with the home computer.

MicroLab's U.S. Constitution Tutor is a two-sided disk that presents material on the Constitution in a logical and straightforward manner. Areas of concentration include: the legislative branch and how a bill becomes a law, the executive branch, elections, the judicial branch and constitutional principles (including separate sections on constitutional amendments and rights).

In addition, you may choose to study either one area at a time or a cross section of questions from all the topics on one side of the disk, at the beginning, intermediate or advanced level. No matter which option you select, you may study in either the Tutorial or Test mode.

In the Tutorial mode, you are given a series of multiple-choice questions. After each, you have the option to answer it, skip ahead to the next question or call up a special Help screen relating to the question. After answering a question, you are told immediately whether or not you are correct and why.

The Test mode, though similar in format, more closely simulates the actual testing experience. There are no Help screens available, and you don't learn which questions you've answered correctly until the entire test has been completed. You may then review the questions you answered incorrectly and pinpoint your particular areas of difficulty.

The program comes with a well-written, 50-page booklet that explains how the study material is organized on the disk and how to get the most from the program. Also included are several study questions with a teacher's guide, a matching test for extra practice and hardcopies of the program's Help screens. A bibliography that suggests references for further study rounds out the package.

While there's no doubt that Myrna Helfand, the author behind U.S. Constitution Tutor, knows her material, and that proper use of the program will help you achieve higher exam scores, you might want to think carefully before spending over $30 for a program you may only use for one semester.

If, on the other hand, you would rather not wade through piles of history books, you will find U.S. Constitution Tutor a useful program that presents old material in a refreshing new light. *(MicroLab, 2699 Skokie Valley Road, Highland Park, IL 60035. C-64/$35 disk.)*

Bob Guerra
Charlestown, MA

CLAS

D

A Program to Help Plan a Child's Education

CLAS stands for computerized lesson authoring system. At first glance, it is a straightforward and useful program, with good documentation. Even people with little computer experience can be writing lessons only minutes after reading the manual.

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However, CLAS has serious limitations. Its operating conditions are so badly designed that I cannot recommend the program for either school or business use. The program can be effective for home use, where parents might wish to develop computer learning materials to enhance their child's schoolwork. However, this program should not be used in any situation where file loss could cause a serious problem.

What CLAS does, it does nicely. A single file can be up to 250 lines, with two courses of ten lessons each, and individual lessons may have up to 30 problems. This format is long enough for simple concepts and for students of up to the junior-high level.

Lessons are in text only. They contain no graphics and only some simple arithmetic. CLAS does not provide for alternate ways to answer a problem. Lessons don't let students who know one set of materials skip to more challenging problems, nor do they provide a record of how the student is doing. Compared to a standard authoring system such as Pilot, CLAS is too superficial and inflexible to be a serious educational tool.

Every procedure in CLAS is a separate program, which means a lot of loading time. It took me more than 20 minutes to create, test and prepare a seven-line lesson.

The program uses methods that are ineffective teaching tools, especially for today's video-sophisticated children. Correct answers flash "Right!" or "Good!" on the screen three times, to the tune of a little fanfare that drove me crazy. Errors produce a polite buzz and the computer refuses to continue until the student types the correct answer.

The authoring disk is copy protected, so you can't make a backup. You also cannot run the disk with a write-protect tab, because all files must be written to the program disk before they can be prepared for the student lesson disks. Once committed to the student disks, these files can be replaced, but not edited.

The program does not store the editable course files on a data disk, nor does it provide a file copier. Teachers with the maximum of nine 250-line files on the program disk must choose between destroying a file that might have some future use and not creating any new files.

Even with its limitations, I liked some aspects of the CLAS system, especially for parents who want to help children with learning disabilities. But no teacher can afford computer lessons that can't be backed up, protected or saved. I sympathize with Touch Technologies' desire to protect against copying, but the result is a system too limited to be useful to any school. *(Touch Technologies, 609 S. Escondido Blvd., Escondido, CA 92025. C-64/$89.95 disk.)*

Annette Hinshaw
Tulsa, OK

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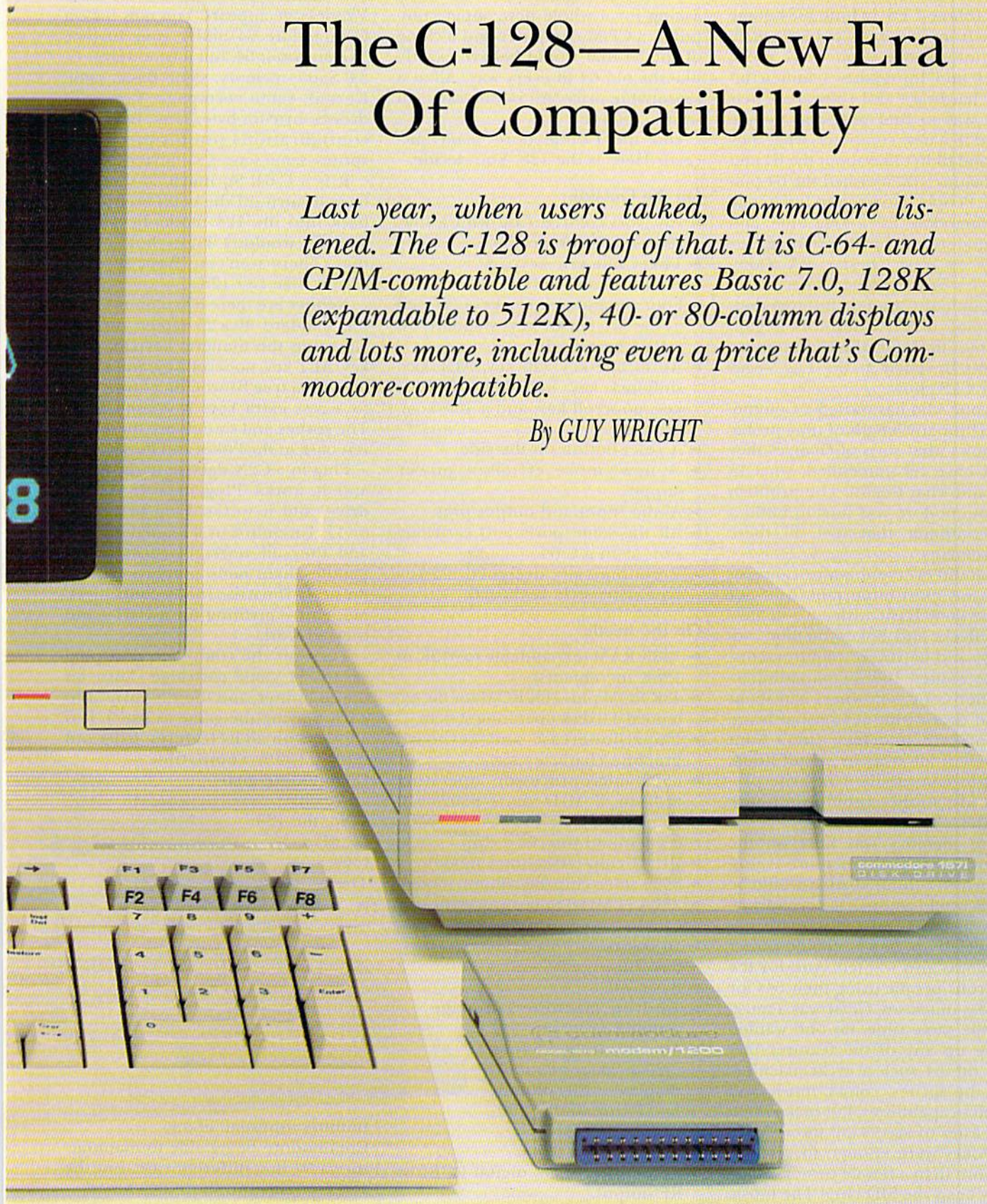
The C-128—A New Era Of Compatibility

Last year, when users talked, Commodore listened. The C-128 is proof of that. It is C-64- and CP/M-compatible and features Basic 7.0, 128K (expandable to 512K), 40- or 80-column displays and lots more, including even a price that's Commodore-compatible.

By GUY WRIGHT



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At the Chicago Consumer Electronics Show (CES) in June 1984, some people from Commodore began gathering information from C-64 users, dealers and third-party manufacturers of hardware and software. Their object was to find out what people wanted in a new computer, what they liked and didn't like about the 64 and what features they wished the 64 possessed. People had been trying to talk to Commodore for a long time, and Commodore was finally listening.

Back in West Chester, PA (Commodore's American headquarters), a development team was put together, the project defined and work begun. Nine months later, the Commodore 128 was unveiled at the Las Vegas winter CES show.

Anyone who has owned a Commodore 64 for any length of time probably knows what sorts of changes they would have recommended, what to keep and what to add. The problem for Commodore was how to build a new computer that met all these requirements.

What did everyone want? Compatibility was most important. And not just the same Basic with a whole new set of Peeks and Pokes, memory addresses and hardware requirements. People wanted 100% compatibility.

Millions of C-64 owners had spent a good deal of money on hardware and software, and they didn't want to throw it all away or spend hours trying to convert their favorite programs just so they could own a new machine.

More memory was next on the list—twice as much, or more if possible. An 80-column display would be nice, as would a numeric keypad, better Basic and a faster disk drive!

A beefed-up, more reliable power supply was also wanted. And for the numerous people using their 64s for business purposes, CP/M was a must.

At the same time, no one wanted to give up any of the features that made the 64 such a great machine. Keep the sprites, colors, music and graphics capabilities, but make them a bit easier to access (all those Peeks and Pokes were enough to discourage more than a few 64 owners). Definitely keep the SID chip! The music and sounds of the 64 were a treasure no one wanted to sacrifice.

And probably the biggest concern was the bottom line—the price!

Simple enough. People were only asking for a whole new, super computer, a CP/M computer and a clone of the 64 that would behave exactly like the old 64 in every way. All at a reasonable price. All in one case. All in nine months.

Did the Commodore team succeed? Here is the 128. You decide.

On the Outside

- An ivory-colored case with a low, sports-car-sleek profile.
- 14-key numeric keypad.
- Four function keys.
- Four separate cursor keys (as well as the two cursor keys standard on a C-64 keyboard).
- An escape key, tab key, ALT key, shift-lock key, help key, line-feed key, no-scroll key, and a 40/80-column key.
- A reset button on the side.
- A new, more efficient power supply.
- Audio input and output pins.
- All the same ports and cartridge slots as in a C-64.
- Ergonomically designed, 92-key typewriter-style keyboard.

On the Inside

- 128K RAM (expandable to 512K in 128K increments).
- 48K ROM plus 16K ROM for the extended 4.0 disk operating system.
- Upper/lowercase and keyboard graphics character sets.
- 8502 microprocessor, operating at 1 or 2 MHz (it is 6502/6510 compatible).
- 6581 sound interface chip.
- VIC-II chip (40-column mode).
- 8563 video chip (80-column mode).
- Z80A (4 MHz) microprocessor (for CP/M).
- 16 colors.
- 8 sprites.
- Basic 7.0.
- Built-in machine language monitor program.
- 40-column by 25-line (320 × 200 resolution) display or 80-column by 25-line (640 × 200 resolution) display.
- CP/M version 3.0.
- Composite video, digital RGBI or RF output.

What does all that mean? Three computers in one (five, if you consider 40/80-column modes as separate).

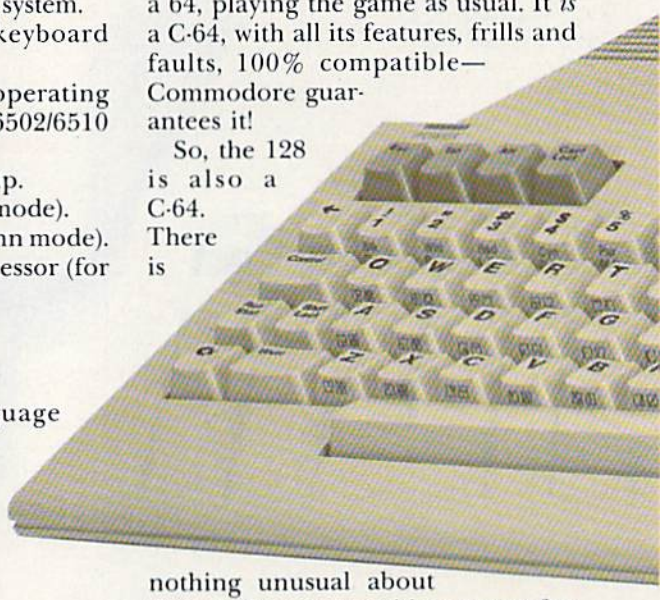
Turn on the 128 and type GO 64. The familiar 38911 bytes free, Basic V2 message appears. You now have a Commodore 64 under your fingers. Not an *almost* 64, but a true, 100% C-64! Same memory, same Basic, same Kernal, same zero-page, same addresses byte-for-byte, same hardware configurations pin-for-pin, same sprites, same sound, same *everything*!

It is a C-64! So much so that you have to turn off the computer to get back into the 128 mode, because a true 64 wouldn't know how to do that. (There aren't any Basic 2.0 commands, like GO 128.)

Neither are there 80 columns—just the standard 40 × 25 screen display. No using the numeric keypad, help key, ALT key, no-scroll key, and so on, because a true 64 wouldn't know how to access extra keys it doesn't have. The sprites and sounds are there, but it is back to the Pokes and Peeks.

Plug in a C2N datassette recorder, and it works. Plug in a 1541 disk drive, and it works. Plug in a 1702 or 1701 monitor or a regular TV set, and they all work. Joysticks, game paddles, light pens, graphics tablets, music keyboards, robot controllers, modems—anything for a C-64—and they all work!

Turn off the computer, and plug in a C-64 game cartridge. Turn on the computer, and the 128 turns into a 64, playing the game as usual. It *is* a C-64, with all its features, frills and faults, 100% compatible—Commodore guarantees it!



So, the 128 is also a C-64. There is nothing unusual about Commodore being able to manufacture a 64 in a different case. But the 128 contains two more machines!

CP/M Mode

Put the CP/M disk in the drive and turn on the 128. Automatically, the

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COMMODORE 128 FEATURES

COMMODORE BEATS THE COMPETITION WITH THE NEW COMMODORE 128 PERSONAL COMPUTER

NATIVE MODE

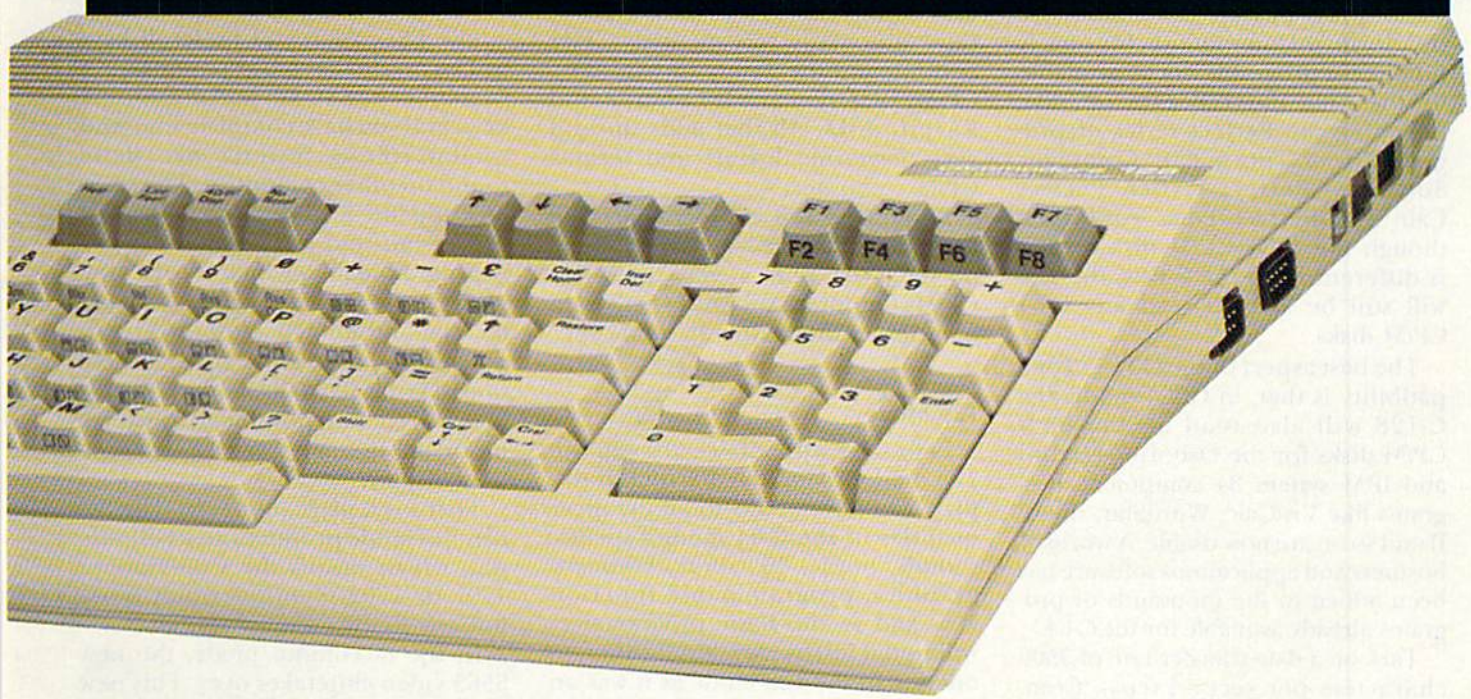
- New enhanced Kernal
- BASIC 7.0
- 40 column output via VIC II
- 80 column output via 8563 chip
- Sound via SID chip
- Access to 128K bytes of RAM
- Extended keyboard
- Fast access serial disk drive
- Operates 512K RAM disk

COMMODORE 64 COMPATIBLE MODE

- C-64 software compatible
- C-64 peripheral compatible
- Standard C-64 key layout
- SID sound chip
- Standard C-64 Kernal
- BASIC 2.0
- Access to 64K bytes
- 40 column output
- 8 movable display objects

CP/M Mode

- CP/M 3.0 via integral Z-80A
- 40/80 character column output
- Sound via SID chip
- Fast access serial disk drive
- Operates 512K RAM disk



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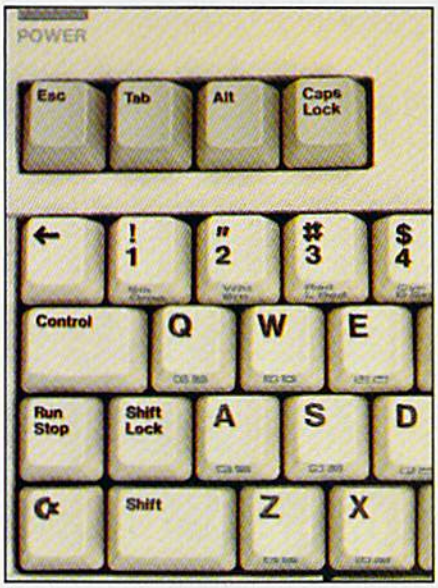

computer boots up CP/M Plus, Version 3.0, and you are ready to begin using the C-128 with all that CP/M software available. As a bonus, you still have access to the SID chip for music and sounds and the VIC-II chip for sprites. You can also use the 8563 video chip (using an Assign statement) for 80-column displays.

Who is going to be producing CP/M programs in a Commodore disk format? Commodore, for one. A number of programs will be available by the time the 128 goes on sale, including the Perfect series of programs from Thorn EMI Computer Software—Perfect Writer, Perfect Calc and Perfect Filer. And even though the 128's CP/M disk format is different from the C-64's, the 128 will still be able to read any C-64 CP/M disks.

The best aspect of the C-128's compatibility is that, in CP/M mode, the C-128 will also read off-the-shelf CP/M disks for the Osborne, Kaypro and IBM system 34 computers. Programs like VisiCalc, WordStar, dBase II and so on are now usable. A world of business and applications software has been added to the thousands of programs already available for the C-64.

Tack on a data-transfer rate of 3500 characters per second (cps). Compare that to the usual 1541 speed of about 320 cps, and the advantages are obvious.

There is even a disk speed "burst" mode that enables data-transfer rates up to 4000 cps. Also, in the CP/M mode, you have access to the full 128K of memory, plus disk data storage of up to 410K (compared to the 1541's 170K).

So the 128 in CP/M mode features a Z80A microprocessor operating at 4 MHz, 128K expandable to 512K, 40 × 25 or 80 × 25 display, a total of 16 colors, sound, music, sprites, 410K disk storage, 3500 cps data-transfer rate, automatic or manual CP/M booting and the ability to read C-64 CP/M, IBM system 34, Osborne and Kaypro disks. All that adds up to a very powerful, flexible and serious CP/M computer!

So far, the 128 is two remarkable computers in one—a perfect clone of the C-64 and a very powerful CP/M computer. And we haven't even mentioned the main 128 mode yet!

128 Mode

Let's start with a few extras in the 128 mode. Using the 40-column display, you have access to all the nicer qualities of the C-64 mode—sprites, sounds, music, 16 colors, keyboard graphics, programmable function keys and so on. Basic programmers will find it just as easy, if not easier, to operate in the 128 mode as it was on the 64. (It's not 100% compatible in the 128 mode, but if you need 100%, just enter GO 64.)

The 128 mode gives you much more than the C-64. It provides 128K of programmable memory, divided into two 64K banks. The first bank of 64K is usable for programs, and the second is used for string, variable and array storage. This means that large arrays don't steal valuable program storage space. (A side note here: Commodore has devised some new variable, string and array storage techniques that should almost eliminate the "garbage collection" problems that can sometimes slow a program's operation.)

At the time of this writing, it is not clear how Commodore is planning to implement the memory expandability of the 128 (or when), but 512K—whether it involves bank switching, RAM disk or true accessibility—is going to provide a lot of space for all kinds of programs.

In the 128 mode, you can now use all of the 92 keys. A complete 14-key numeric keypad makes numeric calculating, data entry and programming a lot easier. Four separate cursor/arrow keys simplify word processing, gaming and editing.

Those familiar with the Plus/4 computer will appreciate the help key. If a program crashes with an error, just press the help key; the line where the error occurred will be displayed, with the error flashing in reverse video.

The ESC, ALT and no-scroll keys will be invaluable programming aids. Combine the ESC key and the normal keys, and you have complete line- and window-editing features like those found on other computers. The shift-lock and line-feed keys will help word processing, and just about every key is programmable, which means simplified, one-key commands for commercial and homemade software.

The one extra key I haven't mentioned is the 40/80 display key. Lock it in the 80-column position before turning on the 128, and you have an 80-column display.

There is a price, however. The 80-column mode produces an RGBI output, which means the Commodore 1701 or 1702 monitors won't work, but any RGBI monitor should.

In the 80-column mode, the new 8563 video chip takes over. This new chip still has the VIC-II chip's color and bit-mapped graphics capabilities and, of course, upper- and lowercase letters. The new 8563 also doubles the screen resolution from 320 × 200

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pixels to 640×200 pixels (imagine the graphics!).

Basic 7.0

Now, to some of the internal differences. Basic 7.0 is without question the most comprehensive, advanced form of the Basic language Commodore has ever produced. With over 140 commands, statements and functions, programming in Basic will take on a whole new meaning.

For those who learned Basic on the C-64 or VIC-20 (Version 2.0), all the commands are still there. For those who learned Basic on the early PET/CBM machines (Version 4.0), all the disk commands are present in Basic 7.0. For those who learned on the Plus/4 or C-16 (Version 3.5 Basic), you won't miss a thing.

Add on the Super Expander commands, those from Simons' Basic and throw in a handful of new ones, plus the 14 other commands for the built-in machine language monitor program, and you end up with Basic 7.0. Thirty-four commands, 35 statements and 13 functions above and beyond a C-64!

Graphics commands like Circle, Box, Paint, Draw, Width, Char, Color, Rdot, Rgr, Rclr and Graphic (many using multiple parameters, making them serve more than one duty) will open up graphics programming.

Commands such as Movespr, Collision, Bump, Rsprite, Rspos and Rspcolor take the frustration out of manipulating sprites. There are also commands for setting up, saving and loading sprites (Sprite and Sprsave).

The same sort of treatment was given to the SID chip. Sound and music commands, like Vol, Envelope, Filter, Tempo, Sound and Play, were added.

Commodore also added some of the control features of Pascal programming language to Basic 7.0: If...Then...Else, Do, Loop, While, Until, Exit, Begin and Bend, plus a few other goodies like Trap and Resume, Print Using and Pudef (print using define), Dec and Hex$ (for converting numbers from one base to another), and Window and Rwindow for (you guessed it) windowing.

To help you write your programs using all the new commands, there are others that perform such feats as automatic line numbering, line renumbering and deleting ranges of lines. In debugging your program once it is finished, there is Help, either the key or the command, to locate those obvious errors, and also Tron and Troff, to help follow the flow of a running program with a trace feature, printing each line number on the screen as it is executed.

For machine language buffs, the built-in monitor offers the standard set of commands to load, save, display the registers, exit to Basic, memory dump, transfer a range, fill a range, compare a range, assemble and disassemble. All in all, a nice little monitor program.

Once you have created and debugged that masterpiece of programming, you may choose from a collection of commands for getting information to and from the disk drive. For example, Directory and Catalog, Bsave and Bload (to utilize both 64K memory banks of the 128), Record (for relative file record selection and pointer positioning) and two new disk commands—Dclear (clears all open disk channels) and Boot (automatically loads and runs a program). No more having to enter:

```
OPEN15,8,15:PRINT#15,"NEW0:TEST3,AA":
CLOSE15
```

Now that there are all sorts of easier disk commands to save time, it would be remiss of Commodore to force people to wait for the drive to catch up, as with the 1541. With the C-128, Commodore is also introducing the 1571 disk drive, which should speed things up a bit. In the 128 mode, this drive features a data-transfer rate of 1500 cps (which is five times faster than a 1541), and, as mentioned earlier, a special Burst mode may bring disk speeds up to 4000 characters per second.

There is only one remaining question: What is the price of this impressive 3-in-1 machine? Around $250, unless something drastic happens (and for that much power, who is going to quibble about a $10 or $20 difference?).

Peripherals

Before wrapping up this report, let me mention some of the new peripherals that Commodore has planned for the 128.

The 1571, a new 5¼-inch disk drive, will have three modes of operation—64, CP/M and 128. It will transfer data at 300 cps in 64 mode, 1500 cps in 128 mode, 3500 cps in CP/M mode and up to 4000 cps in the Burst mode. It uses double-sided, single-density, 350K formatted disk storage in the 64 and 128 modes, and double-sided, double-density, 410K formatted disk storage capacity in the CP/M mode. The 1571 is also compatible with the 128, C-64, Plus/4, LCD, C-16 and VIC-20! There's talk of a new Commodore dual drive as well.

Next are two new monitors to handle that RGBI output from the 128 in 80-column mode: the 1901 monochrome monitor and the 1902 color monitor. The 1902 supports both 40- and 80-column RGBI or composite input, which means it will work with the C-64, the VIC-20, the Plus/4, the C-16 and, of course, the 128. (Are you beginning to see a pattern here?)

There is also a new modem, the 1670, which features 300/1200 baud, auto-dial, auto-answer, auto-baud and auto-parity. It works with the C-64, C-128, Plus/4 and VIC-20.

There's also a mouse and the Jane 2.0 icon-based, picture-driven series of programs and...and...and...

Final conclusions? I'm going to buy a 128 the minute I can lay my hands on one. R

Guy Wright, Technical Manager for RUN, *was invited to Commodore's headquarters to get a first-hand look at the C-128 and to speak with top engineers, designers and project managers about this new computer.*

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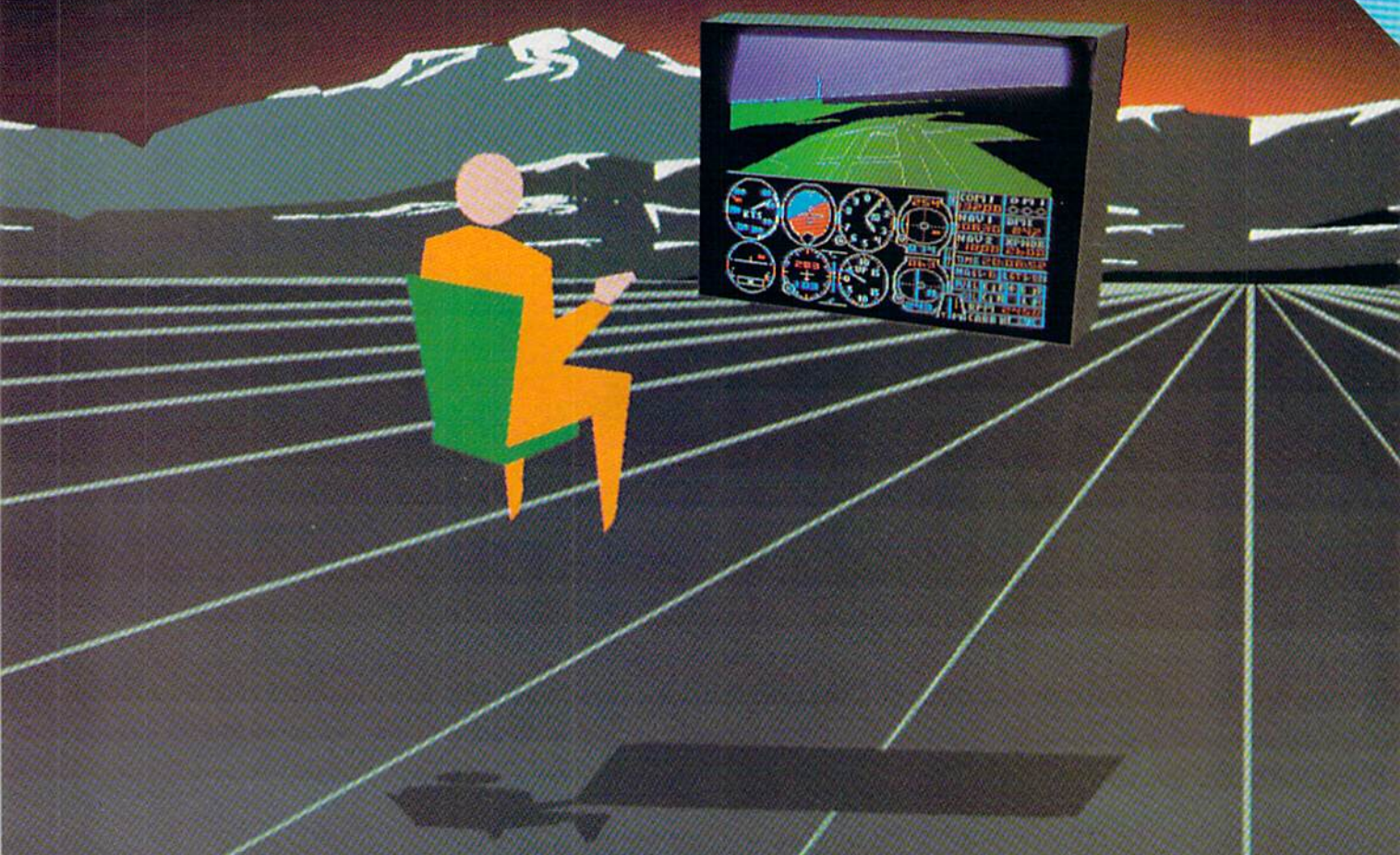

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Home Inventory

If you have ever lost some or all of your household goods due to fire, flood, theft or other disaster, you know how important it is to have an up-to-date inventory of those items, especially for insurance reasons. Without a previously prepared inventory list, you might lack some of the information your insurance company needs to process your claim.

The Home Inventory program allows you to easily prepare an inventory list. The information on your

ED JUDICE

By WILLIAM W. BRAUN

RUN It Right

C-64; VIC-20

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household items is stored within the program as Data statements. You can call up the list on your screen or produce a printed list. You can then store a copy of the program or the printed list in your safety-deposit box or other secure location.

Home Inventory is simple to use, beginning with a menu that allows you to choose between five options just by pressing one key. The options include: adding an item to the list, deleting an item, displaying the list on your screen, producing a printed list and ending the program.

If you choose to end the program, you will receive a message on the screen reminding you to resave the program if you made any additions or deletions. This is necessary in order to keep your updated list, since it is contained within the program itself.

Dynamic Keyboard

When designing this program, it was necessary to decide how the data constituting the inventory list would be stored. I chose to use neither a disk datafile, as many owners do not have a disk drive, nor a tape file, since that form of storage makes it very cumbersome to repeatedly access and update a file. Instead, I decided to use Data statements within the program. By using the "dynamic keyboard" technique to automatically create or delete lines containing the Data statements, the program simulates the action of a disk file.

The "dynamic keyboard" technique is a method of placing information on the screen and having it executed just as if you had typed it in and pressed the return key.

The program itself prints the information on the screen and then receives a command from the keyboard buffer to execute one or more returns. The keyboard buffer is contained in memory locations 631 to 640. Memory location 198 is also important, as it holds a number equal to the number of characters the keyboard buffer will hold.

You will not have to exit the program to actually type in or delete the lines with data. This method's only drawback is that, after you have updated your list, you must resave your program in order to include the changes in your program.

To see how this technique works, look at lines 191–194 of the program. These few lines will put added information into a new line as a Data statement.

The actual line with the data is printed to the screen by line 191. LN is the line number; M$ is a quote mark; N$, D$, C$ and S$ are the fields in the Data statement and correspond to the item name, date of purchase, original cost and serial number.

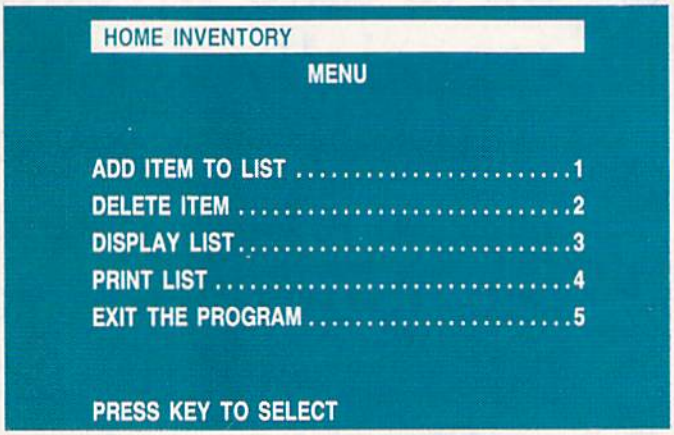
Each time a new item—and, hence, a new line with data—is added, the variable L is increased by 1. L is added to 900 to create the value in the line number variable LN. This ensures that you will not add a line number that you have already used. There is space in the program for thousands of possible line numbers, so you need not worry about running out of them.

Line 192 prints an updated line 32 to the screen, updating the variable L. It also prints a direct statement "GOTO 197(home)." There are now three lines on the screen—the new Data statement line, an updated line 32 and the direct statement to go to line 197. Note that the first part of line 191 cleared the screen and then moved the cursor to the fourth screen row, where the new lines started printing.

Now look at line 194. A 3 is Poked to location 198, meaning there are three characters in the keyboard buffer. Next, three 13s (Returns) are Poked to the keyboard buffer, starting with location 631. When the End

Listing 1. *Home Inventory program for the C-64.*

```
1 REM *** HOME INVENTORY ***
2 REM ***{7 SPACEs}BY{7 SPACEs}***
3 REM ***{2 SPACEs}WM. W. BRAUN{2 SPACEs}**
  *
32 L= 1
33 E$="ENTRY TOO LONG! "
34 F$=" CHARACTER MAXIMUM!"
35 M$=CHR$(34)
36 F=1
4Ø PRINT"{SHFT CLR}{CTRL 9}{CTRL 7}{4 SPACE
   s}HOME INVENTORY{4 SPACEs}{CTRL Ø}"SPC(3
   5)"{CTRL 3}MENU{CTRL 1}
45 PRINT"{2 CRSR DNs}{1Ø SPACEs}ADD ITEM TO
    LIST---1"
46 PRINT"{CRSR DN}{1Ø SPACEs}DELETE ITEM---
   -----2
47 PRINT"{CRSR DN}{1Ø SPACEs}DISPLAY LIST--
   -----3"
48 PRINT"{CRSR DN}{1Ø SPACEs}PRINT LIST----
   -----4"
49 PRINT"{2 CRSR DNs}{1Ø SPACEs}EXIT THE PR
   OGRAM---5"
6Ø PRINT"{5 CRSR DNs}{CTRL 5}{1Ø SPACEs}PRE
   SS KEY TO SELECT
65 GETK$:IFK$=""THEN65
67 ONVAL(K$)GOTO1Ø5,2Ø5,4Ø5,5Ø5,6Ø5
68 PRINT"{CRSR DN}{CTRL 3} PRESS ONLY{2 SPA
   CEs}1-6{SHFT SPACE}!!{CTRL 7}":FORT=ØTO2
   ØØØ:NEXT:GOTO4Ø
```




```
1ØØ REM ** ADDITION **
1Ø5 PRINT"{SHFT CLR}{CRSR DN}{CTRL 7}{6 SPA
    CEs}{CTRL 9} ADDITION {CRSR DN}{CTRL 1}
    "
11Ø PRINT"{CRSR DN}ENTER NAME OF ITEM:"
111 INPUTN$:IFLEN(N$)>35THENPRINT"{CRSR DN}
    "E$"35"F$:GOTO11Ø
112 GOSUB71Ø:ONFGOTO17Ø,115
115 PRINT"{CRSR DN}DATE BOUGHT:":INPUTD$:IF
    LEN(D$)>9THENPRINT"{CRSR DN}"E$"9"F$:GO
    TO115
12Ø PRINT"{CRSR DN}ORIGINAL COST OF ITEM:"
121 INPUTC$:IFLEN(C$)>9THENPRINT"{CRSR DN}"
    E$"9"F$:GOTO12Ø
```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statement in line 194 is executed, the computer executes the Returns you have placed in the keyboard buffer and thus executes the lines that are on the screen. This has the effect of putting your new data line into the program, adding on the updated line 32 and restarting the program at line 197. (The program actually was temporarily ended in line 194.)

If all of this boggles your mind, rest assured that it does work, and you need not understand it to use the program. If you can grasp how the "dynamic keyboard" works, it could come in handy in your own programs. Keep it in mind in situations where you want to add, delete or update a program's lines, or where you may want to execute a user-entered command from within the program.

Invisible Action

When using the program and performing an addition or deletion, you will not see any of the previously described action on the screen. The action occurs very fast and would probably look somewhat confusing to you, so the program temporarily changes the print color to white (which is also the screen color).

Location 646 holds the number for the current print color. Line 185 Pokes a 1 (for white) into 646 and then, after the addition is finished, a 6 (for blue) is Poked back into 646. The same thing happens in the Deletion routine.

When working out this program, I tried several techniques to determine just what line number needed to be removed when deleting a particular item from the list. Looking through a memory map of the VIC-20, I found that locations 63–64 hold the line number of the data currently being read.

This meant that when I found the item with the Search routine, locations 63–64 would be holding the number of the line it was in. I only had to convert the line number from low-byte/high-byte form to a single number, which happens in line 240.

Note that the Restore statement occurs *after* you Peek locations 63 and 64 to find the line number. If this statement occurred *before* that, you would not get the proper line number to delete.

When entering data to add an item to the list, you will get some error messages if you try to enter strings that are too long. I had to limit the length of the item name, date, cost and serial number so that the data could be contained on a single line. This should provide you with enough room; if not, you will have to abbreviate some of the information. The name can be 35 characters long, the date and cost nine characters each, and the serial number 15 characters.

Even with an unexpanded VIC-20, you should be able to store a fairly long list of items. If you find that you run out of memory, try any of the following to increase your storage capability.

- Delete REM statements.
- Delete lines 505–580 if you don't plan to make printed lists.
- Make your added entries as short as possible.
- If all else fails, invest in a memory-expansion cartridge.

I hope that you will find Home Inventory to be useful and that you have learned some new techniques that you can apply to your own programs. If you do not wish to type in the program yourself, you can send me a blank cassette, a self-addressed stamped mailer and $4, and I will send you a verified copy of the program. R

Address all author correspondence to William W. Braun, 3164 Wellington Way, Arnold, MO 63010.

```
HOME INVENTORY LIST
RUN MAGAZINE
2/2/85
 TYPEWRITER                TELEVISION SET
DATE PURCHASED: 2/2/85     DATE PURCHASED: 12/4/84
ORIGINAL COST: $545.00     ORIGINAL COST: $599.99
SERIAL NUMBER: 1234ABCD    SERIAL NUMBER: 4321DCBA
 COMMODORE 64              AM/FM RADIO
DATE PURCHASED: 1/3/85     DATE PURCHASED: 11/8/84
ORIGINAL COST: $N/A        ORIGINAL COST: $54.95
SERIAL NUMBER: 56781234    SERIAL NUMBER: 62134AD
END OF LIST
```

```
125 PRINT"{CRSR DN}SERIAL #(IF NONE --):"
126 INPUTS$:IFLEN(S$)>15THENPRINT"{CRSR DN}
    "E$"15"F$:GOTO125
13Ø PRINT"{CRSR DN}IS DATA ON SCREEN OK? (Y
    /N):
133 GETK$:IFK$="Y"THEN185
137 IFK$="N"THEN1Ø5
138 GOTO133
17Ø RESTORE:PRINT"{SHFT CLR}{3 CRSR DNs} IT
    EM ALREADY IN LIST!":FORT=ØTO3ØØØ:NEXT:
    GOTO1Ø5
185 RESTORE:LN=9ØØ+L:A=L+1:POKE646,1
191 PRINT"{SHFT CLR}{3 CRSR DNs}"LN"D{SHFT
    A}"M$N$M$","M$D$M$","M$C$M$","M$S$
192 PRINT"32L="A:PRINT"GOTO197{HOME}
194 POKE198,3:FORX=ØTO2:POKE631+X,13:NEXT:E
    ND
197 POKE646,6:PRINT"{SHFT CLR}"SPC(178)"ITE
    M ADDED TO LIST"
198 FORT=ØTO15ØØ:NEXT:POKE198,Ø:GOTO1
2ØØ REM ** DELETION **
2Ø5 PRINT"{SHFT CLR}{CRSR DN}{CTRL 7}{6 SPA
    CEs}{CTRL 9} DELETION {4 CRSR DNs}{CTRL
     1}":PRINT"ENTER NAME OF ITEM:":INPUTN$
215 GOSUB71Ø:ONFGOTO24Ø,235
235 RESTORE:PRINT"{SHFT CLR}{7 CRSR DNs} NA
    ME IS NOT IN LIST!"
236 FORT=ØTO15ØØ:NEXT:RESTORE:GOTO4Ø
24Ø LN=PEEK(64)*256+PEEK(63):RESTORE
25Ø POKE646,1:PRINT"{SHFT CLR}{3 CRSR DNs}"
    LN:PRINT"GOTO27Ø"
26Ø PRINT"{HOME}":POKE198,2:POKE631,13:POKE
    632,13:END
27Ø POKE646,6:POKE198,Ø:PRINT"{SHFT CLR}{4
    CRSR DNs}{4 SPACEs}ITEM DELETED":FORT=Ø
    TO15ØØ:NEXT:GOTO1
4ØØ REM ** DISPLAY LIST **
4Ø5 PRINT"{SHFT CLR}{CTRL 9}{CTRL 7}{2 SPAC
    Es}HOME INVENTORY LIST {2 CRSR DNs}{CTR
    L 1}
41Ø READN$,D$,C$,S$
415 IFF=1ANDN$="END"THENPRINT"{2 CRSR DNs}
    NOTHING IN LIST YET!":RESTORE:GOTO485
416 F=2
42Ø IFN$="END"THEN48Ø
435 PRINT"{2 SPACEs}"N$
436 PRINT"{CRSR DN} PURCHASED:"D$
437 PRINT"{CRSR DN} ORIG. COST: $"C$
```

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Listing 1 continued.

```
438 PRINT"{CRSR DN} SER. #:"S$
45Ø PRINT"{6 CRSR DNs}{3 SPACEs}PRESS {CTRL
    9}F7{CTRL Ø} FOR NEXT ITEM{CRSR DN}"
451 PRINT"{2 SPACEs}PRESS{2 SPACEs}{CTRL 9}
    F1{CTRL Ø} FOR MENU{CRSR UP}
46Ø GETK$
465 IFK$="{FUNCT 1}"THENRESTORE:GOTO1
466 IFK$="{FUNCT 7}"THEN4Ø5
47Ø GOTO46Ø
48Ø PRINT"{SHFT CLR}{2 CRSR DNs}{5 SPACEs}{
    CTRL 9}END OF LIST":RESTORE
485 FORT=ØTO2ØØØ:NEXT:GOTO1
5ØØ REM ** PRINT LIST **
5Ø5 PRINT"{SHFT CLR}{CRSR DN}{CTRL 7}{5 SPA
    CEs}{CTRL 9} PRINT LIST ":PRINT"{CTRL 1
    }{3 CRSR DNs}ENTER CURRENT DATE:":INPUT
    D$
5Ø7 PRINT"ENTER{2 SPACEs}YOUR NAME:":INPUTN
    $
51Ø OPEN4,4:PRINT#4,CHR$(14)TAB(12)"HOME IN
    VENTORY LIST"CHR$(13)
515 PRINT#4,CHR$(13)CHR$(15)N$CHR$(13)D$CHR
    $(13)
52Ø READN$,D$,C$,S$,X$,K$,F$,E$
525 IFN$="END"THEN58Ø
53Ø IFX$="END"THEN57Ø
535 PRINT#4,"{4 SPACEs}"N$TAB(45-LEN(N$))X$
54Ø PRINT#4,"{3 SPACEs}DATE PURCHASED: "D$T
    AB(45-LEN(D$)-16)"DATE PURCHASED: "K$
545 PRINT#4,"{3 SPACEs}ORIGINAL COST: $"C$T
    AB(45-LEN(C$)-16)"ORIGINAL COST: $"F$
55Ø PRINT#4,"{3 SPACEs}SERIAL NUMBER: "S$TA
    B(45-LEN(S$)-15)"SERIAL NUMBER: "E$CHR$
    (13)
56Ø GOTO52Ø
57Ø PRINT#4,"{4 SPACEs}"N$:PRINT#4,"{4 SPAC
    Es}DATE PURCHASED: "D$
575 PRINT#4,"{4 SPACEs}ORIGINAL COST: $"C$
576 PRINT#4,"{4 SPACEs}SERIAL NUMBER: "S$CH
    R$(13)
58Ø PRINT#4,CHR$(13)CHR$(14)"END OF LIST"CH
    R$(15):CLOSE4:RESTORE:GOTO1
6ØØ REM ** END PROGRAM **
6Ø5 PRINT"{SHFT CLR}{CRSR DN}{CTRL 1}IF YOU
     MADE ADDITIONS OR DELETIONS,"
6Ø6 PRINT"{CRSR DN}RE-SAVE THE PROGRAM !{3
    CRSR DNs}":END
7ØØ REM ** SEARCH ROUTINE **
71Ø READX$:IFX$=N$THENF=1:RETURN
715 IFX$="END"THENF=2:RETURN
72Ø GOTO71Ø
8ØØ REM ** LIST DATA **
6ØØØ DATA"END","END","END","END","END","END
     ","END","END
```

Listing 2. *Home Inventory program modifications for the VIC-20.*

```
32 L=Ø
4Ø PRINT"{SHFT CLR}{CTRL 9}{CTRL 7}{4 SPACE
   s}HOME INVENTORY{4 SPACEs}{CTRL Ø}"SPC(3
   Ø)"{CTRL 3}MENU{CTRL 1}
45 PRINT"{2 CRSR DNs}ADD ITEM TO LIST---1{C
   RSR DN}{2 SPACEs}DELETE ITEM--------2
47 PRINT"{CRSR DN}DISPLAY LIST-------3{CRSR
    DN}{2 SPACEs}PRINT LIST---------4{CRSR
   DN}{2 SPACEs}EXIT THE PROGRAM---5
6Ø PRINT"{5 CRSR DNs}""{2 SPACEs}PRESS KEY
   TO SELECT
45Ø PRINT"{6 CRSR DNs}PRESS {CTRL 9}F7{CTRL
    Ø} FOR NEXT ITEM{CRSR DN}"
451 PRINT"PRESS{CTRL 9}F1{CTRL Ø} FOR MENU{
   CRSR UP}
```

Circle 137 on Reader Service card.

Dreams CAN come true!

Back in June of 1983, Kelvin Lacy had a dream. He dreamed of creating one integrated program that would include a spreadsheet, business graphics *and* a database. A program with the power of Lotus 1-2-3. On the Commodore 64. People laughed! He had just finished OmniWriter, to be marketed by HESWARE. Ignoring the skeptical, he started on VIZASTAR.

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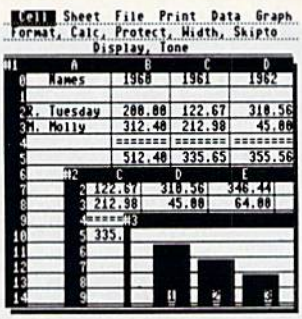

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You'll never forget to buy the butter when you use this program, which provides you with a supermarket checklist and a printout of those items you decide you need.

Shopper's Companion

By JOSEPH J. SHAUGHNESSY

If you have ever had to make a second trip to the supermarket because you had forgotten something, you will probably appreciate this program. Shopper's Companion jogs your memory and helps you keep your kitchen well stocked by providing you with a list of items normally sold in supermarkets. These items are stored in Data statements, so you can easily modify or add to them. (Just make sure your *last* Data statement is END.) You then create your printed shopping list by referring to this master list.

The list is presented in multiple, sequential screen displays and can be as long as your computer's memory allows. You can also note, through the use of function keys, if you have coupons for these items or if they are on sale. You may also use the function keys to advance or back up a "page" on the master list, cancel an unfinished entry or delete an item from your list. The function-key menu is constantly displayed on the screen, along with the latest page from the master list.

To put items from the master list onto your printed list, you type in the number that appears in front of each item and then hit the return key. If you want to mark an item with a coupon or sale reference, you must press those function keys before hitting the return key. Once an item is selected for your list, it appears in reverse video on the screen.

To print out your list, advance *past* the last shopping list page by pressing f7. This will activate the Print routine.

The program also keeps track of how many items you have chosen and displays this number in the upper right corner of the screen. If you forget to note an item as coupon or sale and want to correct it, just reenter the item correctly.

Since you are making the list in your home, you can always get up from your computer and check your pantry if you are in doubt as to whether or not you need a particular item. You can also arrange your coupons and sale notices beside you. Your final printed list will be nicely printed with a "check off" column in front of each item you need and a notation behind each coupon and/or sale item.

Listing 2 contains quite a few REM statements, which you VIC-20 owners may wish to delete to save memory. Your VIC-20 should have at least 16K expansion to run this program. The bare bones of this program is about

RUN It Right

C64; VIC20 with 16K expansion
Printer

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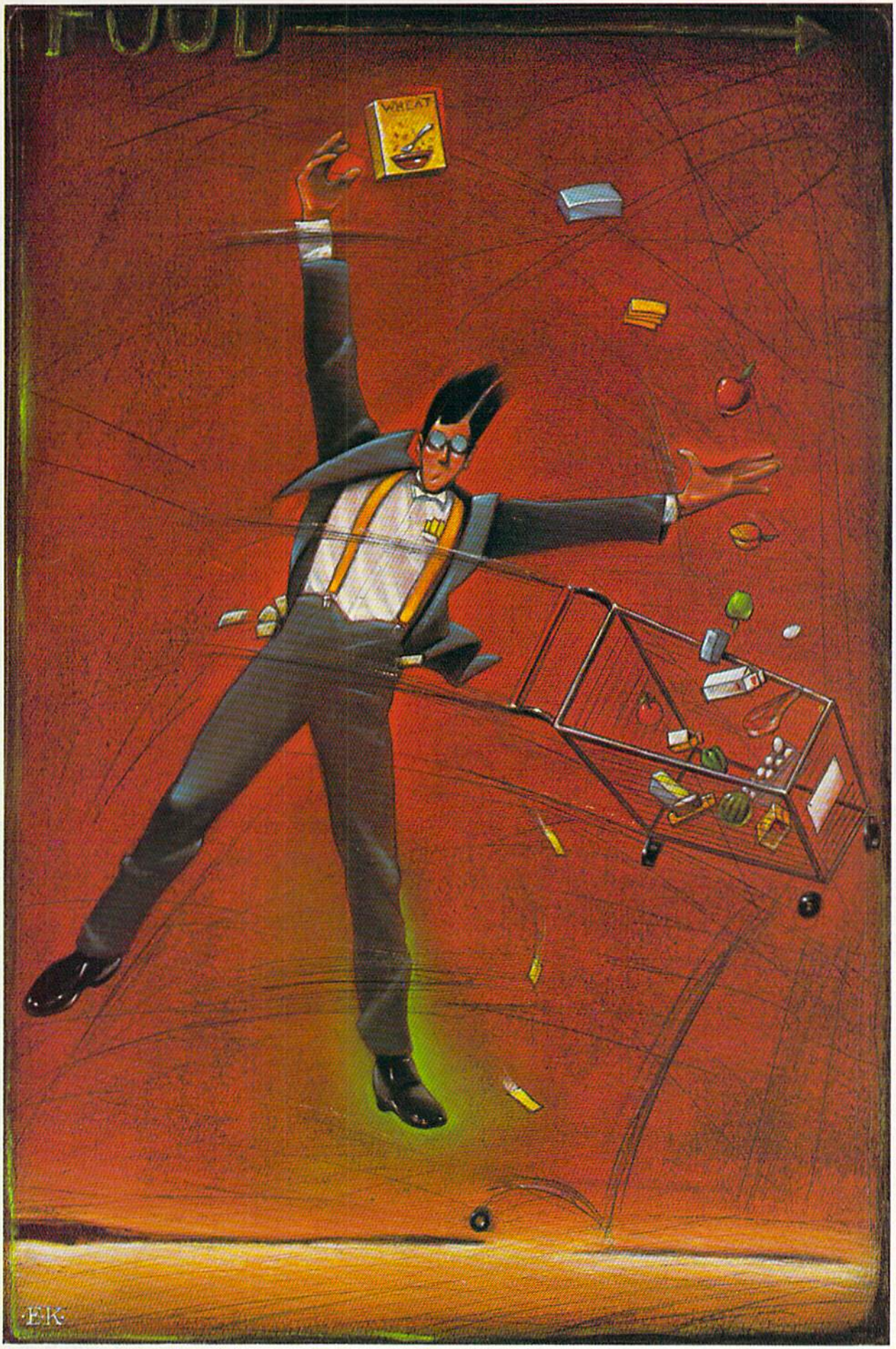

EARL KELENY

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7K without any Data statements. The Data statements require a lot of memory to store your list.

This program should work with any type of printer (with the proper interface). If you have an RS-232 printer, however, you must open your printer file before the DIM statements in the program and eliminate the section on Commodore and non-Commodore printers.

The prices of items are deliberately left out of this program to avoid having to update the whole data when prices change. Instead, your final printed list will give you an item count. If you multiply this count by $1.25, you should get an approximate cost for your shopping list.

If you don't want to type in this program or create your own Data statements, I will provide a copy with about 600 data items already typed in. I will provide either disk or tape (please specify), the program (please specify C-64 or VIC-20), the postage and my time for a $10 fee.

My commercial program, the Shopping Manager System, is also available for the C-64 and VIC-20 (16K memory expansion required) on disk or tape at $31.45, shipping included. This program operates close to machine language speed (C-64 version only), provides several superior features, including the ability to add quantities and personal comments (such as brand names or special instructions), and it comes with an instruction manual. R

Address all author correspondence to Joseph J. Shaughnessy, Serendipity Software, 8438 Lynda Sue Lane W., Jacksonville, FL 32217.

Listing 1. *The Shopper's Companion program for the C-64.*

```
1Ø REM C64 SHOPPER'S COMPANION
2Ø REM BY J. SHAUGHNESSY - 1985
3Ø REM SET UP CONDITIONS
4Ø PRINTCHR$(14)
5Ø POKE5328Ø,5:POKE53281,13:PRINT"{CTRL 1}"
   :P=Ø:I=Ø:Q$=CHR$(34)
6Ø DIMW(2),A(2),S(2),H(2),L(2),LI(99)
7Ø DIML$(99),SD$(18)
8Ø V=54296:W(Ø)=54276:W(1)=54283:W(2)=5429Ø
   :N1=1Ø:SP$="{1Ø SPACEs}":PF=4
9Ø A(Ø)=54277:A(1)=54284:A(2)=54291
1ØØ S(Ø)=54278:S(1)=54285:S(2)=54292
11Ø H(Ø)=54273:H(1)=5428Ø:H(2)=54287
12Ø L(Ø)=54272:L(1)=54279:L(2)=54286
13Ø Z1$="{HOME}{22 CRSR DNs}":Y$="{4Ø SPACE
   s}"
14Ø C1$="{CTRL 7}":C2$="{CTRL 3}":P8$=CHR$(
   14):P9$=CHR$(15)
15Ø SD$(Ø)="{SHFT CLR}{CTRL 9}"+C1$+"{12 SP
   ACEs}{SHFT S}HOPPER'S {SHFT C}OMPANION{
   2 SPACEs}{CTRL 1}"
16Ø VØ=15:POKEV,VØ:Q=Ø:ED=Ø:BK=Ø:KB=Ø
17Ø FORX=ØTO99:L$(X)="{COMD +}":NEXT
18Ø R=1:GOSUB49Ø:R=Ø:GOTO115Ø
19Ø REM SUBROUTINES
2ØØ REM REMOVE REVERSE PRINT FROM SCREEN DI
   SPLAY AND CLOSE GAP IN LIST
21Ø ER=LEN(SD$(ZQ-Q))-1
22Ø SD$(ZQ-Q)=RIGHT$(SD$(ZQ-Q),ER)
23Ø FORS=ØTOI-1
24Ø IFZQ=LI(S)THENT=S:S=I-1
25Ø NEXT
26Ø FORS=TTOI-1
27Ø L$(S)=L$(S+1):LI(S)=LI(S+1)
28Ø NEXT:I=I-1:RETURN
29Ø REM DELETE SUBROUTINE
3ØØ PRINTZ1$;C2$;"{2 CRSR UPs}{CTRL 9} {SHF
   T D}ELETE {SHFT W}HICH {SHFT I}TEM # :{
   CTRL Ø}{5 SPACEs}{CTRL 9}{4 CRSR LFs}";
   NM$
31Ø GETZ$:IFZ$=""THEN31Ø
32Ø IFZ$=CHR$(13)THEN37Ø:REM CARR. RET.
33Ø IFZ$=CHR$(133)THENR=1:GOSUB49Ø:GOSUB72Ø
   :RETURN:REM CANCEL
34Ø IFZ$<"Ø"ORZ$>"9"THEN3ØØ:REM CHECK FOR N
   UMERICAL INPUT
35Ø IFLEN(NM$)>2THEN3ØØ:REM CHECK FOR MAX.
   OF 3 DIDGETS
36Ø NM$=NM$+Z$:GOSUB78Ø:GOTO3ØØ:REM BUILD T
   HE ITEM NO.
37Ø ZQ=VAL(NM$):GOSUB72Ø
38Ø IFZQ<Q+1ORZQ>PTHENGOSUB179Ø:GOSUB49Ø:GO
   TO162Ø:REM IS IT NOW ON THE SCREEN ?
39Ø IFLEFT$(SD$(ZQ-Q),1)<>"{CTRL 9}"THENGOT
   O162Ø:REM IS IT DELETABLE
4ØØ GOSUB21Ø:L$(I)="{COMD +}":LI(I)=Ø:RETUR
   N
41Ø IFQ=ØTHENRETURN
42Ø RESTORE:REM BACK UP SUBROUTINE
43Ø P=Ø
44Ø IFQ=18THEN46Ø
45Ø FORX=1TOQ-18:READA$:P=P+1:NEXT
46Ø Q=Q-18:GOSUB1Ø1Ø
47Ø RETURN
48Ø REM INITIALIZE FUNCTION KEY MENU
49Ø F1$=" {SHFT C}ANCEL":NM$=""
5ØØ F3$=" {SHFT C}OUPON":F3=Ø
51Ø F5$=" {SHFT S}ALE":F5=Ø:GOTO57Ø
52Ø REM FUNCTION KEY SELECTED DISPLAY
53Ø IFF3=1THENF3=Ø:F3$=" {SHFT C}OUPON":GOT
   O57Ø
54Ø F3=1:F3$="{CTRL 9}"+F3$+"{CTRL Ø}":GOTO
   57Ø
55Ø IFF5=1THENF5=Ø:F5$=" {SHFT S}ALE":GOTO5
   7Ø
56Ø F5=1:F5$="{CTRL 9}"+F5$+"{CTRL Ø}"
57Ø GOSUB96Ø
58Ø RETURN
59Ø REM UPDATE SELECTION AND ITEM COUNT
6ØØ PRINTZ1$;"{2 CRSR UPs}{CTRL 9} {SHFT S}
   ELECT {SHFT I}TEM # :{CTRL Ø}{5 SPACEs}
   {CTRL 9}{4 CRSR LFs}";NM$
```

Continued on p. 106.

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Bargain - Hunter's Delight

Clipping and saving coupons is only half the battle of bargain shopping. You must keep track of your coupons and know how to quickly access them. This program helps you do just that.

By ROBERT A. WALLACE

You just ran out of laundry detergent. You'll have to go to the store. Before you go, though, you rummage through a drawer stuffed with coupons. After 15 minutes of frantic shuffling—nothing. You could have sworn you had a coupon for detergent. Didn't you see one just the other day, as you were picking through this very pile for an ice-cream coupon?

From now on, there will be no second-guessing. Coupon Organizer is a complete system for recording your coupons; it even tells you the value of your collection.

Menu options include: review complete file, search by brand or product, compute total value, dump to printer, add new coupons, purge redeemed coupons and locate and purge expired coupons. Updated files can be saved to tape or disk.

The 64 version displays coupon information on a randomly generated multicolor facsimile coupon, complete with dashed lines. The VIC-20 program omits this feature and most of the prompts. Otherwise, both versions provide the same functions.

To use Coupon Organizer, just follow the self-explanatory prompts. When you enter a new coupon, a data line is created at the end of the program. When you purge a redeemed or expired coupon, the data is replaced by a dummy line, which is ignored during subsequent searches.

Later entries will fill in the dummy lines with coupon information; if none is found, a new line is created. When you complete the update, you can save the program, along with the newly created files, using option 7.

When you save an updated file, the entire program, with Data statements, is saved. Next time you use the program, simply load Listing 1 or Listing 2, according to your type of machine.

So clean out that drawer—leave the paper clips and rubber bands, but throw out the bottle caps and pencil stubs—and file your coupons (a recipe box works nicely); then enter the data in Coupon Organizer.

If you don't want to type in the program, I will send you a copy in return for $3, a blank tape or disk and a self-addressed stamped envelope. Please specify which version you want—VIC-20 or C-64. R

VIC-20	C-64	
100	100	jump to menu
105	105	no match
110–115	110–115	transpose date
120	120	search advisory
125–140	125–140	get prompts
145–225	145–225	input date strings
230–260	230–265	main menu
265	270	quit
270–280	275–285	review file
285–330	290–330	main menu
335–375	335–375	hardcopy
380–440	380–440	purge expired coupons
445–495	445–550	find and display
500–530	555–585	compute value
535–550	590–605	save update
555–575	610–635	update menu
580	640	create data line
585–620	645–680	new coupon
625–640	685–705	purge coupon
1000–	1000–	data file

Table 1. *Breakdown of Coupon Organizer program.*

Address all author correspondence to Robert A. Wallace, 6649 Thunderhead Lane, Placerville, CA 95667.

RUN It Right

C-64; VIC-20 with 8K expansion
Printer (optional)

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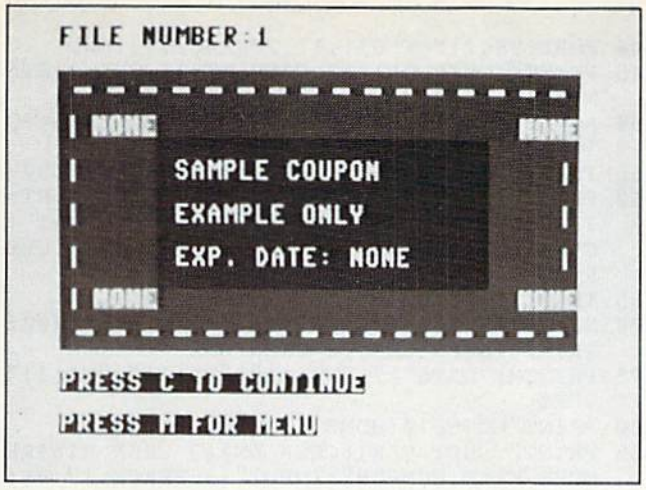

Listing 1. *Coupon Organizer program for the C-64.*

```
1 REM 64 VERSION/WALLACE
10Ø PRINT"{SHFT CLR}":GOTO23Ø
1Ø5 POKE198,Ø:PRINT"{CRSR UP}{3 CRSR RTs}";
    J$;" NOT ON FILE{2 CRSR DNs}":GOSUB13Ø:
    RETURN
11Ø IFE$="NONE"THENRETURN
115 E$=RIGHT$(E$,5)+" "+LEFT$(E$,2)+" ":RET
    URN
12Ø PRINT"{CRSR DN}{3 CRSR RTs}{CTRL 9}SEAR
    CHING{CTRL Ø}":RETURN
125 PRINT"{CRSR DN}{3 CRSR RTs}{CTRL 9}PRES
    S C TO CONTINUE"
13Ø PRINT"{CRSR DN}{3 CRSR RTs}{CTRL 9}PRES
    S M FOR MENU"
135 GETF$:IFF$=""THEN135
14Ø RETURN
145 PRINT"{SHFT CLR}{CRSR DN}{3 CRSR RTs}EN
    TER MONTH EXPIRES (2 DIGITS)":FORL=1TO6
    :E$(L)="":NEXT
15Ø IFZ1=ØTHENPRINT"{CRSR DN}{3 CRSR RTs}EN
    TER N IF NO EXPIRATION"
155 FORL=1TO6
16Ø GETE$(L):IFE$(L)=""ORE$(L)<"Ø"ORE$(L)>"
    9"ANDE$(L)<>"N"THEN16Ø
165 IFZ1=1ANDE$(L)="N"THEN16Ø
17Ø IFE$(L)="N"ANDZ1=ØTHEN2Ø5
175 PRINT"{3 CRSR RTs}"E$(L)"{CRSR UP}"
18Ø IFL=2THENPRINT"{3 CRSR RTs}"E$(1);E$(2)
    :PRINT"{CRSR DN}{3 CRSR RTs}ENTER DAY (
    2 DIGITS)
185 IFL=4THENPRINT"{3 CRSR RTs}"E$(3);E$(4)
    :PRINT"{CRSR DN}{3 CRSR RTs}ENTER YEAR
    (2 DIGITS)
19Ø NEXT:PRINT"{3 CRSR RTs}"E$(5);E$(6)
195 E$=E$(5)+E$(6)+" "+E$(1)+E$(2)+" "+E$(3
    )+E$(4)
2ØØ E1$=E$(1)+E$(2)+" "+E$(3)+E$(4)+" "+E$(
    5)+E$(6):GOTO21Ø
2Ø5 E$="NONE":E1$=E$
21Ø PRINT"{CRSR DN}{3 CRSR RTs}"E1$:PRINT"{
    CRSR DN}{3 CRSR RTs}OK (Y/N)"
215 GOSUB135:IFF$="N"THEN145
22Ø IFF$="Y"THENRETURN
225 GOTO215
23Ø BC=5328Ø:SC=53281:POKEBC,6:POKESC,1:B%=
    Ø:C%=Ø:D1$=" CENTS "
235 PRINT"{SHFT CLR}{2 CRSR DNs}{4 CRSR RTs
    }{COMD 4}{CTRL 9}COUPON ORGANIZER{CTRL
    Ø}":PRINT"{2 CRSR DNs}{CRSR RT}{CTRL 9}
    1{CTRL Ø}{2 SPACEs}REVIEW ENTIRE FILE"
24Ø PRINT"{CRSR DN} {CTRL 9}2{CTRL Ø}{2 SPA
    CEs}SEARCH BY BRAND NAME":PRINT"{CRSR D
    N} {CTRL 9}3{CTRL Ø}{2 SPACEs}SEARCH BY
     PRODUCT"
245 PRINT"{CRSR DN} {CTRL 9}4{CTRL Ø}{2 SPA
    CEs}COMPUTE TOTAL VALUE":PRINT"{CRSR DN
    } {CTRL 9}5{CTRL Ø}{2 SPACEs}DUMP TO PR
    INTER"
25Ø PRINT"{CRSR DN} {CTRL 9}6{CTRL Ø}{2 SPA
    CEs}UPDATE COUPON FILE":PRINT"{CRSR DN}
     {CTRL 9}7{CTRL Ø}{2 SPACEs}SAVE UPDATE
    D FILE"
255 PRINT"{CRSR DN} {CTRL 9}8{CTRL Ø}{2 SPA
    CEs}QUIT":PRINT"{2 CRSR DNs}{4 CRSR RTs
    }{CTRL 9}SELECT FUNCTION{CTRL Ø}"
26Ø GOSUB135:RESTORE:IFF$<"1"ORF$>"8"THEN26
    Ø
265 A=VAL(F$):ONAGOTO275,29Ø,295,555,335,61
    Ø,59Ø,27Ø:GOTO265
27Ø SC=53281:POKESC,6:POKEBC,14:PRINT"{SHFT
     CLR}{COMD 7}":CLR:END
275 POKEBC,7:GOSUB54Ø:IFA$="END"THEN23Ø
28Ø PRINT"{SHFT CLR}":GOSUB445:IFF$="M"THEN
    23Ø
285 GOTO275
29Ø POKEBC,8:INPUT"{SHFT CLR}{CRSR DN}{3 SP
    ACEs}ENTER BRAND";J$:GOSUB12Ø:B%=1:GOTO
    3ØØ
295 POKEBC,9:INPUT"{SHFT CLR}{CRSR DN}{3 SP
    ACEs}ENTER PRODUCT";J$:GOSUB12Ø:C%=1
3ØØ GOSUB54Ø:IFA$="END"THEN325
3Ø5 IFB%THENIFB$<>J$THEN3ØØ
31Ø IFC%THENIFC$<>J$THEN3ØØ
315 GOSUB445:GOSUB12Ø:Z=1:IFF$="M"THEN23Ø
32Ø GOTO3ØØ
325 IFZTHEN23Ø
33Ø GOSUB1Ø5:GOTO23Ø
335 POKEBC,15:PRINT"{SHFT CLR}{CRSR DN}{3 C
    RSR RTs}PRINTER READY? (Y/N)"
34Ø GOSUB135:IFF$<>"Y"ANDF$<>"N"THEN34Ø
345 IFF$="N"THEN23Ø
35Ø OPEN1,4,1
355 READA$:IFA$="END"THENCLOSE1:GOTO23Ø
36Ø IFA$="#"THENREADA:GOTO355
365 READB$,C$,D$,E$:GOSUB11Ø
37Ø PRINT#1,A$" "C$"{4 SPACEs}"B$"{2 SPACEs
    }"D$D1$"{2 SPACEs}"E$:IFPTHENCLOSE1:GOT
    O425
375 GOTO355
38Ø Z=Ø:RESTORE:Z1=1:GOSUB145:Z1=Ø:J$=E$
385 PRINT"{SHFT CLR}":GOSUB12Ø:D1$=" CENTS
    "
39Ø GOSUB54Ø:IFA$="END"THEN43Ø
395 IFVAL(E$)>VAL(J$)ORVAL(E$)<1THEN39Ø
4ØØ P=1:GOSUB445:GOSUB12Ø:Z=1:IFF$="M"THEN2
    3Ø
4Ø5 IFF$="P"THENR$=A$:PRINT"{CRSR UP}{3 CRS
    R RTs}HARD COPY? (Y/N)":GOTO415
41Ø GOTO39Ø
415 GOSUB135:IFF$="Y"THENOPEN1,4,1:GOTO37Ø
42Ø IFF$<>"N"THEN415
425 GOTO69Ø
43Ø IFZTHEN44Ø
435 E$=J$:GOSUB115:PRINT"{CRSR UP}{3 SPACEs
    }NONE EXPIRED AS OF ";E$;"{CRSR DN}":GO
    SUB13Ø
44Ø P=Ø:GOTO23Ø
445 FORL=1TO3:D(L)=INT(RND(Ø)*14)+2:NEXT:B=
    32:E=646
45Ø H$="{3 SPACEs}{CTRL 9}{33 SPACEs}{CTRL
    Ø}":PRINT"{SHFT CLR}{CRSR DN}{3 SPACEs}
    FILE NUMBER:";A$
455 POKEE,D(1):PRINT"{HOME}{3 CRSR DNs}";H$
    :PRINT;H$:PRINT;H$
46Ø FORL=1TO7:PRINT"{3 SPACEs}{CTRL 9}{7 SP
    ACEs}":POKEE,D(2):PRINT,"{CRSR UP}{CRSR
     LF}{CTRL 9}{22 SPACEs}"
465 POKEE,D(1):PRINT,,,"{CRSR UP}{CTRL 9}{6
     SPACEs}":NEXT:PRINT;H$:PRINT;H$
```

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Listing 1 continued.

```
47Ø PRINT"{HOME}{3 CRSR DNs}{3 CRSR RTs}{CT
    RL 9} {COMD P} {COMD P} {COMD P} {COMD
    P}{SHFT SPACE}{COMD P} {COMD P} {COMD P
    } {COMD P} {COMD P}{SHFT SPACE}{COMD P}
     {COMD P}{SHFT SPACE}{COMD P} {COMD P}{
    SHFT SPACE}{COMD P} {COMD P} {COMD P} {
    CTRL Ø}{CRSR DN}"
475 FORL=1TO5:PRINT"{3 CRSR RTs}{CTRL 9}{CO
    MD N}"SPC(31)"{CTRL 9}{COMD H}":PRINT:N
    EXT
48Ø PRINT"{3 CRSR RTs}{CTRL 9} {COMD Y} {CO
    MD Y} {COMD Y} {COMD Y} {COMD Y} {COMD
    Y} {COMD Y} {COMD Y} {COMD Y} {COMD Y}
    {COMD Y} {COMD Y} {COMD Y} {COMD Y} {CO
    MD Y} {COMD Y} {CTRL Ø}":GOSUB11Ø
485 IFVAL(D$)>99THENB=29:IFVAL(D$)>999THENB
    =28
49Ø IFVAL(D$)>99THEND$="$"+LEFT$(D$,LEN(D$)
    -2)+"."+RIGHT$(D$,2)
495 IFD$="FREE"THENB=3Ø
5ØØ POKEE,D(3):PRINT"{HOME}{5 CRSR DNs}{CTR
    L 9}"TAB(5)D$TAB(B)D$:POKEE,D(2):PRINT,
    "{CRSR DN}{CTRL 9}"B$
5Ø5 PRINT,"{CRSR DN}{CTRL 9}"C$:PRINT,"{CRS
    R DN}{CTRL 9}EXP. DATE: "E$:POKEE,D(3):
    PRINT"{CRSR DN}{CTRL 9}"TAB(5)D$TAB(B)D
    $
51Ø PRINT"{CRSR DN}{CTRL Ø}{COMD 4}":POKE19
    8,Ø
515 IFPTHENPRINT"{CRSR DN}{3 CRSR RTs}{CTRL
     9}PRESS P TO PURGE COUPON{CTRL Ø}"
52Ø GOSUB125:IFF$<>"M"ANDF$<>"C"ANDF$<>"P"T
    HENPRINT"{5 CRSR UPs}":GOTO53Ø
525 RETURN
53Ø IFPTHENPRINT"{CRSR UP}"
535 GOTO52Ø
54Ø READA$:IFA$="END"THENRETURN
545 IFA$="#"THENREADA:GOTO54Ø
55Ø READB$,C$,D$,E$:RETURN
555 D$="":T=Ø
56Ø POKEBC,5:GOSUB54Ø:IFA$="END"THEN57Ø
565 T=T+VAL(D$):PRINT"{SHFT CLR}";T:POKEBC,
    13:GOTO56Ø
57Ø T$=STR$(T):Z$=RIGHT$(T$,2):X$=LEFT$(T$,
    LEN(T$)-2):T$=X$+"."+Z$
575 PRINT"{SHFT CLR}{2 CRSR DNs}{3 CRSR RTs
    }TOTAL VALUE: $";T$;"{CRSR DN}"
58Ø GOSUB13Ø:IFF$<>"M"THENPRINT"{3 CRSR UPs
    }":GOTO58Ø
585 GOTO23Ø
59Ø POKEBC,4:PRINT"{SHFT CLR}{CRSR DN}{3 CR
    SR RTs}{CTRL 9}T{CTRL Ø}APE OR {CTRL 9}
    D{CTRL Ø}ISK?{CRSR UP}":GOSUB135:IFF$<>
    "T"ANDF$<>"D"THEN59Ø
595 IFF$="T"THENSAVE"COUPON ORGANIZER":GOTO
    23Ø
6ØØ PRINT"{CTRL 9}{3 CRSR RTs}SAVING UPDATE
    {CTRL Ø}{CTRL 2}":OPEN15,8,15:PRINT#15,
    "S Ø:COUPON ORGANIZER"
6Ø5 CLOSE15:SAVE"COUPON ORGANIZER",8:GOTO23
    Ø
61Ø BC=5328Ø:POKEBC,2:PRINT"{SHFT CLR}{2 CR
    SR DNs} {CTRL 9}1{CTRL Ø}{2 SPACEs}ADD
    NEW COUPONS"
615 PRINT"{CRSR DN} {CTRL 9}2{CTRL Ø}{2 SPA
    CEs}PURGE REDEEMED COUPONS"
62Ø PRINT"{CRSR DN} {CTRL 9}3{CTRL Ø}{2 SPA
    CEs}PURGE EXPIRED COUPONS":PRINT"{CRSR
    DN} {CTRL 9}4{CTRL Ø}{2 SPACEs}RETURN T
    O MENU"
625 P$(1)="BRAND NAME":P$(2)="PRODUCT":P$(3
    )="COUPON VALUE (IN CENTS)"
63Ø D1$=" CENTS "
635 GOSUB135:A=VAL(F$):ONAGOTO645,685,38Ø,2
    3Ø:GOTO61Ø
64Ø POKE198,2:POKE631,13:POKE632,13:END
645 PRINT"{CRSR DN} {3 CRSR RTs}{CTRL 9}STA
    NDBY{CTRL Ø}"
65Ø A=VAL(A$)+1:READA$:IFA$="#"THENREADA:GO
    TO66Ø
655 IFA$<>"END"THENREADB$,C$,D$,E$:GOTO65Ø
66Ø PRINT"{SHFT CLR}{2 CRSR DNs}{3 CRSR RTs
    }ITEM : "A"{CRSR DN}":FORI=1TO3:PRINT"{
    CRSR DN}{3 CRSR RTs}"P$(I):INPUT"{3 CRS
    R RTs}";W$(I)
665 IFW$(1)=""THEN61Ø
67Ø NEXT:GOSUB145:W$(Ø)=STR$(A):M=A*5+1ØØ:
    PRINT"{SHFT CLR}{2 CRSR DNs}"
675 PRINTM;"DATA"A","W$(1)","W$(2)","W$(3)"
    ,"E$
68Ø PRINT"GOTO61Ø{HOME}":GOTO64Ø
685 PRINT"{SHFT CLR}{CRSR DN}{3 CRSR RTs}RE
    MOVE FILE NUMBER":INPUT"{3 SPACEs}";R$:
    IFVAL(R$)=ØTHEN685
69Ø PRINT"{SHFT CLR}{2 CRSR DNs}":M=VAL(R$)
    *5+1ØØ:PRINTM"DATA"CHR$(34)"#"CHR$(34)
    ","VAL(R$)
695 IFPTHENP=Ø:GOTO7Ø5
7ØØ PRINT"J$="CHR$(34)J$CHR$(34)":Z=1:GOTO6
    1Ø{HOME}":GOTO64Ø
7Ø5 PRINT"J$="CHR$(34)J$CHR$(34)":Z=1:GOTO3
    85{HOME}":GOTO64Ø
1ØØØ REM FILES
1ØØ5 DATA 1 ,SAMPLE COUPON,EXAMPLE ONLY,NON
    E,NONE
5ØØØØ DATAEND
```

Listing 2. *Coupon Organizer program for the VIC-20.*

```
1 REM VICOUPON/WALLACE
1Ø SC=36879:PRINT"{SHFT CLR}":GOTO23Ø
1Ø5 POKE198,Ø:PRINT"{CRSR UP}{CRSR RT}";J$;
    " NOT ON FILE{2 CRSR DNs}":GOSUB13Ø:RET
    URN
11Ø IFE$="NONE"THENRETURN
115 E$=RIGHT$(E$,5)+" "+LEFT$(E$,2)+" ":RET
    URN
12Ø PRINT"{CRSR DN}{CRSR RT}{CTRL 9}SEARCHI
    NG{CTRL Ø}":RETURN
125 PRINT"{CRSR DN}{CRSR RT}{CTRL 9}PRESS C
     TO CONTINUE"
13Ø PRINT"{CRSR DN}{CRSR RT}{CTRL 9}PRESS M
     FOR MENU"
135 GETF$:IFF$=""THEN135
14Ø RETURN
145 PRINT"{SHFT CLR}{CRSR DN}{CRSR RT}MONTH
     (2 DIGITS)":FORL=1TO6:E$(L)="":NEXT
15Ø IFZ1=ØTHENPRINT"{CRSR DN}{CRSR RT}ENTER
     N IF NONE"
155 FORL=1TO6
16Ø GETE$(L):IFE$(L)=""ORE$(L)<"Ø"ORE$(L)>"
    9"ANDE$(L)<>"N"THEN16Ø
165 IFZ1=1ANDE$(L)="N"THEN16Ø
17Ø IFE$(L)="N"ANDZ1=ØTHEN2Ø5
175 PRINT"{CRSR RT}"E$(L)"{CRSR UP}"
18Ø IFL=2THENPRINT"{CRSR RT}"E$(1);E$(2):PR
    INT"{CRSR DN}{CRSR RT}DAY (2 DIGITS)
185 IFL=4THENPRINT"{CRSR RT}"E$(3);E$(4):PR
    INT"{CRSR DN}{CRSR RT}YEAR (2 DIGITS)
19Ø NEXT:PRINT"{CRSR RT}"E$(5);E$(6)
195 E$=E$(5)+E$(6)+" "+E$(1)+E$(2)+" "+E$(3
    )+E$(4)
2ØØ E1$=E$(1)+E$(2)+" "+E$(3)+E$(4)+" "+E$(
    5)+E$(6):GOTO21Ø
2Ø5 E$="NONE":E1$=E$
21Ø PRINT"{CRSR DN}{CRSR RT}"E1$:PRINT"{CRS
    R DN}{CRSR RT}OK (Y/N)"
215 GOSUB135:IFF$="N"THEN145
22Ø IFF$="Y"THENRETURN
```


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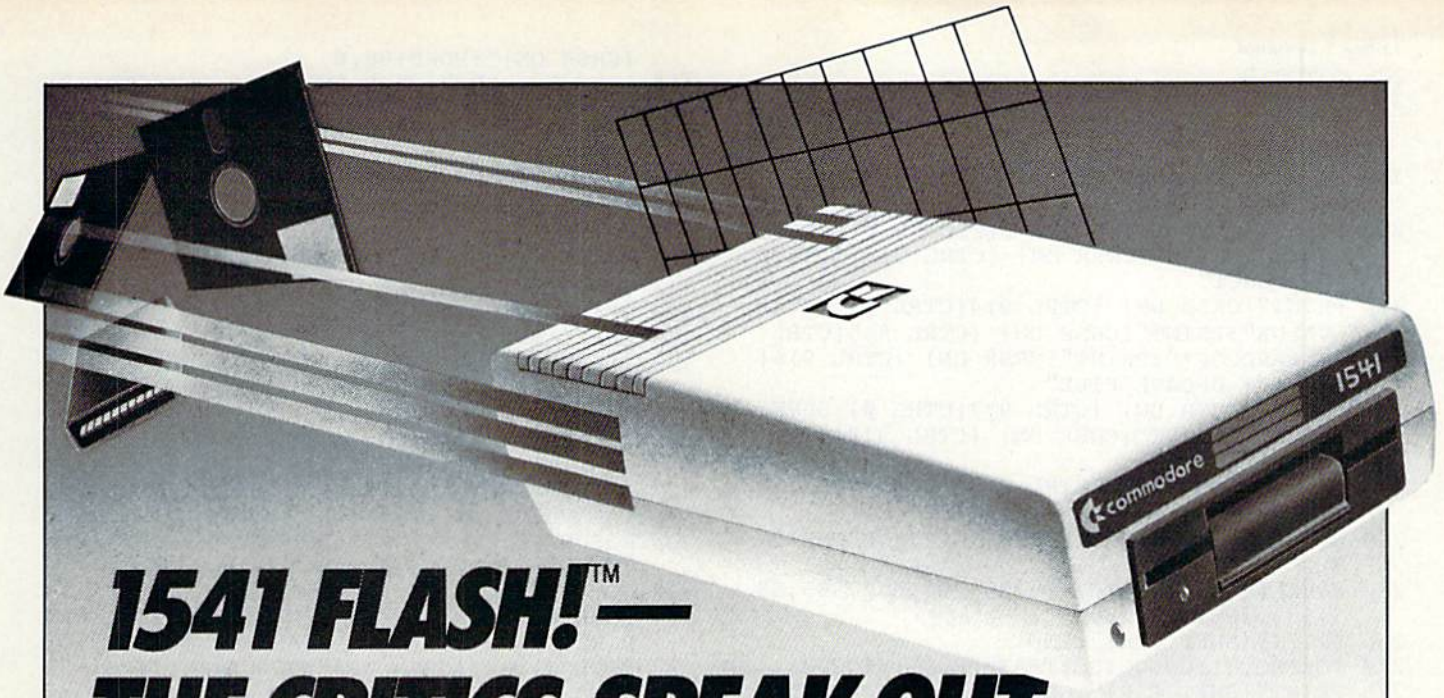

1541 FLASH!™— THE CRITICS SPEAK OUT

This advertisement has been written by independent reviewers of Commodore computer products. We thank them for their frankness and the high marks awarded to the Skyles Electric Works **1541 FLASH!**.

The Reviewers Comment

"Tired of that slow disk drive? The solution is here, and it costs about $90. Considering what it does, the price is a bargain! It speeds up your 1541 disk drive 200%–300%. And if you write your own software specially for the **FLASH!**, you can achieve speed increases of 600%!

The **1541 FLASH!** is the best! It's better than KWIK LOAD.™ And better than 1541 Express.™

Does it sound too good to be true? Do you suspect there must be some drawback that I haven't mentioned? Well... There is one. You have to open up your keyboard and 1541 drive and do a little work inside them. You need to replace a couple of chips with new ones provided by the **FLASH!**. And an extra cable will run from your keyboard's user port to your 1541 drive. But the installation is explained in complete detail with pictures. It's a simple operation that will take under 30 minutes. And in return you will have a disk drive that literally races along!

The biggest complaint with the Commodore 64 is the slow disk drive. No more! You will never be willing to go back after having used the **1541 FLASH!**. It really spoils you! It's even faster than a parallel drive with an IEEE interface! Don't be afraid of the installation. It's really simple. And if you prefer not to do it yourself, your local user's group probably has people with the ability to install it for you. You'll be glad you did!"

The Northwest Users Guide, Jan. 1985

"A tiny wedge is included... you simply SYS65526 to enable it. Those who enjoy using the wedge as part of their normal computer will like this feature.

The utilities added by **FLASH!** include single, double and simultaneous keystroke implementation of such niceties as delete line, escape quote, cursor to bottom of screen, 16 character tab, and return without line execution.

My children have played some of their favorite games and used utilities or educational software without any problems whatsoever, using the **1541 FLASH!** All in all, this device will save the purchaser much of the frustration normally experienced, as well as the time required in normal disk drive-computer interactions. With the above noted exception, I'm very pleased with its operation, and won't hesitate to recommend it to those who would like faster loads and saves or want additional flexibility and power at a moderate price."

RUN, May 1985

"Having used **1541 FLASH!** for several days, already I can't bear to go back to a slow 1541. It's amazing how quickly you can get spoiled by a luxury like this. More than a few editors here have cast covetous eyes on the upgraded 64/1541. And the price is reasonable for such a dramatic enhancement. After reading the installation description above, you can decide if you're up to opening your equipment, yanking out chips, and enjoying a 300% speedup."

Compute!'s Gazette, Jan. 1985

Commercial Details

1541 FLASH!	$ 89.95*
1541 FLASH! with Disk Switchboard	99.00*
1541 FLASH! for Two Drives	139.95*
1541 FLASH! for SX-64	99.95*
1541 FLASH! for MSD Drives	tba*

*Mail order please add $3.50 for shipping and handling. California residents add sales tax as required.

Available from your local Commodore dealer or call 1-800-227-9998

Skyles Electric Works
231E South Whisman Road
Mountain View, CA 94041
1-(415) 965-1735

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Circle 90 on Reader Service card.

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Listing 2 continued.

```
225 GOTO215
23Ø SC=36879:POKESC,3Ø:PRINT"{SHFT CLR}{2 C
    RSR DNs} {CTRL 1}{CTRL 9}COUPON ORGANIZ
    ER{CTRL Ø}"
232 PRINT"{CRSR DN} {CTRL 9}1{CTRL Ø} REVIE
    W FILE":B%=Ø:C%=Ø
235 PRINT"{CRSR DN} {CTRL 9}2{CTRL Ø} BRAND
     NAME":PRINT"{CRSR DN} {CTRL 9}3{CTRL Ø
    } PRODUCT"
24Ø PRINT"{CRSR DN} {CTRL 9}4{CTRL Ø} TOTAL
     VALUE":PRINT"{CRSR DN} {CTRL 9}5{CTRL
    Ø} HARDCOPY":PRINT"{CRSR DN} {CTRL 9}6{
    CTRL Ø} UPDATE FILE"
245 PRINT"{CRSR DN} {CTRL 9}7{CTRL Ø} SAVE
    UPDATE":PRINT"{CRSR DN} {CTRL 9}8{CTRL
    Ø} QUIT"
25Ø PRINT"{CRSR DN} {CTRL 9}SELECT FUNCTION
    {CTRL Ø}"
255 GOSUB135:RESTORE:IFF$<"1"ORF$>"8"THEN25
    5
26Ø A=VAL(F$):ONAGOTO27Ø,285,29Ø,5ØØ,335,55
    5,535,265:GOTO26Ø
265 PRINT"{SHFT CLR}":END
27Ø POKESC,31:GOSUB485:IFA$="END"THEN23Ø
275 PRINT"{SHFT CLR}":GOSUB445:IFF$="M"THEN
    23Ø
28Ø GOTO27Ø
285 POKESC,31:PRINT"{SHFT CLR}{CRSR DN} ENT
    ER BRAND":B%=1:GOTO295
29Ø POKESC,31:PRINT"{SHFT CLR}{CRSR DN} ENT
    ER PRODUCT":C%=1
295 INPUT" ";J$:GOSUB12Ø
3ØØ GOSUB485:IFA$="END"THEN325
3Ø5 IFB%THENIFB$<>J$THEN3ØØ
31Ø IFC%THENIFC$<>J$THEN3ØØ
315 GOSUB445:Z=1:IFF$="M"THEN23Ø
32Ø GOTO3ØØ
325 IFZTHEN23Ø
33Ø GOSUB1Ø5:GOTO23Ø
335 POKESC,27:PRINT"{SHFT CLR}{CRSR DN}{CRS
    R RT}PRINTER READY? (Y/N)"
34Ø GOSUB135:IFF$<>"Y"ANDF$<>"N"THEN34Ø
345 IFF$="N"THEN23Ø
35Ø OPEN1,4,1
355 READA$:IFA$="END"THENCLOSE1:GOTO23Ø
36Ø IFA$="#"THENREADA:GOTO355
365 READB$,C$,D$,E$:GOSUB11Ø
37Ø PRINT#1,A$" "C$"{4 SPACEs}"B$"{2 SPACEs
    }"D$D1$"{2 SPACEs}"E$:IFPTHENCLOSE1:GOT
    O425
375 GOTO355
38Ø Z=Ø:RESTORE:Z1=1:GOSUB145:Z1=Ø:J$=E$
385 PRINT"{SHFT CLR}":D1$=" CENTS ":GOSUB12
    Ø
39Ø GOSUB485:IFA$="END"THEN43Ø
395 IFVAL(E$)>VAL(J$)ORVAL(E$)<1THEN39Ø
4ØØ P=1:GOSUB445:Z=1:IFF$="M"THEN23Ø
4Ø5 IFF$="P"THENR$=A$:PRINT"{CRSR UP}{CRSR
    RT}HARD COPY? (Y/N)":PRINT"{CRSR RT}{CR
    SR DN}{CTRL 9}CHECK PRINTER{CTRL Ø}":GO
    TO415
41Ø GOTO39Ø
415 GOSUB135:IFF$="Y"THENOPEN1,4,1:GOTO37Ø
42Ø IFF$<>"N"THEN415
425 GOTO63Ø
43Ø IFZTHEN44Ø
435 E$=J$:GOSUB115:PRINT"{CRSR UP} NONE EXP
    IRED AS OF":PRINT"{CRSR RT}";E$;"{CRSR
    DN}":GOSUB13Ø
44Ø P=Ø:GOTO23Ø
445 PRINT"{SHFT CLR}{2 CRSR DNs} FILE # :";
    A$:PRINT"{CRSR DN} BRAND{2 SPACEs}:";B$
45Ø PRINT"{CRSR DN} PRODUCT:";C$:PRINT"{CRS
    R DN} VALUE{2 SPACEs}:";D$;D1$
455 GOSUB11Ø:PRINT"{CRSR DN} EXPIRES:";E$;"
    {CRSR DN}":POKE198,Ø
46Ø IFPTHENPRINT"{CRSR DN}{CRSR RT}{CTRL 9}
    PRESS P TO PURGE {CTRL Ø}"
465 GOSUB125:IFF$<>"M"ANDF$<>"C"ANDF$<>"P"T
    HENPRINT"{5 CRSR UPs}":GOTO475
47Ø GOSUB12Ø:RETURN
475 IFPTHENPRINT"{CRSR UP}"
48Ø GOTO465
485 READA$:IFA$="END"THENRESTORE:RETURN
49Ø IFA$="#"THENREADA:GOTO485
495 READB$,C$,D$,E$:RETURN
5ØØ D$="":T=Ø
5Ø5 POKESC,29:GOSUB485:IFA$="END"THEN515
51Ø T=T+VAL(D$):PRINT"{SHFT CLR}";T:POKESC,
    3Ø:GOTO5Ø5
515 T$=STR$(T):Z$=RIGHT$(T$,2):X$=LEFT$(T$,
    LEN(T$)-2):T$=X$+"."+Z$
52Ø PRINT"{SHFT CLR}{2 CRSR DNs}{CRSR RT}TO
    TAL VALUE: $";T$;"{CRSR DN}"
525 GOSUB13Ø:IFF$<>"M"THENPRINT"{3 CRSR UPs
    }":GOTO525
53Ø GOTO23Ø
535 POKESC,28:PRINT"{SHFT CLR}{CRSR DN}{CRS
    R RT}{CTRL 9}T{CTRL Ø}APE OR {CTRL 9}D{
    CTRL Ø}ISK?{CRSR UP}":GOSUB135:IFF$<>"T
    "ANDF$<>"D"THEN535
54Ø IFF$="T"THENSAVE"COUPON ORGANIZER":GOTO
    23Ø
545 PRINT"{CRSR RT}{CTRL 9}SAVING UPDATE{CT
    RL Ø}{CTRL 2}":OPEN15,8,15:PRINT#15,"S
    Ø:VICOUPON"
55Ø CLOSE15:SAVE"VICOUPON",8:GOTO23Ø
555 SC=36879:POKESC,26:PRINT"{SHFT CLR}{2 C
    RSR DNs} {CTRL 9}1{CTRL Ø} ADD COUPONS"
    :PRINT"{CRSR DN} {CTRL 9}2{CTRL Ø} REDE
    EMED COUPONS"
56Ø PRINT"{CRSR DN} {CTRL 9}3{CTRL Ø} EXPIR
    ED COUPONS":PRINT"{CRSR DN} {CTRL 9}4{C
    TRL Ø} RETURN TO MENU"
565 P$(1)="BRAND NAME":P$(2)="PRODUCT":P$(3
    )="VALUE (IN CENTS)"
57Ø D1$=" CENTS "
575 GOSUB135:A=VAL(F$):ONAGOTO585,625,38Ø,2
    3Ø:GOTO555
58Ø POKE198,2:POKE631,13:POKE632,13:END
585 PRINT"{CRSR DN}{CRSR RT}{CTRL 9}STANDBY
    {CTRL Ø}"
59Ø A=VAL(A$)+1:READA$:IFA$="#"THENREADA:GO
    TO6ØØ
595 IFA$<>"END"THENREADB$,C$,D$,E$:GOTO59Ø
6ØØ PRINT"{SHFT CLR}{2 CRSR DNs}{CRSR RT}IT
    EM : "A"{CRSR DN}":FORI=1TO3:PRINT"{CRS
    R DN}{CRSR RT}"P$(I):INPUT"{CRSR RT}";W
    $(I)
6Ø5 IFW$(1)=""THEN555
61Ø NEXT:GOSUB145:W$(Ø)=STR$(A):M=A*5+1ØØØ:
    PRINT"{SHFT CLR}{2 CRSR DNs}"
615 PRINTM;"DATA"A","W$(1)","W$(2)","W$(3)"
    ,"E$
62Ø PRINT"GOTO555{HOME}":GOTO58Ø
625 PRINT"{SHFT CLR}{CRSR DN}{CRSR RT}REMOV
    E FILE NUMBER":INPUT"{3 SPACEs}";R$:IFV
    AL(R$)=ØTHEN625
63Ø PRINT"{SHFT CLR}{2 CRSR DNs}":M=VAL(R$)
    *5+1ØØØ:PRINTM"DATA"CHR$(34)"#"CHR$(34)
    ","VAL(R$):IFPTHEN64Ø
635 PRINT"J$="CHR$(34)J$CHR$(34)":Z=1:GOTO5
    55{HOME}":GOTO58Ø
64Ø P=Ø:PRINT"J$="CHR$(34)J$CHR$(34)":Z=1:G
    OTO385{HOME}":GOTO58Ø
1ØØØ REM FILES
1Ø05 DATA 1 ,SAMPLE COUPON,EXAMPLE ONLY,NON
     E,NONE
5ØØØØ DATAEND
```


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Circle 62 on Reader Service card.

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by CPX

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COLOR MONITOR

- 14" screen
- Resolution meets or exceeds Commodore 1701/1702
- 15% larger screen than the Commodore or CA monitors.
- Complete with Cable and instructions

Our best buy. This is the monitor that Commodore should have made. We bought the same design that is used in monitors costing hundreds more. Meets or exceeds Commodore specifications. Great for use with your VCR too.

Catalog #1210 **$189.95**

AMBER MONITOR

- Highest performance available
- 12" screen
- Up to 132 columns x 25 lines
- Front panel controls
- Amber screen
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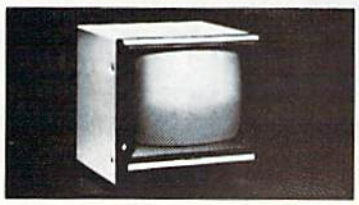
- Complete with cable and instructions

This is the monitor for professional work. If you plan to use an 80 column board (see below) or if you use your 64 a lot **save your eyes** and use the best. We bought the same design used by Sanyo that sells for up to $199.95.

Catalog #1220 **$99.95**



DATA 20 XL 80 (80 column board)

- 80 column x 25 line display
- Clear, sharp display
- Includes:
  Wordmanager Wordprocessor
  Planmanager Spreadsheet
  Com-manager Communications
  Disk copy utility
- Auto boot and auto start
- Speeds up the system up to 15% **including the disk drive**
- 1 year manufacturer's warranty

Every Apple or IBM has an 80 column screen, so can your 64. This amazing cartridge is the best new product we've seen in years. Simply plug it in, and watch the XL 80 load and run its easy to use programs **automatically**. The included programs are fast, powerful, and very easy thanks to the 80 column screen. A **must for wordprocessing**. Use with any monochrome monitor (see above).

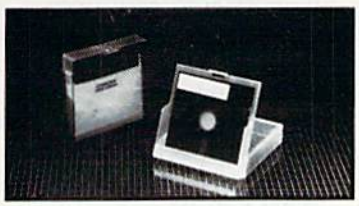
Catalog #1230 **$99.95**

DATA 20 PARALLEL INTERFACE

- 100% compatable with all Commodore Computers Plus 4, 16, 64, VIC 20, SX 100 (portable), and 128
- No power taps to tape, user, joystick ports, or **any** outside source
- No setup required
- No software drivers required
- Great graphics with Printshop, Flexidraw, etc...
- As easy to use as a cable.
- 1 year manufacturers warranty

You wanted graphics, no hassle, and low price. DATA 20 gave it to you. This new interface (never sold before) uses a custom chip that is so low power, it gets all the power it needs from the signals going to the Printer! Works with **any printer or software** or your money back.

Catalog #1240 **$49.95**



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Do you know how much your electricity is costing you per day? This program monitors your meter and computes the daily cost.

Energy Watchdog

By ANN F. SYKES

Kilowatt Analyst stores readings (kilowatt-hours used) from your meter, calculates the average daily consumption of kilowatt-hours (kWh) and computes the average daily cost you are incurring. It keeps track of the dates recorded and gives you the averages for the test period. Additionally, there is a hardcopy option for those with printers.

A second section of the program analyzes the cost of operating your appliances for a month and keeps track of the monthly totals.

An added bonus is a routine that automatically enters your data into the program. This saves you from having to search through the listing to find the beginning of the Data statements.

Using the Program

After you type in and save Listing 1, run the program. You will see a title screen, followed by a menu offering Meter Analysis and Appliance Cost. If you choose Meter Analysis, you will see an options screen asking you whether you want to view data or enter data.

If you choose to view the meter analysis, the screen will clear, providing you with the information. You have the option of getting a hardcopy if you wish.

If you choose to enter data, the screen will clear, and messages in reverse type will appear at the top of the screen. These messages will tell you where the program's Data statements begin and what to increment line numbers by, and will offer instructions for continuing the program.

After continuing, the program will list all Data statements to the screen. That way, you may determine the next line number to use for your data entry.

Next, type RUN 50008. The screen will clear once again, and you'll be prompted to enter your starting and ending line numbers. If, for instance, you wish to enter one day's reading, and your next line number is 875, you would type in 875,875. You will then be prompted for the line increment. Since you are incrementing by one, simply type in 1.

The screen will then clear, and you should see:

```
875 DATA
```

Type the necessary information into the Data statement, taking care to insert commas between entries. All Data statements, except the first one, should contain the date, the meter reading and the month, in that order.

The first Data statement contains the cost per kilowatt-hour in your area. You can obtain this from your electric bill. The last Data statement contains a flag to let the computer know that it has reached the end of the information.

If you choose Appliance Cost from the main menu, the screen will clear and a brief set of instructions will appear at the top of your monitor, followed by a prompt to begin (hit any key). Just respond to the prompts that follow to obtain the cost of operating individual appliances for a month.

During the run of the program, you may switch between the two main menu options except when you are entering data under the Meter Analysis option, in which case you must type RUN to continue.

Be sure to save a copy of the program after entering new data. Also, I have included several sample Data statements, which you should delete before entering your data.

What's in It?

The program was written primarily to give you an idea of how much money you are spending daily on total electricity and how much you can expect to spend for each appliance on a monthly basis.

Lines 10–95 are the main menu of the program.

Lines 200–330 contain the Input prompts for the Appliance-Cost section of the program.

Lines 340–370 compute the cost of

RUN It Right

C-64; Plus/4; C-16

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KATHERINE MAHONEY

operating an appliance for a month and keep track of the totals.

Lines 380–460 make up the screen print section of the Appliance-Cost portion of the program.

Lines 500–507 begin the Meter-Analysis portion of the program.

Lines 510–850 read the Data statements, compute the average daily cost and the average kWh used during a day, and print these results to the screen.

Lines 860–868 are the hardcopy and return-to-main-menu prompts.

Lines 870–1000 are reserved for data entries.

Lines 5000–5020 make up the subroutine to continue the program via the Wait statement.

Lines 6000–6380 constitute the hardcopy option of the program. This is included separately so you will get the proper tab settings on the printer.

Lines 50000–50021 make up the section that automatically enters data to Data statements. This is accomplished by the "dynamic keyboard" technique of writing to the screen, having the cursor pass over the message and then ending with a carriage return. The data is then Poked into the keyboard buffer.

Armed with the information that Kilowatt Analyst gives you, you can then make plans to alter your usage. For instance, I was shocked to learn that my hot water heater was costing me $34.75 to operate for one month. I have now cut that cost in half by keeping the heater on for only two hours per day. R

Address all author correspondence to Ann F. Sykes, 3270 SE 18th Ave., Gainesville, FL 32601.

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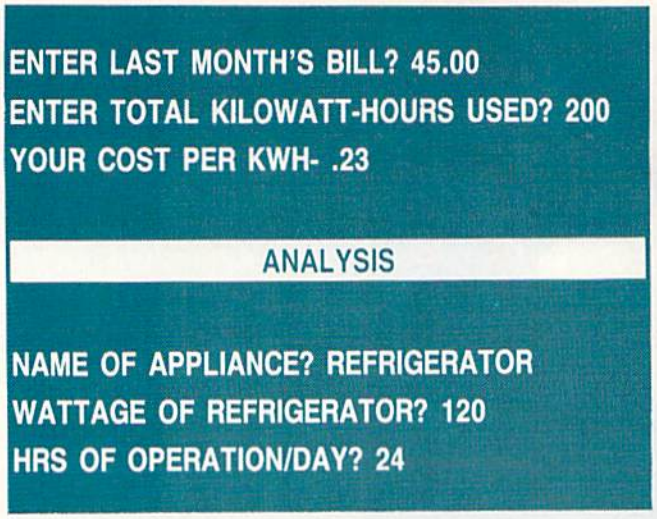

Listing 1. *Kilowatt Analyst program for the C-64, Plus/4 and C-16.*

```
1 REM{5 SPACEs}ANN F. SYKES
2 REM{5 SPACEs}327Ø SE 18TH AVENUE
3 REM{5 SPACEs}GAINESVILLE, FL.{2 SPACEs}32
  6Ø1
4 REM{5 SPACEs}(9Ø4) 378-4862
5 REM
6 REM
1Ø POKE5328Ø,1:POKE53281,1
15 PRINT"{SHFT CLR}
2Ø FORI=1TO3
25 PRINT"{2 CRSR DNs}":NEXT
3Ø PRINTTAB(13);"KILOWATT ANALYST":FORDE=1T
   O15ØØ:NEXT
4Ø PRINT"{SHFT CLR}{2 CRSR DNs}";
5Ø PRINTTAB(15)"{CTRL 9}{CTRL 8}OPTIONS:{CO
   MD 7}":PRINT:PRINT
6Ø PRINTTAB(11)"{CTRL 9}{COMD 1}M {CTRL Ø}{
   COMD 7} ETER ANALYSIS":PRINT
65 PRINTTAB(11)"{CTRL 9}{COMD 1}A {CTRL Ø}{
   COMD 7} PPLIANCE COST ANALYSIS":PRINT
75 PRINTTAB(11)"YOUR CHOICE
8Ø GETZ$:IFZ$=""THEN8Ø
85 IFZ$="M"THEN5ØØ
95 IFZ$<>"A"THEN8Ø
2ØØ CLR:PRINT"{SHFT CLR}"
21Ø PRINT"THIS SECTION WILL COMPUTE THE COS
    T OF"
22Ø PRINT"ELECTRICAL APPLIANCES AROUND YOUR
     HOME."
23Ø PRINT"YOU'LL NEED YOUR ELECTRIC BILL FR
    OM"
24Ø PRINT"LAST MONTH."
25Ø PRINT"{5 CRSR DNs}";
252 GOSUB5ØØØ
26Ø INPUT"{SHFT CLR}{CRSR DN}{CRSR RT}ENTER
     LAST MONTH'S BILL";LA
27Ø INPUT"{CRSR DN}{CRSR RT}ENTER TOTAL KIL
    OWATT-HOURS USED";TK
28Ø AV=LA/TK:AV=INT(AV*1ØØ+.5)/1ØØ
29Ø PRINT"{CRSR DN}{CRSR RT}YOUR COST PER K
    WH-";AV
295 PRINT:PRINT:PRINTTAB(16)"{CTRL 9}{CTRL
    5}ANALYSIS{CTRL Ø}{COMD 7}":PRINT:PRINT
3ØØ INPUT"{CRSR DN}{CRSR RT}NAME OF APPLIAN
    CE";NA$
31Ø PRINT"{CRSR DN}{CRSR RT}WATTAGE OF "NA$
    ;
32Ø INPUTWA
33Ø INPUT"{CRSR DN}{CRSR RT}HRS OF OPERATIO
    N/DAY";HR
34Ø CS=(WA*HR)*(3Ø.4/1ØØØ*AV)
35Ø J=J+1
36Ø SU=SU+CS
37Ø CS=INT(CS*1ØØ+.5)/1ØØ:SU=INT(SU*1ØØ+.5)
   /1ØØ
38Ø PRINT"{SHFT CLR}{4 CRSR DNs}{CRSR RT}TH
    E COST OF OPERATING YOUR"
39Ø PRINT"{CRSR DN}{CRSR RT}"NA$" FOR 1 MON
    TH"
4ØØ PRINT"{CRSR DN}{CRSR RT}IS ";"$";CS
41Ø IFJ>1THEN44Ø
42Ø PRINT"{3 CRSR DNs}{CRSR RT}WANT ANOTHER
     APPLIANCE (Y/N)?
421 GETC$:IFC$=""THEN421
422 IFC$="Y"THEN3ØØ
423 IFC$<>"N"THEN421
43Ø PRINT"{CRSR DN}{CRSR RT}WANT TO RETURN
    TO MAIN MENU (Y/N)?
432 GETC$:IFC$=""THEN432
433 IFC$="Y"THEN4Ø
434 IFC$<>"N"THEN432
435 STOP
44Ø PRINT"{CRSR DN}{CRSR RT}WANT TO SEE MON
    THLY TOTALS (Y/N)?
441 GETC$:IFC$=""THEN441
442 IFC$="N"THEN42Ø
443 IFC$<>"Y"THEN441
45Ø IF C$="N"THENGOTO42Ø
46Ø PRINT"{3 CRSR DNs}{CRSR RT}YOUR TOTALS
    THUS FAR ARE ";SU:GOTO42Ø
5ØØ CLR:PRINT"{SHFT CLR}{2 CRSR DNs}";
5Ø1 PRINTTAB(5)"DO YOU WANT TO:":PRINT:PRIN
    T
5Ø2 PRINTTAB(1Ø)"{CTRL 9}{COMD 1}V{CTRL Ø}{
    COMD 7} IEW DATA":PRINT
5Ø3 PRINTTAB(1Ø)"{CTRL 9}{COMD 1}E{CTRL Ø}{
    COMD 7} NTER DATA":PRINT
5Ø4 PRINTTAB(1Ø)"YOUR CHOICE
5Ø5 GETZ$:IFZ$=""THEN5Ø5
5Ø6 IFZ$="E"THEN5ØØØØ
5Ø7 IFZ$<>"V"THEN5Ø5
5Ø8 PRINT"{SHFT CLR}":Q=1ØØØ
5Ø9 RESTORE
51Ø READA
52Ø READB,C,D$
53Ø PRINT"FIRST READ ON "D$;B;" WAS ";C
54Ø PRINT:PRINT"COST PER KWH IS ";A
55Ø PRINT:PRINT"DATE READ";TAB(12);"METER";
    TAB(19);"KWH USED";TAB(29);"COST/DAY
56Ø PRINT"{9 SHFT Es}";TAB(12);"{5 SHFT Es}
    ";TAB(19);"{8 SHFT Es}";TAB(29);"{8 SHF
    T Es}
57Ø G1=C
58Ø B2=B
6ØØ FORI=1TOQ
61Ø K=1
62Ø READB
63Ø IFB=ØTHEN76Ø
64Ø IFB<B2THEN66Ø
65Ø K=B-B2
66Ø B2=B
67Ø READF,D$
68Ø H=F-G1
69Ø G=H*A
7ØØ PRINTB;D$;TAB(12);F;TAB(19);H;TAB(29);G
72Ø G1=F
73Ø G2=G2+G
74Ø K1=K1+K
75Ø NEXTI
76Ø G3=F-C
```


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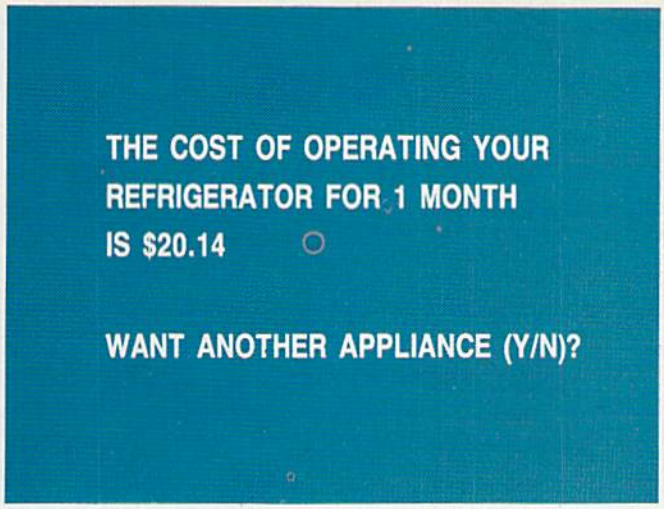

Listing 1 continued.

```
77Ø PRINTTAB(19);"{5 SHFT Es}";TAB(29);"{5
    SHFT Es}
78Ø PRINTTAB(5);"TOTALS";TAB(19);G3;TAB(29)
    ;G2
8ØØ PRINT"{34 SHFT Es}
81Ø PRINT"TOTAL TEST DAYS:";K1
82Ø X=G3/K1:X=INT(X*1ØØ+.5)/1ØØ
83Ø Y=G2/K1:Y=INT(Y*1ØØ+.5)/1ØØ
84Ø PRINT"AVG DAILY USE:"X;"KWH
85Ø PRINT"AVG DAILY COST: $"Y
86Ø PRINT:PRINT"DO YOU WANT HARDCOPY (Y/N)?
861 GETPO$:IFPO$=""THEN861
862 IFPO$="Y"THEN6ØØØ
863 IFPO$<>"N"THEN861
864 PRINT:PRINT"WANT TO RETURN TO MAIN MENU
    (Y/N)?
865 GETC$:IFC$=""THEN865
866 IFC$="Y"THEN4Ø
867 IFC$<>"N"THEN865
868 STOP
87Ø DATA .Ø85
871 DATA 2,11ØØ,FEB
872 DATA 3,129Ø,FEB
873 DATA 4,146Ø,FEB
874 DATA 5,172Ø,FEB
875 DATA 6,21ØØ,FEB
876 DATA 8,247Ø,FEB
877 DATA 9,268Ø,FEB
878 DATA 1Ø,298Ø,FEB
879 DATA 11,329Ø,FEB
88Ø DATA 12,35ØØ,FEB
1ØØØ DATA Ø
5ØØØ PRINTTAB(8)"{CTRL 9}{CTRL 8}HIT ANY KE
    Y TO CONTINUE{CTRL Ø}{COMD 7}
5Ø1Ø WAIT197,64,64:POKE198,Ø
5Ø2Ø RETURN
6ØØØ CLR:PRINT"{SHFT CLR}{3 CRSR DNs}";
6Ø1Ø PRINTTAB(16)"{CTRL 9}{CTRL 5}PRINTING{
    CTRL Ø}{COMD 7}
6Ø2Ø OPEN4,4:CMD4
6Ø3Ø RESTORE
6Ø35 Q=1ØØØ
6Ø4Ø READA
6Ø5Ø READB,C,D$
6Ø6Ø PRINT"YOUR FIRST READ ON "D$;B;" WAS "
    ;C
6Ø7Ø PRINT:PRINT"YOUR COST PER KWH IS ";A
6Ø8Ø PRINT:PRINT"DATE READ";CHR$(16);"2ØMET
    ER";CHR$(16);"4ØKWH USED";
6Ø9Ø PRINTCHR$(16);"6ØCOST/DAY
61ØØ PRINT"{9 SHFT Es}";CHR$(16);"2Ø{5 SHFT
     Es}";CHR$(16);"4Ø{8 SHFT Es}";
611Ø PRINTCHR$(16);"6Ø{8 SHFT Es}
612Ø G1=C
613Ø B2=B
614Ø FORI=1TOQ
615Ø K=1
616Ø READB
617Ø IFB=ØTHEN629Ø
618Ø IFB<B2THEN62ØØ
619Ø K=B-B2
62ØØ B2=B
621Ø READF,D$
622Ø H=F-G1
623Ø G=H*A
624Ø PRINTB;D$;CHR$(16);"2Ø"F;CHR$(16);"4Ø"
    H;CHR$(16);"6Ø"G
625Ø G1=F
626Ø G2=G2+G
627Ø K1=K1+K
628Ø NEXTI
629Ø G3=F-C
63ØØ PRINTCHR$(16);"4Ø{5 SHFT Es}";CHR$(16)
    ;"6Ø{6 SHFT Es}
631Ø PRINTCHR$(16);"Ø5TOTALS";CHR$(16);"4Ø"
    G3;CHR$(16);"6Ø"G2
632Ø PRINT"{66 SHFT Es}
633Ø PRINT"TOTAL TEST DAYS:";K1
634Ø X=G3/K1:X=INT(X*1ØØ+.5)/1ØØ
635Ø Y=G2/K1:Y=INT(Y*1ØØ+.5)/1ØØ
636Ø PRINT"AVG DAILY USE:";X;" KWH
637Ø PRINT"AVG DAILY COST: $";Y
638Ø PRINT#4:CLOSE4:GOTO 864
5ØØØØ CLR:PRINT"{SHFT CLR}{2 CRSR DNs}";:PR
      INTTAB(3)"{CTRL 9}{CTRL 5}DATA ENTRIE
      S BEGIN WITH LINE 87Ø{CTRL Ø}{COMD 7}
5ØØØ1 PRINT:PRINTTAB(3)"{CTRL 9}{CTRL 5}THE
      Y ARE INCREMENTED BY 1{CTRL Ø}{COMD 7
      }
5ØØØ2 PRINT:PRINTTAB(3)"{CTRL 9}{CTRL 5}PLE
      ASE CHECK FOR LAST ENTRY LINE,{CTRL Ø
      }{COMD 7}
5ØØØ3 PRINT:PRINTTAB(3)"{CTRL 9}{CTRL 5}THE
      N TYPE RUN 5ØØØ8.{CTRL Ø}{COMD 7}
5ØØØ4 PRINT:PRINT:GOSUB5ØØØ
5ØØØ6 LIST87Ø-1ØØØ
5ØØØ8 PRINT:PRINT:PRINT"{2 CRSR DNs}{2 CRSR
      RTs}ENTER STARTING,ENDING LINE NUMBE
      R:":INPUTT,G
5ØØØ9 IFT>5ØØØØORG>5ØØØØORG<TTHEN5ØØØ8
5ØØ1Ø INPUT"INCREMENT LINES BY";FT:Y=T
5ØØ11 PRINTCHR$(147)Y;"DATA ";:H$=""
5ØØ12 GETA$:IFA$=""THENPRINT"{SHFT Q}{CRSR
      LF}";:GOTO5ØØ12
5ØØ13 IFLEN(H$)>65ANDA$<>CHR$(13)ANDA$<>CHR
      $(2Ø)THEN5ØØ12
5ØØ14 IFA$=CHR$(2Ø)ANDLEN(H$)=ØTHEN5ØØ12
5ØØ15 PRINTA$;:IFA$=CHR$(2Ø)THENH$=LEFT$(H$
      ,LEN(H$)-1):GOTO5ØØ12
5ØØ16 IFA$=CHR$(13)THEN5ØØ18
5ØØ17 H$=H$+A$:GOTO5ØØ12
5ØØ18 PRINT"Y=";Y;":FT=";FT;":G=";G:PRINT"G
      OTO5ØØ2Ø":POKE631,19:POKE632,13
5ØØ19 POKE633,13:POKE634,145:POKE635,145:PO
      KE636,13:POKE198,6:END
5ØØ2Ø Y=Y+FT:IFY>GTHENEND
5ØØ21 GOTO5ØØ11
```

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Circle 189 on Reader Service card.

Slik Load

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Slik Load is a Kartridge for the C-64.
Slik Load is the most reliable, effective and thought out Kartridge of it's kind.
The options include:

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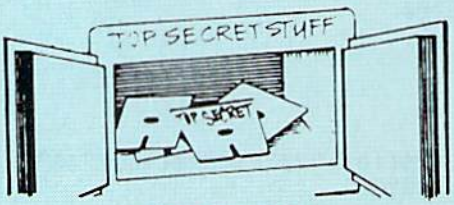
- **Eliminates drive rattle when errors are encountered.**
- **Old and un-new Will restore a basic program**
- **Status key will give you information on device number, bytes free and status of the drive.**
- **Silk Load is also fully compatible with the 1541 Super Rom**



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DMS-Errors 20, 21, 22, 23, 27 & 29 Format Single Tracks Read Disk Errors
½ Track Reader-read and select ½ track
½ Track Formatter-Format a disk with ½ tracks. This is where the next protection schemes are coming from.
Drive Mon-Disk Drive assembler/disassembler. For your 1541.
The Doc-Disk Doctor that reads code under errors.
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Disk Logger-Finds starting track sector, start and end addresses.
Disk Match-Compare any two diskettes Byte for byte.
New Wedge-Easier to use DOS wedge.
ID Check-Check ID's on **any** track.
Unscratch-Restore a scratched file.
View-BAM-Visual display of the free and used sectors on a diskette.
Read/Write Test-1541 performance test.
Repair a Track-Repair a track with checksum errors. Reads code under errors and restores track.
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This is the only utility of its kind. It even has a 3 min. copy on it.

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2-Review Numbers will review numbers that were answered by a computer.
3-Save Numbers will save numbers where a computer answered.
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4-NEW SYSOP'S CORNER	11-CYCLE LOG
5-READ MESSAGES	12-READ DOWNLOAD FILE
6-SCRATCH MESSAGE	13-SCRATCH DOWNLOAD FILE
7-CYCLE MESSAGES	14-ADD TO OTHER SYSTEMS
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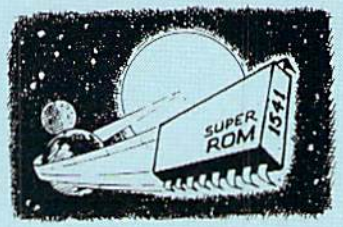
1541 Super ROM $39.95



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- *Easily installed in Minutes*

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At last a complete utility package for the MSD Dual Drive. ***This is the first MSD utility program that does it all.*** *The main menu options include:*

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***Sure Copy** will put all errors automatically on disk: 20, 21, 22, 23, 27 and 29's.*

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- Translates any machine language program into easy-to-read English descriptions with complete explanations of each command!
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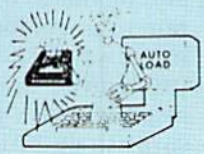
- *Byte splitter for easy splitting of decimal addresses into low byte-high byte format!*

Super Loader

Super Loader is a Kartridge that plugs into your expansion port, that allows the computor, on power up start the disk drive and load the first preselected program on the disk.

- Change colors
- Load wedge
- Works with more drive
- Takes up no memory
- Reset switch included



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TOOL BOX

This Disk has over 100 routines, some of them are routines for protection, smooth scrooling, modem routines, and sound and color routines. They can easily be incorporated into all of your programs. It is also fully documented.

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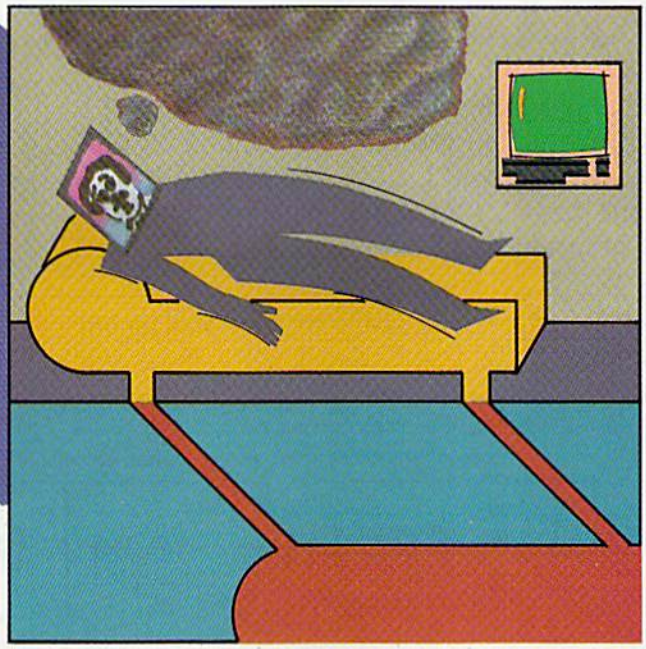
What Makes You Tick?

By CHRISTINE ADAMEC

Psychological software is now available for C-64 users. This new genre of programs helps you to analyze yourself and your friends, reduce stress, lose weight—even improve your sex life.



PHIL GERACI

Psychological, self-help or life-enrichment software—whatever you prefer to call it, this new genre of programs is one of the latest trends to hit the home computer marketplace.

Ranging from behavior modification to personality analysis, and based upon a variety of techniques and methods, these products let you put your computer to use in some novel ways. They can't replace your psychiatrist or counselor, but they just might give you some useful (and surprising) insights about yourself and others.

Here's a look at what's available for Commodore users.

Expando Vision

Expando Vision is a unique hardware/software configuration for both the VIC-20 and the C-64. Depending upon the accompanying program that you purchase, it will input subliminal messages on your TV screen to help you lose weight, quit drinking or smoking, or even improve your sex life! Other available programs include stress control/positive thinking, athletic confidence, study habits/memory power and career/success motivation.

What is a subliminal message? It's a word or phrase flashed on the screen so fast that it's very difficult (or impossible) to consciously read it. But supposedly, if you're relaxed enough, your subconscious mind can see it, and the message makes a lasting impression on your mind.

You'll need a VCR or cable tuner for this system, because you'll have to hook up the hardware to function on channel 3 or 4.

Setting up the system is relatively simple, comparable to hooking up a video game system to your TV set. One end of the cable plugs into joystick port 1 of your C-64 and the other into your TV. The program is supplied on either disk or cartridge.

Turn on your computer and you'll get the introductory message, and you'll then select your category. The weight-loss program allows you to choose from five categories of messages: Weight Control, Self-Image, Deep Relaxation, Good Health and Physical Exercise. After selecting the message series you want, simply move the electronic interface device to "TV," sit back and enjoy your favorite TV program.

If you're wondering exactly what messages are being fed to your subconscious, just move the interface device to "computer," and the message will then be displayed in huge letters across the screen. If you've chosen the Weight Control option, you'll see messages such as "I see me thin," or "I am attractive." The Physical Exercise mode includes messages such as "Exercise is fun" and "I like my body." Each category has nine messages, all ending with "I am OK."

Can you notice the messages as you're watching TV? Most of the time you'll just see a static-like flash, and after you've watched TV for a while, you won't even notice it. But if you're really relaxed, you can actually read the message and it can be startling

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and exciting when it happens.

But does it work—will you actually lose weight, quit smoking or improve your sex life? I tried the Weight Control program for two weeks and lost about two pounds, which I don't think is significant. The success or failure of the program depends largely upon you, your receptiveness to subliminal stimuli and your determination to achieve your goals. It would be difficult to determine to what extent your behavioral change (if any) could be attributed to Expando Vision.

My only complaint about Expando Vision is the price. The hardware, including the electronic interface device and coaxial cable with antenna adapter, costs $89.95, which is rather steep. In addition, each program costs $34.95. So with the $3 shipping fee, you're looking at a bottom-line cost of $132.90. But if you can afford it and would like a fascinating and unique application for your computer, you might well find this unusual product highly satisfactory. *(Stimutech, 3850 Research Park Drive, Ann Arbor, MI 48104. Hardware, $89.95; software, $34.95 each on C-64 or VIC disk or cartridge.)*

Personality Analyzer

If you're curious to know what kind of person you really are, Psycom Software International offers Personality Analyzer for the C-64.

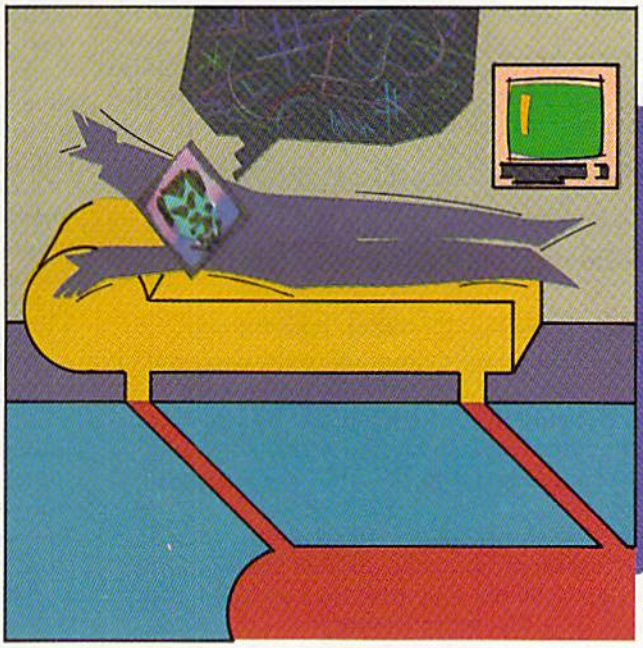
Personality Analyzer asks you a series of questions about yourself. You can select 22, 44 or 88 questions to answer.

Here are a few samples: "Are you governed more by intuition or experience? Are you reserved rather than approachable? Which do you prefer, libraries or lounges?" After answering all the questions, the program takes about a minute to compute your analysis.

The program distinguishes between 16 basic personality types. According to the program, I am a "trustee" type of person, and may be described as steady, loyal, realistic, serious, traditional, conservative, bondable and decisive in practical matters. The program then told me I'd enjoy working as an auditor, officer, mortician, supervisor or accountant. As a mate, I'm "faithful," but I may have difficulty understanding the emotions of others. The program says I value honor the most, and my "vulnerability to criticism" could give me trouble.

I think the program analyzed me rather well (although I really could never see myself as a mortician).

Personality Analyzer is not designed to replace your psychiatrist, but it can provide some very interesting insights. Psycom is currently working with a psychology professor to add a section on motivation. Psycom President Patrick Williams says this motivation scale will help you determine if you're a low-achiever, a Type-A person (workaholic) or somewhere in the middle. Updates will be offered to program owners for just $12.95. *(Psycom Software International, 2118 Forest Lake Drive, Cincinnati, OH 45244. C-64/$32.95 disk.)*



The relationship disk will analyze you and your favorite person to determine if you're truly soulmates.

Emotional Maturity

The International Self-Help Institute of Salt Lake City, UT, has introduced a new program which purports to measure and improve emotional maturity. The author, a researcher with a Ph.D. in psychology, tested over 550 people, ranging from psychotics and neurotics to "normal" people. Based on their responses, he devised 220 true/false survey questions, which are included on the Emotional Maturity demo disk.

The program tabulates your answers and then generates a graph of where you are emotionally. You're asked to respond to statements such "One should trust a physician to treat an illness" and "An honest person can't always be polite." Most of the questions are very straightforward.

You must have patience to answer 220 questions, but after it's over, the analysis comes up quite rapidly. The program not only measures your level of correct answers, but also your consistency—it asks you the same questions in several different ways.

Instead of giving you an age-level score (indicating that you are emotionally 5, 25 or 90 years old), the program gives your scores in percentages. You may be told, for example, that your maturity level is 95%, your consistency is 70% and your bottom-line percentage score is 60% (50% is average and 60% is in the 70th percentile). The program also highlights your inconsistencies and shows stress areas in your life based upon your answers.

The demo disk sells for only $4.95. Once you've identified your stress areas you can buy the maturity profile disk, which will analyze your problem areas and help you to alleviate them. A dynamics and treatment disk is available for further help. Or, you can get the relationship disk to analyze you and your favorite person and determine if you truly are soulmates. Business versions of these programs are also available (at higher prices), which could theoretically be used to help screen prospective employees or realign current jobs so that you would have compatible people working together. *(International Self-Help Institute, PO Box 520950, Salt Lake City, UT 84152. C-64/demo disk, $4.95; maturity profile disk, $49.95.)*

Mind Prober

Human Edge Software's Mind Prober is the most reasonably priced

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of the programs reviewed here. For $29.95, this program will supposedly help you to analyze other people. "Analyze anyone in your life. Get to know their secret likes and dislikes. Find out hidden truths about people you thought you knew," states the manual. Pretty strong claims!

The program asks you whether the person you want to evaluate is male or female, and over or under 18. (If you're evaluating someone under 18, you get a reading on how well they do in school instead of a sexual analysis.)

You're given 66 traits with which to agree or disagree regarding the person you've selected. You're asked whether the person is egotistical, adventuresome, sensitive, meticulous and so on. The program saves the analysis, and you can examine it on your screen, print it out or come back to it later.

I evaluated a friend who's hard-working and rather shy. She was analyzed as being "accurate," but not "playful." She's not "rigid," but she's somewhat "distant." Mind Prober told me that my friend is "likely to be an introvert who tends to judge her accomplishments against harsh standards." In relationships, she is "usually cautious and guarded towards others." She seeks "an organized, efficient work environment" and "a job without challenges would be boring for her."

As for coping with stress, my friend doesn't do very well. "All of life's strains are keenly felt," and "lacking a tough skin or cavalier attitude to protect herself, she takes refuge by withdrawing from others."

Regarding sex, she "moves cautiously toward a serious commitment...she will spend a great deal of time testing her prospective partner's willingness and acceptability."

The final analysis provided by the program is what makes your subject "tick." My friend would "secretly like to live in a world of beauty and tranquility, inhabited by gentle people. In such a setting, she could feel free to express herself without fear of criticism or exploitation."

As an experiment, I decided to create some imaginary people—Susie Sunshine, a perfect person, and Gloomy Gus, a cantankerous man who lives only for his job. I wanted to see if Mind Prober would come out entirely positive for Susie or entirely negative for Gus.

Mind Prober told me that Susie "is an outgoing person who enjoys the excitement of being with a group of companions. She is friendly and engaging and has little trouble telling people what's on her mind." However, "she may overwhelm you with attention once you have indicated your interest in her as a friend." Sexually, "it is very important to Ms. S.S. that you admire and desire her."

As for Gus, Mind Prober reveals that he is "a cynical loner who seems to love his possessions more than his family." There is some hope, however. "Consider Mr. G.G.'s quirks as endearing. He plays a cautious game and often feels uncomfortable about initiating contact. However, a change of scene could work wonders in jarring him out of any unromantic phase."

Mind Prober is intriguing and revealing. The well-written manual includes chapters on how we read others, how to train yourself to read others, how to read friends and business associates and more. (I strongly recommend you read the manual before plunging into the program.)

The accuracy of Mind Prober depends largely upon how you perceive your subject. It's much easier to evaluate a person you already know well than a new acquaintance. How can you have a good feel for whether or not a new friend is meticulous or charitable? Also, some people tend to be overly generous in evaluations, while others are more negative and judgmental. Your tendencies towards one end of the scale or the other will influence the analysis.

Mind Prober won't give you the final word on a person, but if you use it as a guide, it can be helpful and very enlightening. *(Human Edge Software, 2445 Faber Place, Palo Alto, CA 94303. C-64/$29.95 disk.)* R

Other Self-Help Products for Commodore Users

Relax *(Synapse, 5221 Central Ave., Richmond, CA 94804. C-64/$99.95.)*

Relax is a stress-reduction system for the Commodore 64, designed to help users minimize job burnout, control nervous habits such as smoking and overeating and possibly live longer, simply by teaching them how to relax. The documentation and tutorial were written by Dr. Martha Davis, a clinical psychologist and an authority on stress reduction.

Using biosensory technology, the system allows you to monitor stress levels by representing muscle tension graphically on your screen. The Relax workbook helps you to understand your reactions to stress and also provides suggestions for managing and reversing those reactions. An audio tape guides you into deep relaxation; the system also allows you to use subliminal messages that will reinforce your relaxation response.

The Relax sensor headband has three tiny sensors that provide measurements of muscle tension. This biofeedback method, called electromyograph (EMG), measures electrical activity in the muscles. Muscle tension is portrayed on your screen, and it can also be printed out.

The Relax hardware/software package includes the program on disk or cassette, sensor headband, control unit, audio tape and workbook.

Self Search *(Light 8, 405 Washington St., Suite 179, San Diego, CA 92103. C-64/$39.95 disk.)*

Self Search analyzes your personality based upon your answers to 89 test questions. The analysis is based upon a psychological theory known as the Seven Rays, which asserts that there are seven personality modes, manifested in all people in varying degrees.

The program gives you an analysis indicating both primary and secondary personality types. A list of your positive and negative traits is also generated. The analysis can be sent to your screen or printer, and data can be saved to disk and recalled for furture reference. The package contains a second disk with programs for evaluating your test data.

Address all author correspondence to Christine Adamec, 1921 Ohio St., N.E., Palm Bay, FL 32907.

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Commodore's Secret Recipe

By DAVID A. BIER

This program is a key ingredient in helping you budget your meal expenses.

One of the major expenses in any budget these days is food. This program, Recipe Calculator, helps you determine the amount of money you spend on a meal by figuring the total cost of a recipe's ingredients and calculating the cost per serving.

Written entirely in Basic for the VIC-20, the program will also run as is on the C-64, Plus/4 and C-16. The program begins by asking you for the number of ingredients that you'll be using in your recipe. (Do not include items that carry no dollar value, such as water.) You then will be asked to name the ingredients one at a time.

After you've entered the ingredients, you will receive three prompts pertaining to each of the ingredients used in the recipe. First, you'll be prompted for the purchase price. Enter the amount spent on that particular item. If you paid $1.10 for a dozen eggs, you would enter 1.10.

Next, you will be prompted for the total servings per container. This can usually be found on the package or container. For example, a gallon of milk contains 16 cups, so you would enter 16. A pound of butter contains 32 tablespoons, so you would enter 32. With certain ingredients, such as potatoes, vegetables and spices, you may have to estimate the total number of servings. With a little practice, you can become very accurate.

Next, you will be prompted for the servings used. If the recipe calls for 3½ cups of milk, enter 3.5. If it calls for 2 eggs, enter 2.

The last prompt is for the number of servings. If you plan to feed a family of four, you would enter 4. The total cost of the recipe and the cost per serving will be calculated and listed on the screen. You will then have the option to change the number of servings, and the cost per serving will be recalculated.

The program is very simple and easy to follow. It can help the beginning programmer understand the use of many of the more common Basic statements, such as Input, For...Next and Print, and also the use of arrays. ®

Address all author correspondence to David A. Bier, 4973 N. Holt, #101, Fresno, CA 93705.

RUN It Right

C-64; VIC-20; Plus/4; C-16

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RECIPE
CALCULATOR

```
NUMBER OF INGREDIENTS
? 4
NAME THE INGREDIENTS
INGREDIENT 1:? MILK
INGREDIENT 2:? EGGS
INGREDIENT 3:? FLOUR
INGREDIENT 4:? BUTTER■
```

Listing 1. *Recipe Calculator program for the C-64, VIC-20, Plus/4 and C-16.*

```
1 REM*DAVID A. BIER
2 REM*4973 N. HOLT #1Ø1
3 REM*FRESNO, CA. 937Ø5
4 REM
1Ø PRINT"{SHFT CLR}{2 CRSR DNs}{CTRL 1}{8 C
   RSR RTs}{CTRL 9}RECIPE
2Ø PRINT
3Ø PRINT"{6 CRSR RTs}{CTRL 9}CALCULATOR
4Ø PRINT:PRINT
5Ø PRINT"NUMBER OF INGREDIENTS
6Ø INPUTN
7Ø DIMA$(N)
8Ø PRINT
9Ø PRINT"NAME THE INGREDIENTS
1ØØ FORI=1TON
11Ø PRINT
12Ø PRINT"INGREDIENT"I;"{CRSR LF}:";:INPUTA
   $(I)
13Ø NEXTI
14Ø FORI=1TO5ØØ:NEXTI
15Ø FORI=1TON
16Ø PRINT"{SHFT CLR}{2 CRSR DNs}{3 CRSR RTs
   }{CTRL 9}"A$(I)
17Ø PRINT
18Ø PRINT"PURCHASE PRICE:";:INPUTC
19Ø PRINT
2ØØ PRINT"TOTAL SERVINGS:";:INPUTT
21Ø PRINT
22Ø PRINT"SERVINGS USED:";:INPUTS
23Ø PRINT
24Ø P=P+C/T*S
25Ø FORA=1TO25Ø:NEXTA
26Ø NEXTI
27Ø PRINT
28Ø PRINT"NUMBER OF SERVINGS:
29Ø INPUTN
3ØØ PRINT
31Ø FORI=1TO5ØØ:NEXTI
32Ø PRINT"{SHFT CLR}{2 CRSR DNs}COST OF REC
   IPE:":PRINT:PRINT" $";INT(P*1ØØ+.5)/1ØØ
33Ø PRINT:PRINT
34Ø PRINT"COST PER SERVING:":PRINT:PRINT" $
   ";INT(P/N*1ØØ+.5)/1ØØ
35Ø PRINT:PRINT
36Ø PRINT"CHANGE SERVINGS (Y/N)
37Ø PRINT
38Ø GETA$:IFA$=""THEN38Ø
39Ø IFA$="Y"THEN28Ø
4ØØ END
```


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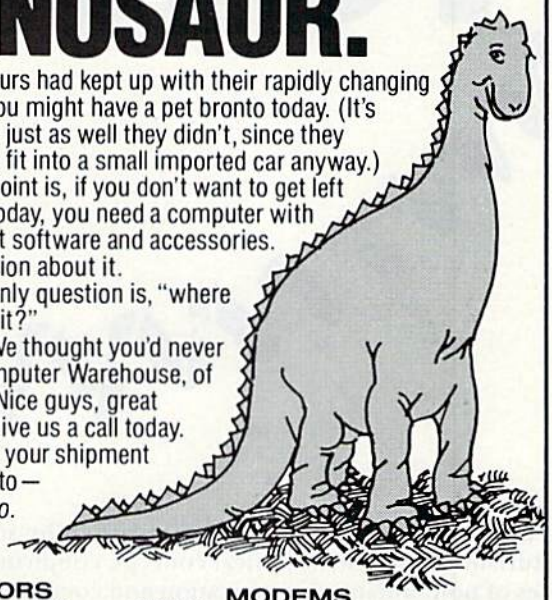
HOW TO AVOID BECOMING A DINOSAUR.



If dinosaurs had kept up with their rapidly changing world, you might have a pet bronto today. (It's probably just as well they didn't, since they wouldn't fit into a small imported car anyway.)

The point is, if you don't want to get left behind today, you need a computer with the latest software and accessories. No question about it.

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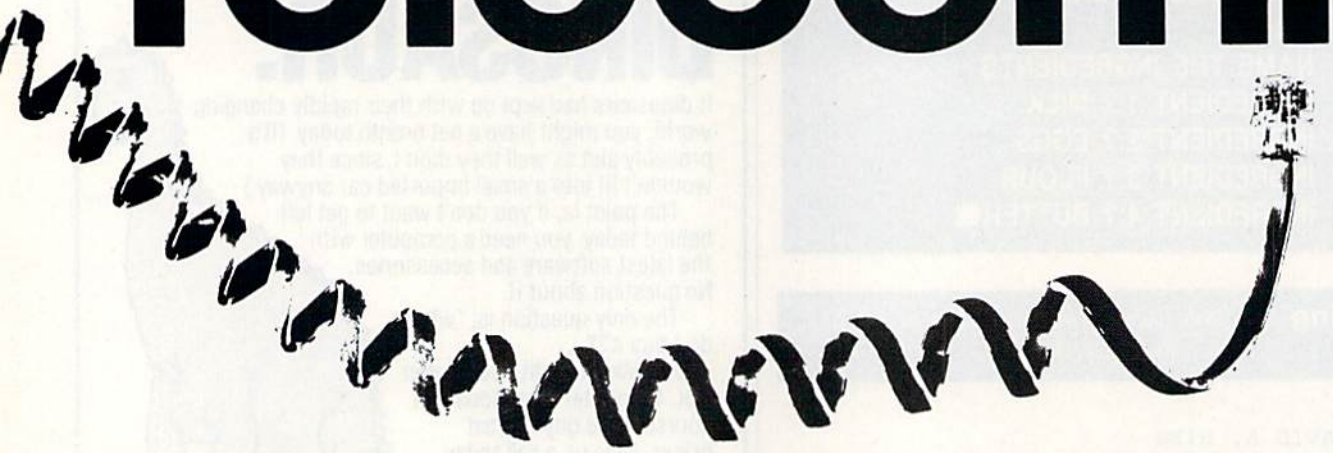
Telecomm



Telecommunications has been regarded by some as a futuristic and highly technical concept, conjuring up images of nonhuman communication and complicated data retrieval. This misconception is fading today as more computers enter the home and more computer users enter the realm of on-line communication.

In 1983, game playing was the predominant home computer activity; in 1984, this was shared with word processing as the top home use. Analysts foresee telecommunications as the fastest-growing home application in 1985, and Commodore home computerists won't be left out of this tremendous surge of on-line activity.

As a matter of fact, Commodore owners will probably be the most active home telecommunicators worldwide, since there are almost four million Commodore owners out there. Additionally, a Commodore modem with terminal software costs less than $100, thereby making telecommunications well within your reach.

While doing research for this series, I was astounded by the great opportunity that Commodore computer owners possess. Whether your Commodore is used most often by the adults in your house or by the younger people, you have an extraordinary tool for doing serious research, multifaceted communication and consumer transactions. The wealth of possibilities that you have at your fingertips is amazing. Furthermore, you don't have to lay out exorbitant amounts of money for this privilege.

With all of this in mind, as well as much reader interest displayed over the past few months, *RUN* has decided to publish a series on telecommunications. We won't bog you down with highly technical discussions on telecommunications electronics, such as how a computer manages to convert digital information into analog and so on. Rather, we will give you a detailed description of the major on-line services that you can try out if you have a modem or intend to buy one.

We will also give you practical information about how to subscribe to these services and how much they cost. You'll be given information that is current at the time of publication, but you might be pleasantly surprised to find services more varied and rates a bit less expensive when you actually go on-line yourself.

In addition, these articles will contain the actual log-on procedure for the services being discussed, and they will highlight setting up and getting on-line using the various Commodore modems. (See *RUN*'s Special Issue 1985 for an in-depth discussion on using the VIC-Modem and Auto-Modem.) You will also be provided with supplemental sources to consult for more detailed information on telecommunications and other on-line utilities.

The amount and variety of information accessible in the home today are truly impressive. Traditionally, professionals and business people have had a need for on-line information to keep abreast of the latest news in their fields and to perform research more efficiently. Today, however, both the kind of user and the data services available have grown more varied. The user is now anyone who owns a computer with a modem and who has the curiosity to peek at the rest of the world. The data being provided now goes well beyond topical research into the areas of public service and communications.

On-line information utilities, such as CompuServe, the Dow Jones News/Retrieval, The Source, the Knowledge Index, BRS and Dialog, provide the opportunity for detailed research, consumer activity and communication.

Entertainment, one-on-one communication, mail service, banking, Hollywood gossip, interactive game playing, college guidance, travel planning, home shopping, group discussions led by professionals and university coursework are among the activities and services now present and constantly expanding. You will find that telecommunicating is very people-oriented and provides you with many avenues for human interaction.

In this series, we will only scratch the surface for you, but, more important, you will be provided with relevant information that you can use immediately for telecommunicating. You may even be prompted to search deeper to find services that will fill your own specific needs.

We start in this issue with a focus on CompuServe, the on-line utility most used by *RUN*'s readers, according to our most recent reader surveys. R

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unications

Introducing a new series on telecommunicating with your Commodore.

On-Line With CompuServe

By MARGARET MORABITO

With a computer, a modem and a terminal program, you can contact CompuServe for just about any reason. You might want to get the latest information on national sports, perform some transactions with your bank, do research for a college course, browse around in Sears, plan a flight itinerary for a trip or participate in a continental game of strategy. The options are too numerous to cover in less than a book.

CompuServe provides such a variety of databases and opportunities for consumer activity and communication that it is not surprising it is mentioned most often by new telecommunications participants as their first on-line subscription.

Its subscribers are of all ages, from all across the United States and Canada—wherever there are phone lines. Anyone with just about any income can share in its offerings. The service is one of the least expensive to join and charges minimal rates (ten cents a minute).

CompuServe brings all the diversity of its far-flung subscribers into an arena for open discussion, private communication and directed activity. This emphasis on human interaction and day-to-day services may be contrary to what you expected from a computerized information service. However, you will discover that telecommunications provides much more than just highly specialized research and credit reports.

Introducing one of the most popular electronic information services, with nearly 200,000 subscribers in the U.S. and Canada.

CompuServe has been around since 1969 as a reliable supplier of business information and communications services to large corporations. The Executive Information Services (EIS) is targeted at business people and professionals, providing sophisticated business communications, worldwide news, demographic and sales information, travel assistance and a wealth of banking and brokerage services.

This side of CompuServe is not advertised nearly as much as the Consumer Information Service (CIS), which is open to the general public at a lower rate. Most home computerists will join the latter rather than the EIS because it offers enough business and financial data to satisfy the average person, plus so much more.

Services Galore

CIS is arranged into seven major headings, each containing from one to a dozen subheadings. To see a brief rundown of all of CIS's offerings, consult Table 1, which lists the major headings, the areas they cover and the topics within those areas. From this table (compiled in January 1985), you can get an idea of the diversity that this information system supplies.

Services such as the CB Simulator, the Forums/SIGs (special interest groups), the National Bulletin Board and Easy Plex (electronic mail) provide the opportunity for every CIS subscriber to chat or write to others in a group or individual setting. (You may have heard of the on-line wedding that occurred several months ago.)

This stage for personal interaction is open on all levels: from spontaneous, non-directed chatting to well-planned and moderated group discussions. Recently, I participated in one of the first on-line national interviews ever held, in which selected members of the press were invited to participate prior to the event. CompuServe sponsored this activity.

Transactional services, such as electronic shopping and banking, are gradually becoming more accepted, and CIS is providing these to its subscribers. Although computerized banking from the comfort of your own home sounds attractive, it is still on trial for many people. In time, though, you may find it easier to do your banking by computer.

Facilities for accessing information represent the largest of CompuServe's offerings. The information is designed to meet a wide

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range of user requirements. Students can get information from *Grolier's Academic American Encyclopedia*; IRS and Social Security information is available; business and financial services provide data on investments, economics, business and law; and services for professionals include reference material on aviation, data processing, engineering, medicine and much more.

Now that you know what CompuServe can offer you, let's proceed into a discussion of how to subscribe, how much it costs, what you will need to get on-line and how to log on using the new Commodore 1660 Modem/300.

How to Subscribe

You can subscribe to CIS in two ways. First, you can get a free membership upon buying the VIC-modem, Auto-Modem or 1660 Modem/300 from Commodore. Packaged with these modems is a free CompuServe Snapak that gives you a user identification number, a secret password—good for one free hour on CIS—and the opportunity to sign up as a free subscriber by logging on to CIS and entering personal information on-line. You will need to provide your name, billing address, phone number and method of billing. Accompanying the Snapak is a service agreement that you fill out and send to CIS after subscribing.

Second, you can buy a CompuServe CIS Starter Kit at a computer or retail store. This kit, also including the Snapak, costs from $20 to $30 and gives you a user's guide ($15 value), a user identification number, secret password, instructions for subscribing and five hours of free on-line time.

Home Services Page HOM-1

News/Weather/Sports: The Washington Post; St. Louis Post-Dispatch; AP Videotex Wire; NOAA Weather Wire; Hollywood Hotline; Sports News and Information; College Press Services.

Reference Library: Academic American Encyclopedia; U.S. Government Publications; New Tech Times; Human Sexuality; Family Healthcare; Family Matters; The Electronic Gourmet; Wine Guide; World of Art; College Press Service; Naked Eye Astronomy; Olympic Scoreboard.

Communications: Electronic Mail; CB Simulator; National Bulletin Board; User Directory; CB Society; Love Messages.

Home Shopping/Banking: Comp-U-Store; Electronic Banking; Athlete's Outfitter; Music Information Service; Fifth Avenue Shopper; Primetime Radio Classics; AutoNet/AutoBase; Savings Scan.

Discussion Forums and Groups and Clubs: CBers; HamNet; WitSig; Sports; Cooking; Travel; Space; Issues; Literary; Educators; Health; Educational Research; Games; Religion; Good Earth; Work-at-Home; Music; Human Sexuality; Military Veterans Services; Family Matters; Ski Forum; Outdoor Forum; Racing Information; Democrat SIG; Republican SIG; Science Education Forum.

Games and Entertainment: Board Games; Parlor Games; Sports Games; Games of Chance; Adventure Games; War Games/Simulations; Space Games; Educational Games; Fortune Telling Games; Game SIGs and Archives.

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Home Management: Balance Your Checkbook; Calculate Net Raise; Calculate Net Worth; Amortize Loan; Electronic Gourmet.

Travel: Official Airline Guide; FIRSTWORLD Travel Agency; WWX Holiday Homes-Yachts-RVs; State Department Advisors; Pan Am Travel Guide; TravelVision; TravelFax; West Coast; Forums; Discover Orlando; TravelShopper.

Entertainment: Hollywood Hotline; Video Information; Sho-Time Movie Catalog; Primetime Radio Classics; Words of Wit & Wisdom; Showbizquiz; Movie Reviewettes; Caine's Mystery Magazine; The Whiz Quiz; The National Satirist.

Business and Financial Services Page FIN-1

News/Reports: Business Information Wire; Business Wire; News-A-Tron Commodities; Stevens Busin Report; Computer Wire; Business & Law Review; MMS Financial Analysis.

Investments & Quotations: Quotations; Commodities Quotations; Corporate Analysis & Financials; Investment Analysis Tools; Other Investment Services; Documentation & Surcharge Information; Expert User.

Communications: EMail; User Directory.

Brokerage and Banking: Unified Management Corporation; Ticker-screen; Huntington National Bank; Shawmut Bank of Boston; United American Bank Memphis.

Reference Library: Incorporating Guide; Diamond Service; Internal Revenue Service; Social Security Administration.

Discussion Forums: 'Ask Mr. Fed' Economic Analysis; HiTech Forum (Columbus, Ohio, Area Chamber of Commerce High-Tech Group).

Travel: same as those in Home Services Travel section.

Personal Finance: Internal Revenue Service; Calculating Personal Finances; Social Security Administration; Donoghue Money-Letter; Independent Insurance.

Financial Services Documentation: Access Documentation; Search on Specific Topics via Keyword; Updates to MicroQuote Manual; Preview of Executive Service.

Table 1. *The seven categories of services offered by CompuServe.*

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Personal Computing Services Page PCS-1

News: RCA Newsletter; Tandy Newsletter; Commodore Newsletter; The Altertext Report; Digital Research, Inc.; OnModem Magazine; OnLine Today Magazine; Computer Language Magazine; Family Computing Magazine; ICCA Directory.

Personal Computing Reference: Software Reports; Text Editors/Word Processors; Utilities; Math and Statistics; Special Features; VIDTEX Information.

Communications: E-Mail; CB Simulation; National Bulletin Board; User Directory; Access (Public File Area).

Shop At Home: Softex-CompuServe's electronic software exchange; Howard Sams Books; Comp-U-Store; Micro-Shoppe.

Communication Forums: for Commodore computer owners and at least 39 other professional, personal and home computer users. Also includes the Writer's SIG, Whole Earth Software and several computer magazines.

Personal File Area: your own personal file management area.

Services for Professionals Page SFP-1

Aviation: ASI Newsletter; NWS Aviation Weather; EMI Flight Planning and Aviation Weather Briefings; AVSIG; AOPA Forum; Official Airline Guide; Aircraft Insurance; FAA Rule Changes/NTSB Cases; VIDTEX Weather Radar Maps; Jet Fuel Hotline.

Communications/Data Processing: The Direct Connection; PR and Marketing Forum; Communications Industry Forum; Information on Demand.

Engineering/Technical: Communications Industry Forum; Environmental Forum; FireNet; Miner's Underground Forum; News-A-Tron Commodity Quotes; Information Retrieval Service; NWWA Waterline Mining and Energy Services.

Legal: Legal Forum; Business Incorporating Guide; Business and Law Review.

Medical: AAMSI Medical Forum; ASCMD Forum; OBGYN Forum; FOI Newsline-FDA Information; AAMSI Communications Network; HealthNet; Op-Net Forum; HealthCom.

Jewelers (The Diamond System): System Intro; Diamond Information; Diamond Wholesale Price Data; Diamond Market News & Reports; Diamond Buy Listings; Diamond Sell Listings; RDC Message Ctr.

Real Estate: The World-Wide Investment System.

Military Veterans Services: Introduction; Information Highlights; Features and Book Reviews; Ask A Vet; Answers to Your Questions; POW/MIA Information; Military Veterans Forum; Veterans National Locator; Agent Orange Legal Action.

The Electronic Mall Page EM-1

Introduction; New & Noteworthy; Ordering Instructions; Directory of Merchants; Browse the Mall; Talk to the Manager; Enter the Mall.

User Information Page CIS-4

What's New.

Command Summary and Usage Tips.

Feedback To CompuServe: problems; VIDTEX software questions; billing questions; change address; request additional services; general comments and questions.

Order Products, Guides, Etc.

Welcome to Default: Terminal Type; Service Actions; Printer Setting; View or Change Terminal Settings; Change Password; Billing Information.

Logon/Logoff Instructions: CompuServe; Tymnet; Telenet; DataPac.

OnLine Today.

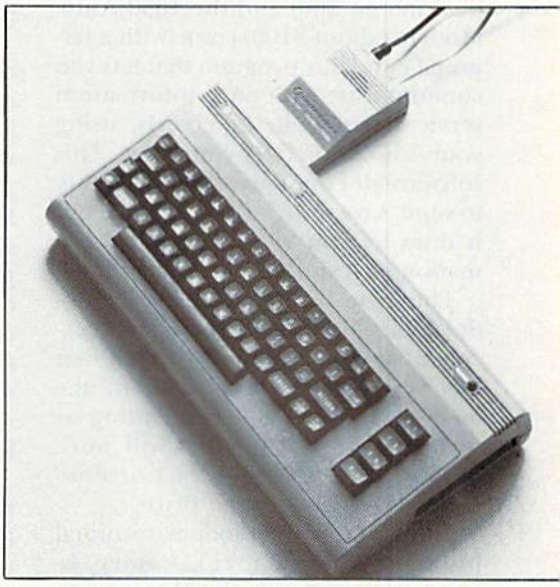
Documentation.

Information Service Index Page IND-1

Search for topic; all indexed topics; index list; explain index.

Soon after subscribing, you will receive a second password, detailed information about how to log on and a list of services offered. All new subscribers receive a free one-year subscription to *OnLine Today*, the monthly CIS magazine. If you did not buy a Starter Kit, you can buy the *CompuServe CIS User's Guide* while on-line. It provides you with an overview of CIS and a wall chart displaying all the services.

You have three options for billing. You can be billed on your VISA card



or Mastercard, or you can have your local bank billed each month. With approval from CIS, you can also use a business account for billing.

As for rates, CompuServe charges an hourly rate for Standard and Prime usage. Most people will use Standard time ($6 an hour or ten cents a minute), which is from 6 PM to 5 AM weeknights and all day on weekends. Holidays specified by CIS also fall into Standard usage. You will be billed in one-minute increments for the on-line usage. Prime-time usage is from 8 AM to 6 PM on Mondays through Fridays at $12.50 an hour.

There are certain databases and services that have charges in addition to the regular on-line charges. These are called Transaction/Premium program charges and are listed in the information accompanying your subscription. Most of these deal with stocks, investment support and financial news.

CompuServe's Customer Service can be accessed on-line. At any prompt, you can ask for help with a particular database; or, through CIS Feedback service, you can ask questions that will be answered through Easy Plex. Also, you can find answers

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to many of your questions within discussion forums and the CB Simulator service on-line. In addition, you can phone for help direct to CIS's Customer Service Department at (800) 848-8990.

What You Need to Go On-Line

Commodore home computer owners need only buy a modem to gain the ability to telecommunicate with CompuServe. The three Commodore modems provide sufficient choice for anyone's needs. The 1600 VIC-Modem (about $60) and the 1650 Auto-Modem (about $100) come with a terminal-emulator program that lets you communicate with most information services and bulletin boards, using your VIC-20 or C-64 computer. This software does not give you the ability to send, save or print files of data, but it does let you view as much information as you wish.

The new Commodore 1660 Modem/300 (about $100) includes an excellent smart terminal program that lets you capture your data in the memory buffer for later printing or saving. This new modem will work on any VIC-20, C-64, SX-64 or Plus/4 and is well worth the price.

Once you have a modem, terminal program, and your user I.D. and password, you need only the phone number of the nearest access network. You can choose from Telenet, Tymnet, DataPac (for Canadian users) and the CompuServe telephone network. If you have an access number within your local calling district, you will not have to pay any charges beyond your actual CIS on-line rates.

Setting Up and Logging On

To log onto CompuServe, you will need your user identification number and your password. In *RUN*'s Special Issue, the article "It's Only a Modem Away" discusses the setup and log-on procedures for the VIC-Modem and Auto-Modem. For those of you who have purchased the 1660 Modem/300, here is a rundown of the log-on procedures for that device. What follows will especially interest the new Plus/4 owners, as the 1660 will work on that computer as well.

Setting up the Modem/300 is not difficult, as its user's manual provides graphic illustrations and instructions applying to all four Commodore computers. With power off, insert the modem into the user port of your computer. Unplug from your phone the cord that connects your modular phone to the wall and plug it into the port labeled Line on the back of the modem. Then insert one end of the plug supplied with the modem into the port marked Phone on the back of your modem, and the other end into your telephone.

Two audio cables are supplied with your Modem/300; they will connect to either your Commodore monitor or a television set to provide sound when auto-dialing. Instructions for these audio connections are tailored to your specific computer and monitor and are discussed in detail in the manual.

The disk included with your modem holds an excellent smart terminal program, called HiggyTerm (named after the programmer), which will work on the C-64 and Plus/4.

After powering up, load and run the HiggyTerm boot program. A menu showing nine options will be displayed. Press 9 to enter the auto-dial option. Next, press 0 to type in your local access telephone number. Once this is entered, you simply press D for dial, followed by 0. The Modem/300 will automatically dial the phone number and switch you to Terminal mode.

When you hear a continuous high-pitched sound from your modem, you know that you have made connection with the CompuServe access network. Wait for the sound to end and then press the return key. There's no cable-connecting or switch-flipping, as with the VIC-Modem and Auto-Modem.

You will immediately be prompted with "Host Name;" whereupon you should type CPS or CIS. Then you will be asked for your user I.D., which you type in, followed again by Return. Lastly, you will be asked for your password. When you type it in, you will not see it displayed on your screen. This is a security measure to help keep others from learning it.

Once you have entered your password and pressed the return key, you will have completed the log-on procedure. A short greeting will be displayed, followed by the main menu, which holds the seven major headings listed in Table 1.

Now What?

Navigating through CompuServe is quite easy, as long as you know where you want to go, but CIS is so enormous that it can be overwhelming to a newcomer. The navigational system is a combination of menu selections and commands.

If you don't know where you are going, you can follow the path of menus that will lead you further and further into the inner depths of this huge information utility. If you do know what database or service you want, you can get there fast by typing the appropriate command, usually in the form of GO followed by the service's abbreviation. (GO CBM will take you to the Commodore Information Service.)

Your first free hour will be well spent browsing through the multitude of available services. When you finally do subscribe, though, you should have an itinerary planned before going on-line. This will save you money, as you will not waste time wading through menus or pausing for decision making. You can have great fun on-line, but, remember, your minute charges add up and your phone bill grows. Use your time wisely.

Next month, we will give you a close look at the Dow Jones News/Retrieval service, which is also offered free with the purchase of a Commodore modem. R

Address all author correspondence to Margaret Morabito, c/o RUN *editorial, 80 Pine St., Peterborough, NH 03458.*

Names and Addresses:

CompuServe Information Services
PO Box 20212
5000 Arlington Centre Blvd.
Columbus, OH 43220

CompuServe Customer Service	800-848-8990
CIS Direct Line	614-457-8600
CIS Account Inquiries	800-848-8199
Commodore Customer Assistance	215-436-4200

Books to consult:

The Computer Data and Database Source Book by M. Lesko, Avon Publishers, 1984.
C-64 Telecommunications by J. Erickson, McGraw-Hill Publishers, 1985.

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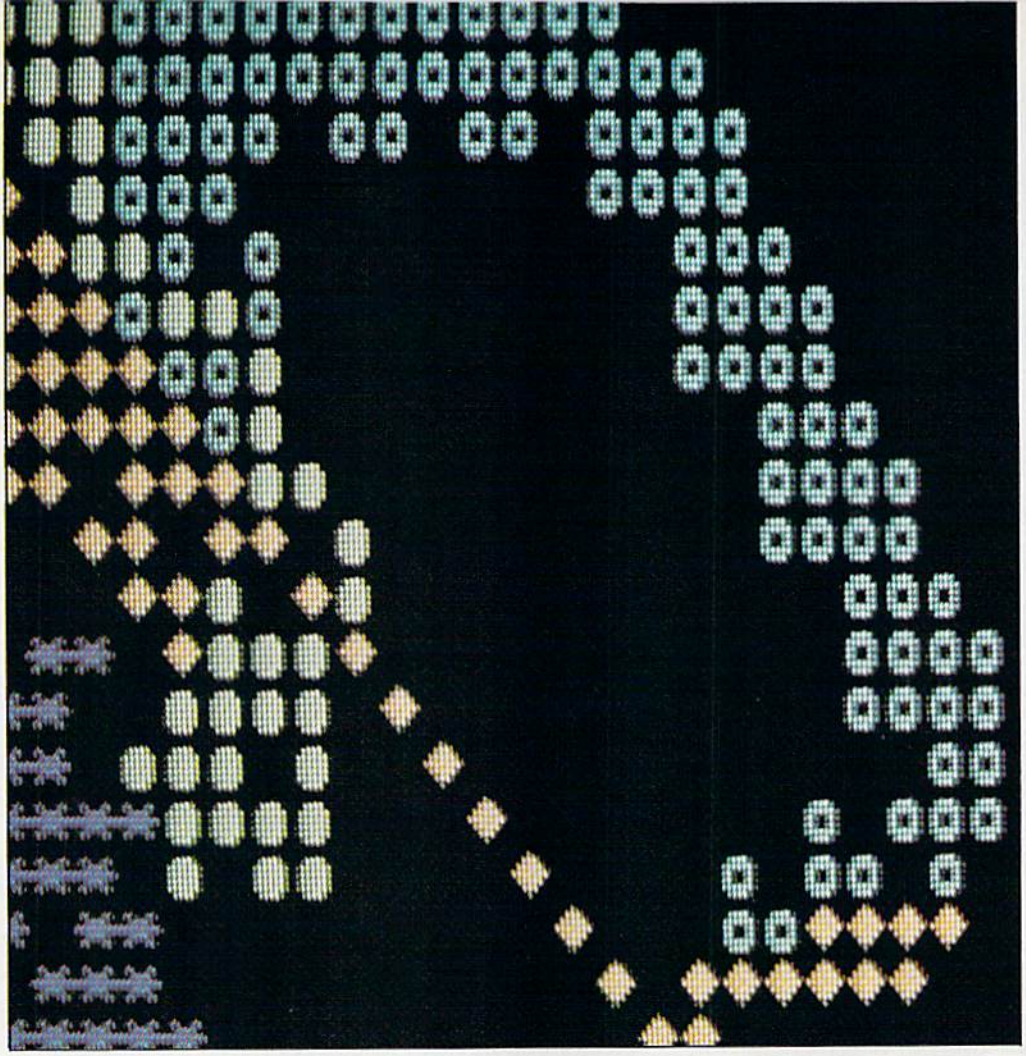

Snakes

Outwit your three opponents by teaching your snake strategic moves that will help it grow into victory.

By DOUGLAS FISH

In Snakes, up to four players accumulate points by moving their snakes around the screen to occupy as many spaces as possible.

At the beginning of the game, the screen prompts you to choose one of four options:

1. Player controlled—new
2. Player controlled—old
3. Computer controlled—new
4. Computer controlled—old

For the first game, each player chooses a "new" snake by pressing the 1 key. If you play Snakes with fewer than four players, press the 3 key for each snake without a player. Your C-64 will determine these snakes' moves as the game progresses.

After all snakes have been assigned to a player or to the computer, the screen displays four differently colored and shaped characters. These are the snakes. You move your snake around the screen one space at a time by using one of eight keys:

U—up	Y—up-left
H—left	I—up-right
J—right	B—down-left
N—down	M—down-right

As your turn comes up, the computer will prompt you to move your snake in one of the eight directions; you cannot, however, move to a place already occupied.

A "new" snake begins the game not knowing in which direction to move. If the computer is controlling the new snake, it chooses the snake's directions at random. If *you* control the snake, you'll be prompted for a direction every time the snake encounters a situation it does not recognize.

Initially, the snakes don't recognize any situations; everything is new to them. As the snakes grow, move by move, they begin to encounter familiar situations. As soon as a snake recognizes an old situation, it repeats the same moves that it "learned" to perform the first time it was in that predicament.

For example, if a snake is moving to the right side of the screen and runs into the edge, it will stop and

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Listing 1. *Snakes program for the C-64.*

```
10 POKE53281,0:POKE53280,0:CL(0)=3:CL(1)=13
   :CL(2)=4:CL(3)=7:CR(1)=81:CR(0)=87
20 DR(0)=40:DR(1)=39:DR(2)=-1:DR(3)=-41:DR(
   4)=-40:DR(5)=-39:DR(6)=1:DR(7)=41
30 DIMIN(255,3):C=54272:CR(2)=42:CR(3)=90
35 GOSUB2050
36 REM **********************
40 PRINT"{SHFT CLR}{CTRL 4}{CTRL 9}{39 SPAC
   Es}"
45 FORX=1TO20
50 PRINT"{CTRL 9} {CTRL 0}{37 SPACEs}{CTRL
   9} {CTRL 0}"
60 NEXT
70 PRINT"{CTRL 4}{CTRL 9}{39 SPACEs}"
80 REM **********************
90 FORX=0TO3
100 PL(X)=1024+INT(RND(1)*20)*40+INT(RND(1)
   *38)
110 IFPEEK(PL(X))<>32THEN100
120 POKEPL(X),CR(X):POKEPL(X)+C,CL(X)
130 NEXT
200 REM **********************
210 FORTU=0TO3
220 CL=CL(TU):CR=CR(TU):PL=PL(TU):MV=0
230 GOSUB2000
240 IFSI=255THENGOSUB2500::GOTO1000
250 IFIN(SI,TU)THENPL=PL+IN(SI,TU):POKEPL,C
   R(TU):POKEPL+C,CL:GOTO230
260 GOSUB2040:PRINT"WHAT DIRECTION, PLAYER"
   TU+1;:POKE1930,CR:POKE1930+C,CL
265 IFSN(TU)>2THEN500
266 POKE198,0
270 GETA$:IFA$=""THEN270
280 X=(A$="B")+(A$="H")*2+(A$="Y")*3+(A$
   ="U")*4+(A$="I")*5+(A$="J")*6+(A$="M")*
   7
285 X=ABS(X)
290 IFX>0ORA$="N"THEN305
300 GOTO270
305 IF(SIAND2{UP ARROW}X)=(2{UP ARROW}X)THE
   N270
310 IN(SI,TU)=DR(X):PL=PL+DR(X)
320 POKEPL,CR:POKEPL+C,CL
330 GOTO1000
500 X=INT(RND(1)*8)
510 IF(SIAND2{UP ARROW}X)=(2{UP ARROW}X)THE
   N500
520 GOTO310
1000 PL(TU)=PL:NEXT
1010 IFT=4THENGOTO3000
1020 T=0:GOTO200
2000 REM **********************
2010 SI=0:FORX=0TO7:I=PEEK(PL+DR(X)):IFI=32
   THENNEXT:RETURN
2020 SI=SI+2{UP ARROW}X:NEXT:RETURN
2030 REM **********************
2040 PRINT"{HOME}":FORX=1TO21:PRINT:NEXT:RE
   TURN
2050 REM **********************
2060 PRINT"{SHFT CLR}":FORX=1TO8:PRINT:NEXT
2070 PRINTSPC(16)"SNAKES"
2080 PRINTSPC(16)"{6 COMD Ts}"
2100 PRINT"{HOME}":FORX=1TO15:PRINT:NEXT:PR
   INT"1. PLAYER CONTROLLED-NEW"
2110 PRINT"2. PLAYER CONTROLLED-OLD"
2120 PRINT"3. COMPUTER CONTROLLED-NEW"
2130 PRINT"4. COMPUTER CONTROLLED-OLD"
2140 FORY=0TO3:PRINT"{HOME}":FORX=1TO12:PRI
   NT:NEXT:PRINT"SNAKE"Y+1"TYPE : {CRSR L
   F}";
2145 POKE 204,0
2150 GETA$:IFVAL(A$)=0ORVAL(A$)>4THEN2150
2160 SN(Y)=VAL(A$):PRINTA$:POKE204,1
2165 IFSN(Y)=1ORSN(Y)=3THENGOSUB3070
2170 NEXT:RETURN
2500 GOSUB2040:PRINT"{30 SPACEs}"
2510 GOSUB2040:PRINT"PLAYER"TU+1"IS TRAPPED
   "
2520 T=T+1:RETURN
3000 REM **********************
3003 GOSUB2040:PRINT"{30 SPACEs}":FORX=0TO4
   :SC(X)=0:NEXT
3005 FORX=1024TO1924
3010 I=PEEK(X)
3020 FORY=0TO3:IFI=CR(Y)THENSC(Y)=SC(Y)+1
3030 NEXT:NEXT
3040 GOSUB2040:FORTU=0TO3:PRINT"PLR."TU+1"-
   "SC(TU),:NEXT:POKE198,0
3045 PRINT"{HOME}"SPC(7)"{CTRL 9}PRESS ANY
   KEY TO CONT."
3050 GETA$:IFA$=""THEN3050
3060 T=0:GOTO35
3066 REM **********************
3070 FORX=0TO255:IN(X,Y)=0:NEXT:RETURN
```

RUN It Right

Commodore 64

wait to be taught where to go when it runs into something on the right. If you move the snake up at that point, it will store in its memory this situation and the move, so the next time it runs into a wall on the right, it will always move up.

If your snake can use a previous move or series of moves to advance into a space or spaces, the computer automatically moves your snake for you. Your snake will continue repeating this pattern until it reaches a place already occupied.

You must, however, move your snake to a new space if the computer doesn't make a move for you.

The game is over when all four snakes can no longer move to a space. Then the computer will take about a minute to total all of the characters on the screen and give each player his score.

Strategy is the Key

Press any key to return to the title screen. In this game and games immediately following, you may choose to have the computer save any or all snakes' moves from previous games. These are "old" snakes. Press the 2 and 4 keys to save each snake's moves from these games. If you want your snake to start the game anew, with no memory of previous games, press the 1 key. To start a game anew for the computer's snake, with no memory of previous games, press the 3 key.

Strategy is important in Snakes. As a game progresses, you can create for your snake a series of moves to hinder an opponent's moves around the screen.

Positioning is another strategy you can use. Your snake is in a good position if it can trap any opponent's snake within a small area, leaving it with few spaces to fill. R

Address all author correspondence to Douglas Fish, 1106 S. 6th St., Marshalltown, IA 50158.

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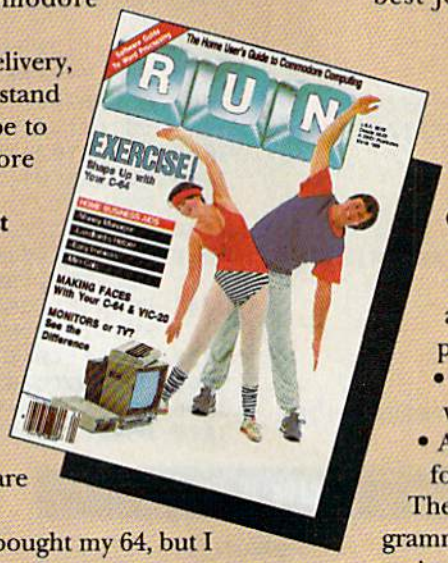

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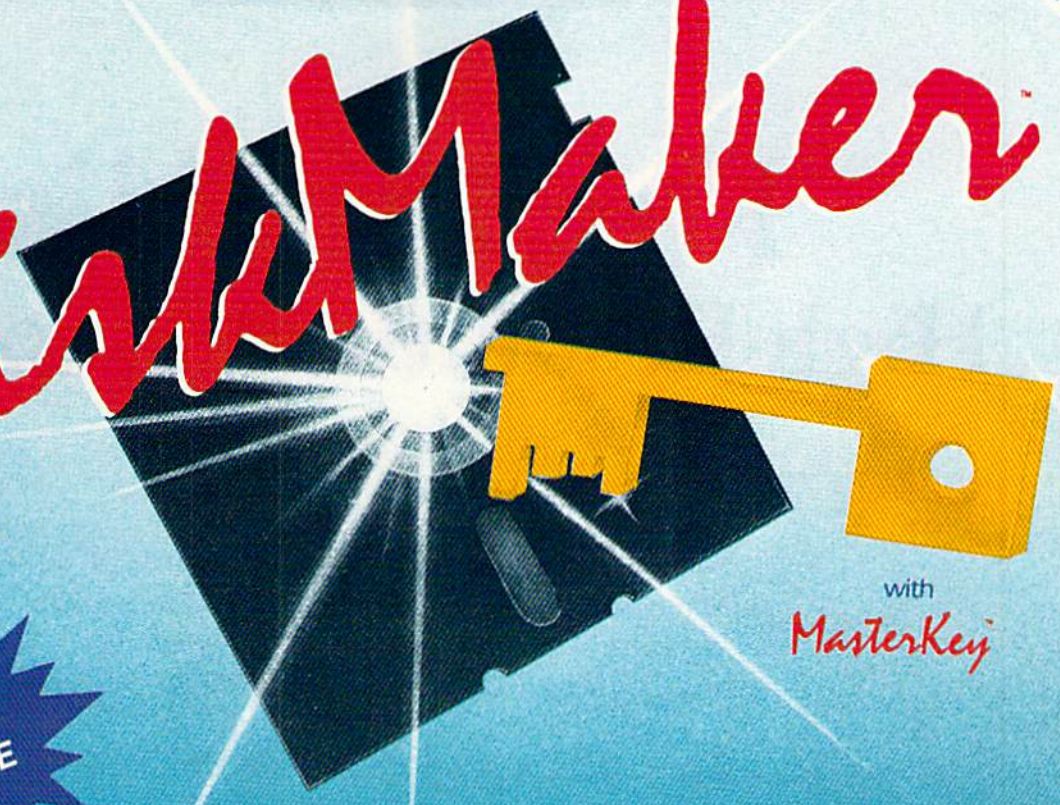

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The Plus/4's High-Resolution Graphics

By GLENN Van VALKENBURG

No more Peeks and Pokes to achieve those high-resolution graphics displays. The Plus/4 lets you control these graphics with easy one-word commands, like DRAW, CIRCLE and BOX.

I love computer graphics! Partly because of that, I also love the Commodore Plus/4. Graphics are easy on the Plus/4, and, to me, easy means more fun.

The Plus/4 graphics procedures are similar to those of a Commodore 64 with a Super Expander cartridge, but the Plus/4 has the advantages of no cartridge to purchase (thus, no worry nor nuisance of a cartridge on the back of the computer) and support of abbreviation of graphics keywords. Another advantage is that in shifting the Plus/4 to Split-Screen mode, with text lines at the bottom of the high-resolution screen, graphics in the text area are not lost. With the Super Expander, they are. The Plus/4 can move freely between all five screen modes without this concern, letting you easily mix basic routines with Direct mode commands.

This article will discuss and show each of the operations (commands, statements or functions) related to the Plus/4's high-resolution graphics, with the parameters allowed or required, and will describe their purposes. These high-resolution commands are part of the enhanced Basic 3.5 and should not be confused with the built-in low-resolution graph-making program that is integrated with the Plus/4 word processor and spreadsheet.

A demonstration program (Listing 1) is provided to illustrate one way the operations can be used with Basic routines to draw a picture.

In the following descriptions, parameters in angle brackets are required, in the range shown, to avoid a Syntax error. If one optional location value is given, either X or Y, then both are required.

Also, all optional parameters preceding a desired parameter must be represented at least by a comma. Don't end with a comma, though, or you'll get a Syntax error. Parameters shown in parentheses are not required, but, if used, must be in the given range. The brackets and parentheses are only for clarity in describing the operations and are not used when working on the computer.

Preliminary Setup Commands

The "open sesame" to this treasure is GRAPHIC <0 to 4>,(0 or 1). The required parameter designates the mode, in the following order: Normal Text, High-Resolution, High-Resolution/Text Split-Screen, Multicolor and Multicolor/Text Split-Screen.

The Split-Screen modes provide a five-line area of normal text at the bottom of the screen. In these modes, the cursor can go behind and be hidden by the drawing area, but the down-cursor key returns the cursor to view.

The High-Resolution modes provide maximum detail, allowing individual pixel (dot) control of the 320-wide by 200-high screen. This mode allows only two colors in each of the 1000 (40-wide, 25-high) character positions. Four colors are allowed in each character position in both multicolor modes, but with reduced resolution. Each horizontal position becomes two-pixels wide, resulting in a 160-wide by 200-high matrix. Option (,1) clears the screen in the mode entered.

If no value is shown, the zero value is assumed and leaves the screen intact. GRAPHIC CLR is used when all graphics work is completed, making available to Basic 10K of RAM, if it was previously set aside for graphics by use of GRAPHIC <1 to 4>.

COLOR <0 to 4, 1 to 16>, (0 to 7) is used to assign background, foreground, multicolor 1, multicolor 2 and border colors. These "source" areas make up the first parameter (0 to 4, respectively).

The 16 colors available are printed on keys 1 to 8, with colors 9–16 on the bottom row. The optional luminance parameter controls color brightness. Black (color number 1) is the only color not affected by luminance, so, in theory, there are fifteen colors times

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eight luminance levels (120), plus black, for 121 colors.

SCNCLR completely clears the screen in the current mode and is on f4 (shift function 1).

Three Impressive Commands

Only three of the 18 high-resolution-related operations directly generate the picture: DRAW, BOX and CIRCLE. All three can specify location by direct coordinates, relative to the pixel cursor or by distance and angle. Relative location X and Y variables are preceded by a "+" or "–" to indicate direction. Angle and distance use a semicolon separator instead of a comma.

Starting simply, DRAW (0 to 3),X,Y TO X1,Y1 TO. . . is used to create or erase a point, a straight line or multiple straight lines. The first parameter is color or source. Strictly speaking, it is source, but since you determine the color specified for foreground, background and so on, then source indirectly calls for a color. Just remember that where source is called for, a number in the range 0 to 3 (4 is for border only) is required, but any of 16 colors can be assigned to that source by the COLOR command.

To erase a feature, draw over it, specifying a source that is the same as the background in that area. X and Y, X1 and Y1 are line end points, which DRAW connects in sequence. One X,Y location without the TO produces a dot. If the pixel cursor is the starting point, only the second location need be shown (after TO).

The DRAW command is powerful and easy to use. To try it out, enter the following one-line program:

```
10 DRAW 1, 0,0 TO 319,0 TO 319,199 TO
   0,199 TO 0,0
```

Now enter GRAPHIC1,1 in the Direct mode to get into High-Resolution mode, and clear the screen. Enter RUN (you won't be able to see the text), and your program will frame the screen, in a clockwise direction.

BOX (0 to 3),X,Y,X1,Y1,(Rotation 0 to 360),(Paint 0 or 1) adds a bit of zest, with two new parameters. Rotation turns a box clockwise around its center, and Paint, if enabled by a value of 1, fills the box with the source color. Source is specified first, then the coordinates specify diagonally opposite corners of the box. BOX can frame your screen much more simply than DRAW. Follow the same procedure, except, for line 10, use:

```
10 BOX 1,0,0,319,199
```

To fill in the box, add „1 to the end of line 10.

The most sophisticated of the group is CIRCLE(0 to 3),X,Y,XR,YR,SA,EA, Rotation,Increment. The CIRCLE operation can do most of what DRAW and BOX can do and more, but there is a price. It has nine parameters. You seldom need all parameters, but even when you do, it's

1—Color Source (set color)	10—Arc ending angle
2—Color	11—Rotation
3—Luminance	12—Increment (included angle, ea. side)
4—CIRCLE color	13—Variable R + A(A(13)) = R 1
5—CIRCLE center (X)	14—FOR R = A(14) Or PAINT Color
6—CIRCLE center (Y)	15—TO A(15) PAINT location
7—X radius	16—STEP A(16) PAINT Y location
8—Y radius	17—Subroutine identification
9—Arc starting angle	

Table 1. *Definitions of subscripted variables in Listing 1.*

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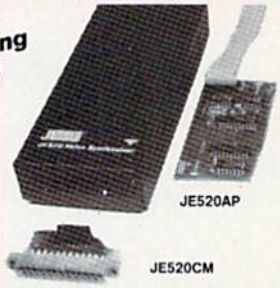

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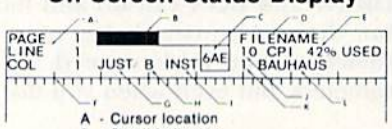

A - Cursor location
B - Scroll Indicator
C - Print features currently being used
D - Filename of text
E - Percentage of RAM (memory) used
F - Ruler (also message line)
G - Word wrap/justification flag
H - 'Block marked' flag
I - Insert mode flag
J - Characters per inch
K - Number of the current font
L - Name of the current font

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The polygons are defined with the Increment parameter, which specifies how many degrees of arc to cover with a straight line. (For example, 90 degrees yields a four-sided figure.) The general equation is "360/increment = number of sides." If the increment doesn't go evenly into 360, one side will be shorter than the rest.

Running quickly through the other parameters, left to right, we have: source; the center location; X and Y radii; starting and ending angles that specify an arc if desired; and degrees of clockwise rotation. The option of differing X and Y radii offers not only ellipses, but also an adjustment in proportion, if desired. Circles drawn with equal X and Y radii print almost in correct proportion, but are too short or tall on screen, depending on the current graphics mode.

CIRCLE has no integral paint command, but any enclosed figure can be filled with color by using PAINT (0 to 3),X,Y,(Mode 0 or 1). First specified is source, where the painting will start, then mode. Mode indicates the specified fill boundary, 0 calling for the PAINT color and 1 calling for any non-background color.

The demonstration program starts by drawing a bush, using the CIRCLE command. It uses an X radius of 40 and a Y radius of 30, and paints with source 1, which was set at 6 (green), luminance 7.

And Lots More

SCALE (0 or 1) determines the range of X and Y screen coordinates. When SCALE is enabled (parameter of 1), the X and Y coordinates extend from 0 to 1023 in each of the four high-resolution modes, allowing movement between the modes without adjusting dimensions. The normal range (parameter 0) differs depending on the screen mode, as previously described. The sample program was meant for SCALE 0, but will run (sort of) in SCALE 1.

The screen coordinates are not limiting, in that coordinates off the screen can be called out as location parameters. It is perfectly feasible to have the computer draw to a point off screen, and even draw several lines completely off screen. If the drawing comes back on screen, it will do so in a manner logically following the invisible geometry drawn.

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Remember that if you try to specify a direct coordinate in a negative X or Y location (by using a minus sign in front of the number), the computer will interpret that number as a request for a location relative to the pixel cursor.

SSHAPE and GSHAPE are used to store portions of the screen in memory, and later recall them. In SSHAPE $,X,Y,X1,Y1, the first parameter is the name assigned the saved shape. The location parameters define diagonally opposite corners of the space to be saved. The data on the area saved is held in a string, which Basic limits to a maximum of 255 characters, so the area that can be saved is rather limited. GSHAPE $, X, Y, (Mode 0 to 4) recalls the string, with the upper left corner at the specified coordinates. Exotic OR, AND and XOR display modes are available, as well.

LOCATE X,Y allows invisible movement of the pixel cursor and is very useful with RDOT (2), which returns the color of the location of the pixel cursor. RDOT, as with the following four functions, requires that the argument be given in parentheses.

RDOT <(0 or 1)> returns the X and Y coordinates of the pixel cursor. RCLR <(0 to 4)> gives the color assigned to the source whose number is used as the argument. RLUM <(0 to 4)> gives the luminance of the source. RGR <(X)> returns the Graphic mode. JOY <(1 or 2)> returns a number that reveals the specified joystick position.

The last command is one that allows you to place text anywhere on the screen in any mode. It is CHAR <0 to 3,X,Y>,(X$), reverse flag (0 or 1). First comes source; then the character column (0 to 39) and row (0 to 24) where the text will start. Next comes the text to be printed and an option for reverse video. This is a very handy command, equivalent to PRINT AT (found on some other computers), but doubly handy, as it is usable in the High-Resolution modes.

Seeing the Plus/4's high-resolution graphics in action is much more rewarding than reading about it... It offers you a great opportunity to easily incorporate all kinds of graphics and text displays into your programs.

If you wish to get a better notion of what can be done with the Plus/4's high-resolution graphics, type in Listing 1. Seeing it in action is much more rewarding than reading about it. The Plus/4 offers you a great opportunity to easily incorporate all kinds of graphics and text displays into your programs.

Explanation of Listing 1

Line 0—Clears screen, prints R/Q? (Run/Repeat or Quit). If "R," goes to Multicolor mode, clears screen and variables, sets number of variables, starts drawing. If "Q," changes foreground color to black; Syntax error returns text.

Line 1—Sets color variables, then a For...Next subroutine containing a drawing subroutine (line 2).

Line 2—Generates lines based on values from Data statements.

Line 3—Switches to line 0 on 999 from data or sets color and paints.

Line 10—Reads data and sets variables. If data is negative, drops to line 20 to change X and skip over unchanged variables.

Line 20—Advances X to skip unneeded variables.

Lines 30–80—Start of data. Data for A$(X). "X" determines variables, as shown in Table 1.

Line 100—Checksum. To use this—after you have typed in the program—type LIST – 30; then use the cursor to scroll the listing to the top of the screen. (Make sure your listing begins exactly at the top of the screen.) Now type over READY with RUN 100 and press the return key. Ignore the first number (– 1000); the rest are checksums for each screen line. Note the numbers and then enter LIST40 – and repeat the above scrolling and checking process.

If there are no typing errors, the numbers will be 113, 57, 225, 138, 256, 317, 164, 260, 185, 205, 494, 890, 782, 868, 756, 878, 738, 926, 767, 869, 742, 924, 741, 727, 402, 407, 280, 286. The last two numbers are for the blank line and the RUN100 line. R

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Listing 1. *Demonstration program for Plus/4 high-resolution graphics.*

```
0 PRINT''[SHFT CLR]R/Q ?''GETKEYB$:IFB$=''
  R''THENGRAPHIC3,1:CLR:DIMA(17):GOTO10:EL
  SECOLOR1,1
1 COLORA(1),A(2),A(3):FORR=A(14)TOA(15)STE
  PA(16):A(A(13))=R:GOSUB2:NEXT:RETURN
2 CIRCLEA(4),A(5),A(6),A(7),A(8),A(9),A(10
  ),A(11),A(12):RETURN
3 IFA(16)=999THEN0:ELSECOLORA(1),A(2),A(3):
  PAINTA(14),A(15),A(16):RETURN
10 FORX=1TO17:B=A(X):READA(X):Z=A(X):IFA(X
   )>=0THENNEXT:ONA(17)GOSUB1,2,3:GOTO10
20 [illegible]:DATA1,6,7,1,115,172,40
   ,30,,,,1,-16,1,-13,1,115,172,3,2,13,5
30 DATA2,115,199,14,,270,360,85,90,5,,160,
   2,1,-5,150,100,200,250,290,,1,5,150
40 DATA153,1,1,3,3,6,3,55,90,40,,110,290,,
   180,11,,360,10,1,-3,2,-13,5,365,10,1
50 DATA-3,1,35,150,20,20,310,50,,2,5,35,70
   ,35,1,-4,35,125,-8,130,230,-16,1,-13,1
60 DATA70,137,3,-14,35,137,3,1,8,7,1,140,2
   0,,-12,11,, 360,20,1,-6,12,12,130,130
70 DATA-16,2,-13,1,140,20,3,1,6,7,3,90,170
   ,-11,140,-14,360,90,1,2,7,7,2,115,155
80 DATA-11,120,-16,1,2,1,7,2,140,170,-15,6
   0,1,1,6,1,-16,3,-15,999,3
100 FORY=0TO14:PRINTZ-1000;'' '',:Z=0:FORX
   =0TO39:Z=Z+PEEK(3072+X+Y*40):NEXTX,Y
```

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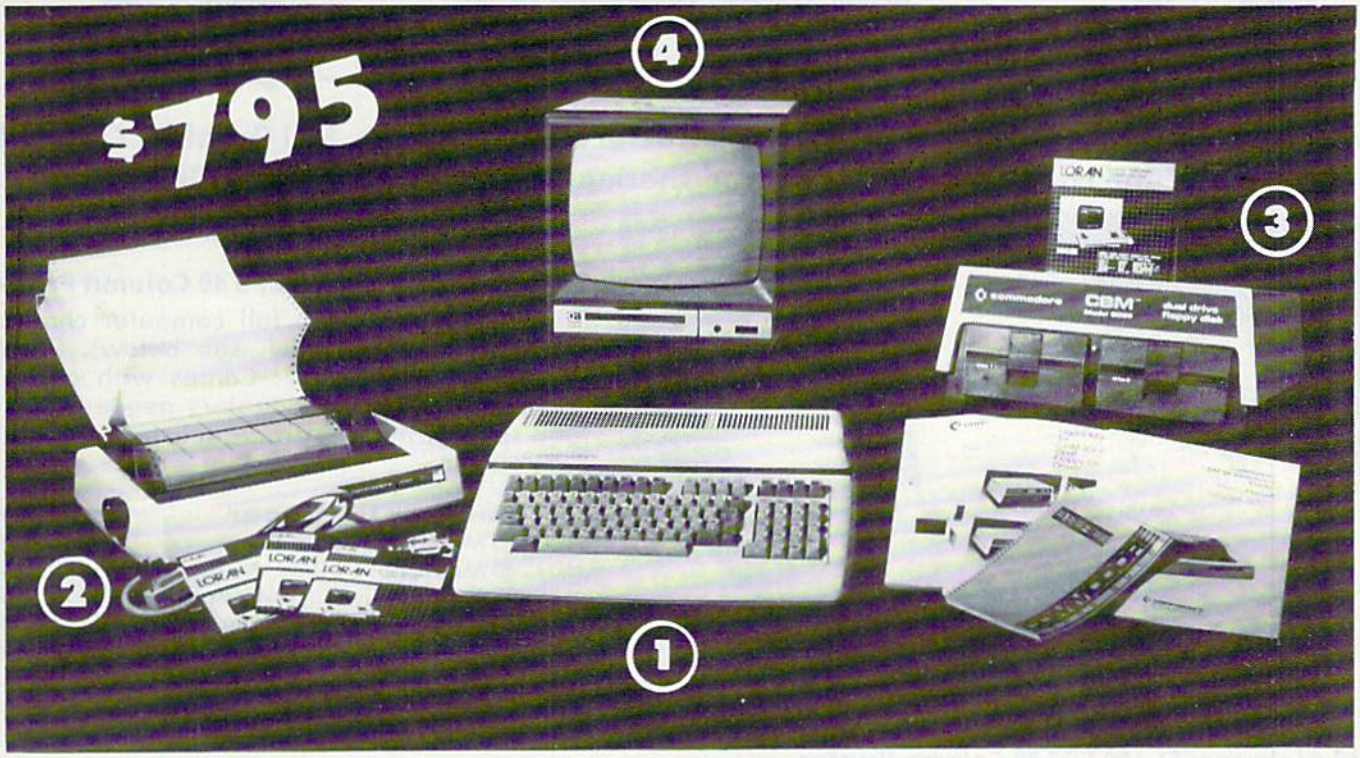

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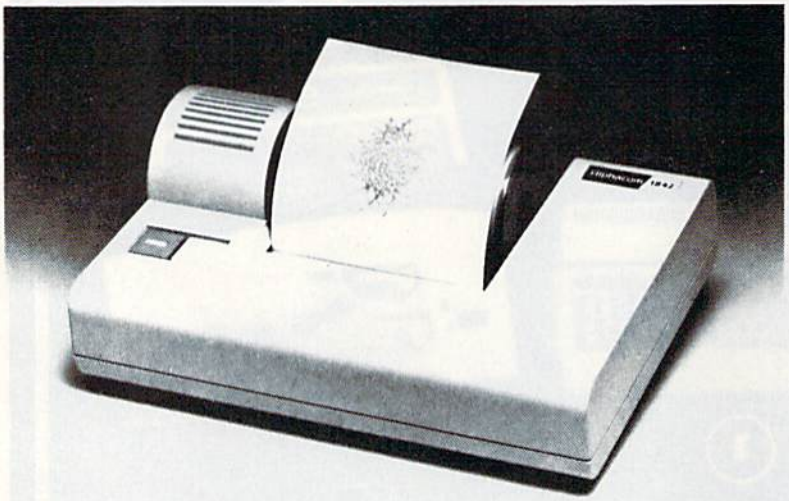

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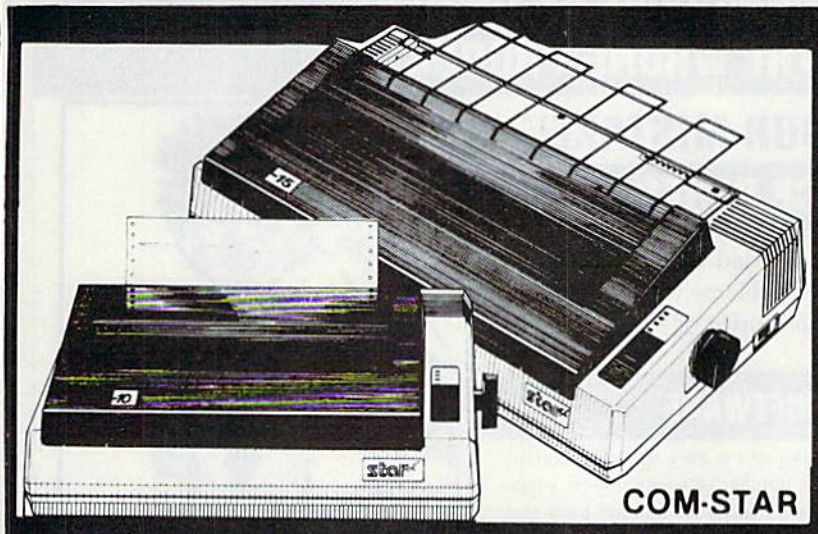

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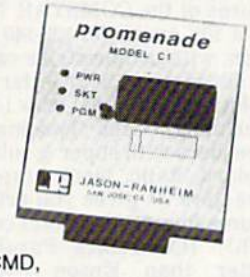

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VIC Patrol

The VIC-20 is a good, low-cost way to use computer control for your home or business. With some hands-on experience, you may find dozens of applications that save you money and make your life easier and safer.

By ANNETTE HINSHAW

If you have a VIC-20 you're not using (perhaps you've upgraded to a C-64), you might want to consider using it as a control system for your home or business.

This article will introduce you to some basic concepts in computer control systems and point you to specific Commodore-oriented products to get you started.

What Can You Control?

A friend who recycled his old PET as a house controller tells me his kids argue less when the computer turns off the TV at bedtime.

Computers can monitor anything that can be turned on and off with a switch.

You can control lights, appliances, thermostats, sprinkler systems, alarms, radio-control triggers, robots or a factory assembly line with on/off switches.

With the right equipment, your computer can call the fire department and report a fire when the smoke alarm goes off or flash all the lights off and on if someone breaks in. The limits of your system are your imagination, your pocketbook and your self-confidence.

Core Concepts

Every computer-control system has three core components that meet in the software: a clock, a bank of output switches, and input sensors and switches. I'll discuss each in turn.

Without a clock, the computer doesn't know when to perform its control functions. Commodore computers have an internal clock, but you need software to use it. The Commodore control packages I know use software clocks that are loaded as part of the control program.

Output switches are easy to control from the Commodore user port. They work with receiver modules that attach directly to whatever you are controlling.

Probably the most commonly used receiver modules for the home are the easy-to-use BSR System X-10 modules, which are specialized according to the objects they control. They include lamp modules, appliance modules and controls for wall switches, receptacles or thermostats. BSR even has a module for programming controls over the telephone.

Some modules control single objects, while others can control groups. They range in price from about $25 to almost $200. Combinations of modules can operate almost anything in the house, from the coffee pot to a burglar alarm system.

The receiver modules have addresses by which the computer can recognize each module. That way, it can, for example, turn off the F8 lamp at 8 AM and turn on the A0 air conditioning an hour before you get home from work.

The modules are connected to

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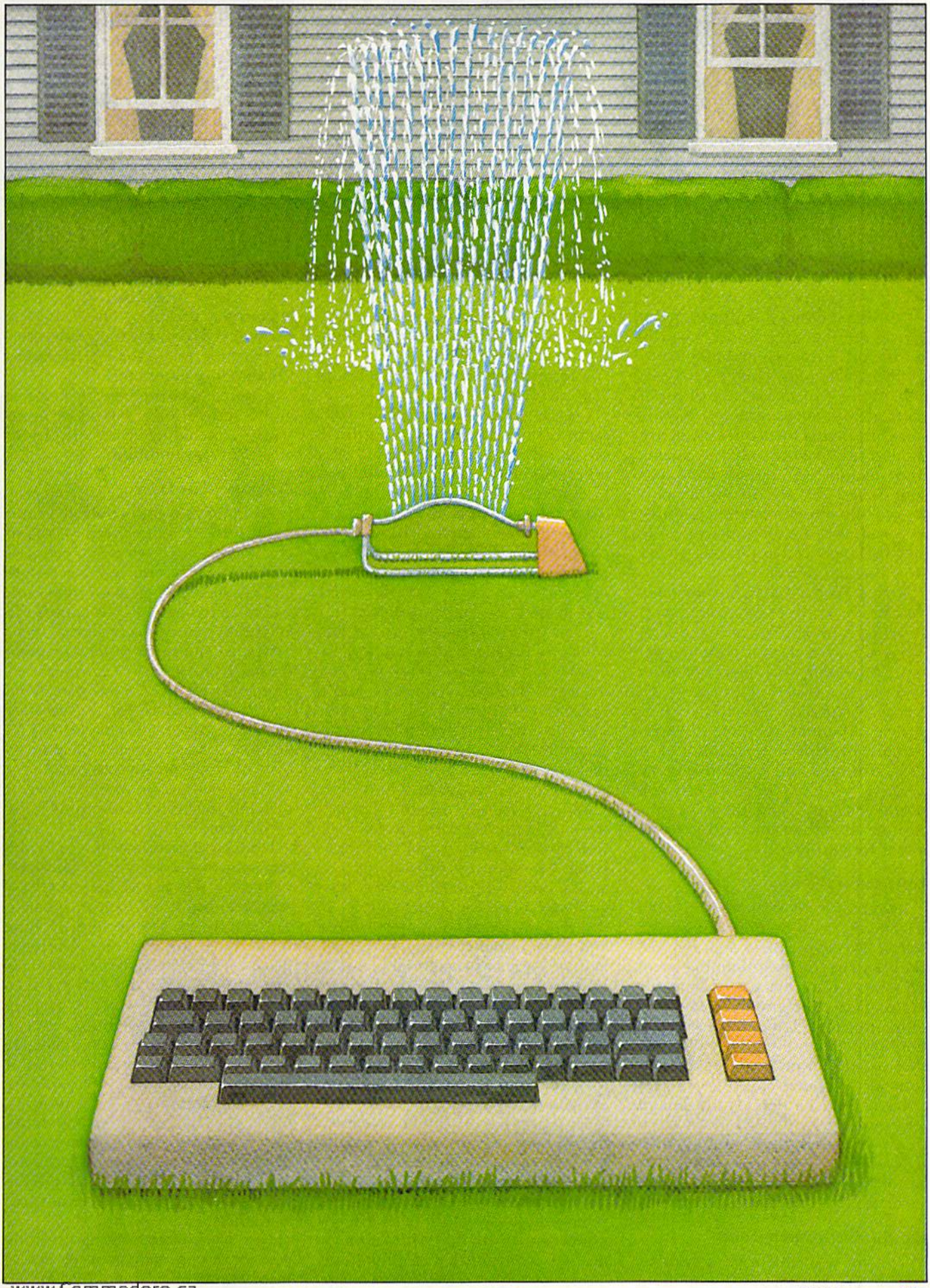

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the computer through an interface (which may have its own power cord) plugged into the user port. They may be connected through the house wiring or a direct wire, depending on the system. Your computer program turns things on and off, singly or in groups, as the clock dictates.

Input sensors are more complicated to use than output modules, but they are necessary for really fancy home-control applications. If you want to turn lights on when the sun goes down, or water the lawn when soil moisture drops or use any kind of alarm, you must have input to which the computer responds.

On Commodore computers, input is read through the control (joystick) port, which has seven input lines, two of them analog (the paddle lines). An analog line can measure a range of data, such as temperature or humidity, while digital lines can only detect on and off. Having only two analog lines is not as limiting as it may sound. You can use the output port to switch between different sensors. You can also use circuits called analog-to-digital converters to trigger your digital inputs.

Alarm systems and light-controlled switches both operate from on/off switches. A photocell conducts (turns on) when it detects a certain light level. A burglar who opens a window also opens a switch and triggers the alarm. A smoke detector trips a switch and sounds off when it detects certain substances in the air. All of these are nuts and bolts in a home security system. The clock lets you decide exactly when these systems turn on and off, so you needn't worry about forgetting.

Software is the Key

If you want a custom system, you'll have to do some programming yourself or find someone to do it for you. Fortunately, the programming is not difficult. I think it's easier than file manipulation or graphics. The programming logic is about the same on both the VIC and the C-64, although they use different memory locations to read the control port.

It's a little harder to understand sufficiently how the sensors work so that you can tell the computer what to look for. However, several of the products I'll discuss have all the information you need to figure it out.

Off-the-Shelf Components

The most inexpensive controller system I've found for Commodore comes from Genesis Computer Corporation. Their basic unit is the VIController, which plugs into the user port of either the VIC or the C-64.

It is an elegant little box (compared to our sprawling homemade circuit cards), with its own power cord. The package includes three programs, each of which controls receiver modules from BSR, Leviton or Radio Shack.

One program lets you set any module manually. The second lets you set up a 24-hour program. The third allows a seven-day program and can run in the background while you use the computer for other things. This last program, Super Schedule, is also available as a separate software package. It requires at least 16K expansion to run on a VIC.

The program lets you turn up to 256 two-character addresses on or off. Each address that contains the same first character can be turned on or off with one command. Another command sets light-intensity level in ten increments. The 24-hour clock software runs up to 30 operations on the unexpanded VIC. All operations can be set manually or programmed for specific times. An operations program can be saved and loaded from tape or disk.

The User's manual for VIController is excellent, one of the best I've seen. It is so easy to follow, even novices will be encouraged. The most complicated technical operation in the VIController system is setting receiver module addresses, and even that is easy.

Genesis also makes an input unit, called COMsense, which I haven't seen. I did, however, read its manual, which is well written and thorough. However, you must provide sensors and modify the VIController program to read the information. If you're a novice at computer control and programming, I suggest you get help or study basic material in books or magazines.

I haven't seen Genesis' COMclock/AB or the following off-the-shelf products. If any of them interest you, write to the companies for specific information.

COMclock is an external clock with calendar and battery backup. For the C-64, it also has an autoboot feature that reloads essential programs if power is interrupted. Some business systems or heavy-duty home systems might need this kind of apparatus.

Savergy, Inc.'s CIM-112 is a high-power system for use with Commodore. It can control high-voltage units. They also have a low-voltage unit called Power Port and a Miniport, which controls only one relay (switch). All of these come with software for manual and timed control.

Savergy also has some basic parts for building control systems, such as heavy relays and power transformers. These products handle larger electrical loads than the Genesis products.

Remote Measurement Systems has a control unit (ADC-1) that plugs into standard RS-232 ports. It can also plug directly into the Commodore user port without the RS-232 adapter most RS-232 devices need.

The ADC-1 does not provide control software or a clock, so it's not a beginner's package. The company provides programming examples and technical data for interfacing to Commodore computers.

Remote Measurement Systems is also a source for a variety of input sensors, including wind speed and electrical consumption.

Building Your Own

Building your own controllers and input devices is the cheapest way to go. You'll also learn a lot more. If you can solder and build a simple circuit, you have all the foundation you need to begin. Persistence is the key to mastering the basics.

If you choose to build a control system from scratch, I strongly recommend you buy *Control Your World with the Commodore VIC-20 Computer* and *Easy Interfacing Projects for the VIC-20*. The former consists of a clock/control program on cassette and a 45-page instruction booklet, which explains the basics of computer control in simple terms.

It includes instructions for building an input sensor card and an eight-switch output board. Step by easy step, you build two control boards. You also learn how to interpret the input data through the computer program and adjust the sensors. This package is simple and easy for relative beginners. You won't be a beginner when you complete it.

The latter book is also relatively easy for beginners to understand. It contains instructions for building and programming specific projects, like a speech synthesizer and a cassette interface. It also explains both hardware and software for basic operations such as analog-to-digital conversion and running mechanical actuators.

One of its most exciting possibilities for home control is its set of instructions on making a ROM car-

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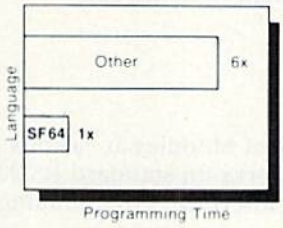

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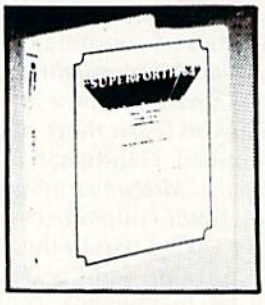

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tridge program. With such a program, you could devote your VIC to controlling the house without tying up a monitor and tape or disk drive.

Those of you who are experienced in electronics and dream not only of home control but also of robots and beyond may be interested in Nth Solutions, for the C-64. It has two disks that design and analyze circuits. They are especially useful for frequency and phase relationships. The design disk helps you choose components, particularly in filter design.

Sources

Whether you build from scratch or off the shelf, you will profit by looking for sources of help, information and parts.

There are a lot of non-computer people who work with control systems, especially in the area of security. They can help you with the peripheral hardware. Ham radio operators and other electronics hobbyists may be sources for circuit help. Almost any computer club will have kids as young as eight or ten who possess terrifying amounts of knowledge about computer programming. They will often help, perhaps just for pocket money.

Parts can be a real problem if you need anything that you can't buy at Radio Shack. I've included the names and addresses of a few vendors with whom I deal. They aren't necessarily better or less expensive than others who advertise in the backs of electronics magazines, but I know they're reliable. Send postcards for catalogs and ask around among friends who have electronics junk boxes.

Old issues of computer magazines such as *Byte*, *Microcomputing* and *Computers & Electronics* have articles that will help you learn more about computer control. Handyman magazines like *Popular Mechanics* may have material on timer-controlled systems for security. Take a trip to the library or borrow a friend's old issues.

With an inexpensive central controller like the VIC, many exciting possibilities are technically feasible and economically within reach. Even on an elementary level, you can improve your life considerably with computer control. R

Address all author correspondence to Annette Hinshaw, Box 580635, Tulsa, OK 74158.

Company Addresses

Receiver Modules

BSR (X-10 modules)
Route 303
Blauvelt, NY 10913
(914) 358-6060

Leviton Manufacturing Co. (central control remote switches)
5925 Little Neck Parkway
Little Neck, NY 11362
(212) 229-4040

Radio Shack Stores (Plug n' Power)

Plug-In Systems for Commodore

Genesis Computer Corporation
Ben Franklin Technical Center
Lehigh University
Bethlehem, PA 18015
(215) 861-0850

VIController	$69.95	(VIC & C-64)
COMsense	$69.95	(VIC & C-64)
COMclock/AB	$69.95	(C-64 only)

Note: VIController comes with software; COMsense manual has program code; COMclock has ROM program; and Genesis also sells a separate software package, Super Schedule Plus, for $19.95

Savergy, Inc.
1404 Webster Ave.
Fort Collins, CO 80524
(303) 221-4200

CIM-112 $479 (Controls high-voltage circuits with VIC or C-64.)
Power Port $99.95 (Low-voltage control with VIC or C-64.)
Miniport $19.95 (One-relay output.)

Note: All come with appropriate software.

Remote Measurement Systems, Inc.
PO Box 15544
Seattle, WA 98115
(206) 525-3369

ADC-1 $369
Sensors & Control Modules at various prices

Note: The ADC-1 works on standard RS-232 and on the Commodore user port without interface. Programming examples provided.

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Jance Associates, Inc.
PO Box 234
East Texas, PA 18046
(215) 398-0434
Home Security System $195
Caretaker System $349
Note: Includes software and hardware to add to VIC or C-64 for complete system.

Homebrew Helps

Control Your World with the Commodore VIC-20 Computer
The Continental Press, Inc.
Elizabethtown, PA 17022
$19.95

Easy Interfacing Projects for the VIC-20
by Jim Downey, Don Rindsberg & William Isherwood
Prentice-Hall Publishers
$12.95

Past Issues of *Byte*, *Microcomputing*, *Computers & Electronics*, *QST* and *73* at your local library

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I have dealt with these firms, but dozens of others, probably just as good, advertise in electronics and ham radio magazines. Send postcards for catalogs.

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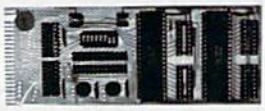

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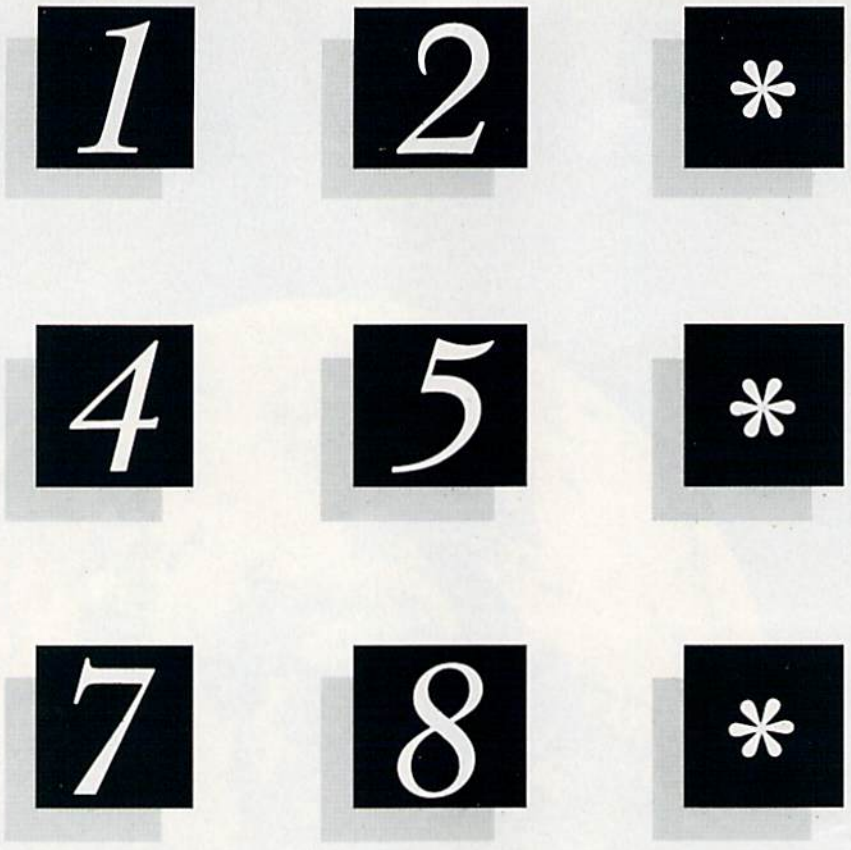

Con Game

By NICK SULLIVAN

In this version of the pea-and-shell con game, you'll be facing a dealer of unusual dexterity—your computer. Instead of the usual three shells, this game uses nine, and you'll be looking for three peas, not just one. Luckily, the dealer doesn't cheat.

This game is very easy to play. You are first asked to choose a speed between 1 (molasses) and 9 (lightning). Then you are shown nine white squares with asterisks in three of them. The squares are the shells, of course, and the asterisks are the peas.

You are given a few moments to note the positions of the peas; then they vanish. The computer scrambles the shells with a series of deft moves and, when they are again at rest, numbers them from 1 to 9. Type in the three numbers corresponding to the shells you think now conceal the peas. That's all there is to it. The computer will determine your score out of three, and give you a chance to play again.

The game has several noteworthy features. One is its size—well under 2K bytes of memory, even with a spacious listing. This makes it a snap to type in.

It's also quick to play (each round takes less than a minute), which means that you can build up your skill in a relatively short time. The short turns also make it ideal for head-to-head competition with a friend, and since all the input can be handled by one player, there's no need for continually changing places.

Finally, this is one game that calls for concentration, alertness and quickness of eye, but not for speed of response, so you don't need the reflexes of a hockey goalie to win. R

Address all author correspondence to Nick Sullivan, 11 Rosegrove Place, Agincourt, Ontario, Canada M1S 1W5.

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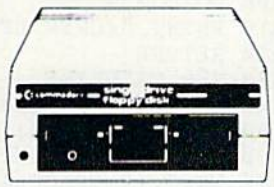

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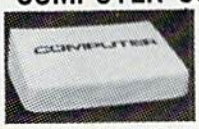

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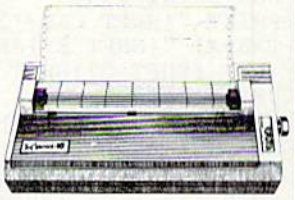

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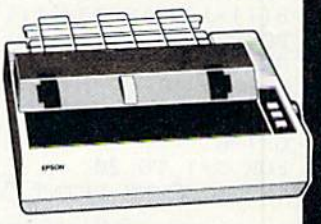

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Listing 1. *The Shell Game program.*

```
10Ø REM YE OLDE SHELL GAME BY SULLIVAN
11Ø DEF FN D(N)=INT(RND(1)*N)
12Ø J=RND(-TI): A=15
13Ø PRINT CHR$(14)
14Ø GOTO 44Ø
15Ø REM PRINT TITLE
16Ø PRINT "{SHFT CLR}{2 CRSR DNs}{CTRL 9}"
    TAB(A) "{SHFT S}{SHFT H}{SHFT E}{2 SHFT
     Ls} {SHFT G}{SHFT A}{SHFT M}{SHFT E}"
    U$
17Ø A=15: U$="": RETURN
18Ø REM GET SKILL LEVEL
19Ø POKE Z,P: PRINT
2ØØ PRINT TAB(1Ø)"{SHFT S}KILL {SHFT L}EVEL
     (1-9): ";
21Ø GOSUB 33Ø: B=N: K=12Ø+((9-B){UP ARROW}2
    )*5
22Ø FOR I=1 TO R: NEXT: RETURN
23Ø REM DELAY
24Ø FOR I=1 TO K: NEXT: RETURN
25Ø REM SHELL LAYOUT
26Ø FOR I=Ø TO 8
27Ø J=INT(I/3)
28Ø B(I)=1241+8Ø*J+3*(I-J*3)
29Ø POKE B(I)+C,1
3ØØ NEXT I
31Ø RETURN
32Ø REM NUMERAL INPUT
33Ø G=1-G
34Ø FOR J=1 TO 2Ø
35Ø IF G=1 THEN PRINT "{CTRL 9}";
36Ø PRINT "?{CRSR LF}{CTRL Ø}";
37Ø GET Q$
38Ø N=VAL(Q$): IF N>Ø GOTO 41Ø
39Ø NEXT J
4ØØ GOTO 33Ø
41Ø PRINT "{CRSR LF}" N "{CRSR DN}"
42Ø RETURN
43Ø REM MAINLINE
44Ø C=54272: E=16Ø: F=17Ø: R=7ØØ
45Ø H=1484: Z=214: P=8: GOSUB 16Ø
46Ø GOSUB 19Ø: S=Ø: P=21
47Ø U$=":{2 SPACEs}{SHFT L}EVEL"+STR$(B): A
    =1Ø
48Ø GOSUB 16Ø: GOSUB 26Ø: POKE C+H,1
49Ø U=FN D(9)
5ØØ V=FN D(9)
51Ø IF V=U GOTO 5ØØ
52Ø W=FN D(9)
53Ø IF W=U OR W=V GOTO 52Ø
54Ø FOR I=Ø TO 8
55Ø A(I)=E
56Ø IF I=U OR I=V OR I=W THEN A(I)=F
57Ø POKE B(I),A(I)
58Ø NEXT I
59Ø FOR I=1 TO H: NEXT
6ØØ POKE B(U),E:POKE B(V),E:POKE B(W),E
61Ø FOR I=1 TO R: NEXT
62Ø M=FN D(2)+8
63Ø FOR J=1 TO M
64Ø X=FN D(9): POKE B(X),32
65Ø T=A(X): POKE H,E: GOSUB 24Ø
66Ø Y=FN D(9): IF Y=X GOTO 66Ø
67Ø POKE B(Y),32: A(X)=A(Y)
68Ø FOR I=1 TO 12Ø: NEXT
69Ø POKE B(X),E: GOSUB 24Ø
7ØØ POKE H,32: POKE B(Y),E
71Ø A(Y)=T: GOSUB 24Ø
72Ø NEXT J
73Ø FOR I=Ø TO 8
74Ø POKE B(I),177+I
75Ø NEXT I
76Ø POKE Z,11: PRINT
77Ø FOR I=1 TO 3
78Ø PRINT TAB(18) "{CTRL 9}*{CTRL Ø} = ?{CR
    SR DN}"
79Ø NEXT I
8ØØ POKE Z,11: PRINT
81Ø FOR I=1 TO 3
82Ø PRINT TAB(22);
83Ø GOSUB 33Ø
84Ø IF A(N-1)>Ø GOTO 86Ø
85Ø PRINT "{2 CRSR UPs}";: GOTO 82Ø
86Ø S=S-(A(N-1)=F): A(N-1)=-A(N-1)
87Ø NEXT I
88Ø FOR I=Ø TO 8
89Ø IF ABS(A(I))=F THEN POKE B(I),F
9ØØ NEXT I
91Ø PRINT "{CRSR DN}" TAB(14) S "OUT OF 3!{
    2 CRSR DNs}"
92Ø PRINT TAB(14) "{CTRL 9}{SHFT A}{SHFT G}
    {SHFT A}{SHFT I}{SHFT N}{2 SHFT SPACEs}
    ({SHFT Y}/{SHFT N})?";
93Ø GET Q$: IF Q$="Y" GOTO 46Ø
94Ø IF Q$<>"N" GOTO 93Ø
95Ø GOSUB 16Ø: PRINT
```


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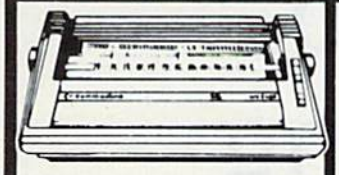

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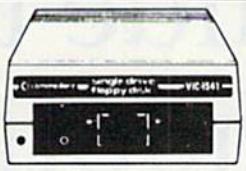

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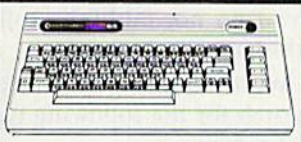

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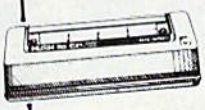

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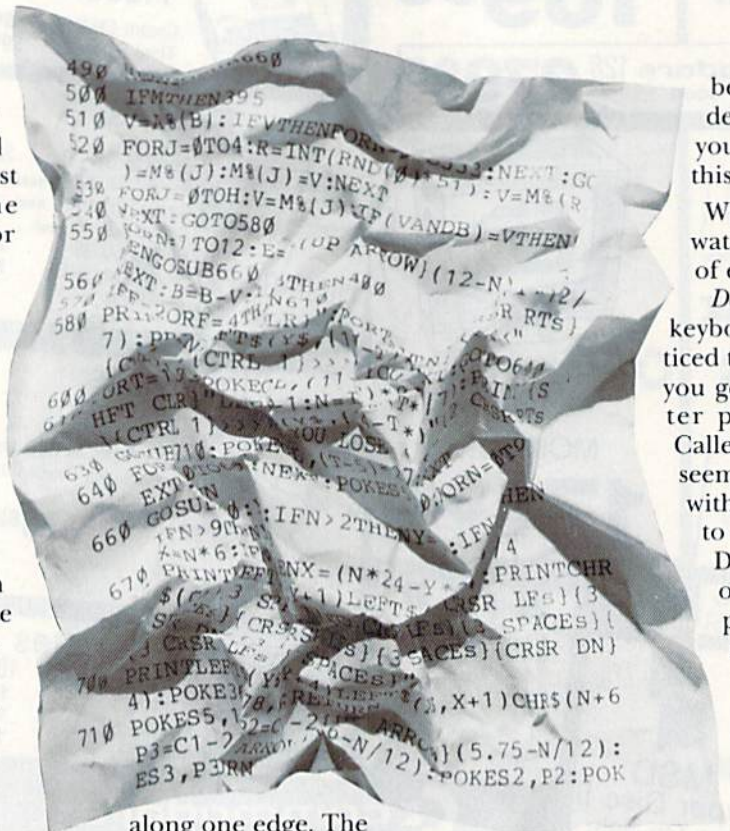
Have you ever decided against typing in a program listing for fear of making errors that could leave you tearing your hair and screaming? Fear no more. This article provides you with hints on how to prevent errors and helps you understand and deal with those errors that do occur.

Your Guide to Troubleshooting

By GARY L. ENGSTROM



If you view entering programs as a hobby, rather than a task, you can gain all kinds of benefits. As with most hobbies, it involves some learning, the possibility for working with someone else, a feeling of accomplishment and a useful end product.

It can be very discouraging, however, if you spend an hour or so entering a program and it fails to work. It is still more frustrating if it still doesn't work after you've spent several hours trying to fix it. In this article, I will describe the approach that I use when entering published program listings. I hope you'll find this approach helpful the next time you sit down to enter a program.

Preventing Entry Errors

It is ten times more efficient to prevent an error than it is to try to find it after it has been entered. Take your time when entering program listings. I use the following rules:

- Enter one line at a time and then check for errors before entering the next line.
- Use a guide under the line to help you keep your place. I use a sheet from a Scotch "Post-it" note pad. These sheets have a sticky surface along one edge. The sticky edge holds the paper flat against the listing, and it securely marks my place without obstructing my work.
- Work with another person. Have the second person look over your shoulder. You will be surprised at how many errors the second pair of eyes can spot.
- Double-check all numbers. Number errors are the most difficult to find and cause the most problems.
- Always save and verify the program before running it. A great deal of time can be lost if you do not faithfully follow this rule.

While entering the listing, watch for the following types of errors.

Double characters. With some keyboards, you may have noticed that when you press a key, you get more than one character printed on the screen. Called keyboard bounce, this seems to be more of a problem with people who are not used to the feel of the keyboard. Double characters are often difficult to spot, especially when there are no spaces between commands and variables.

Missing characters. Sometimes nothing is printed on the screen when you press a key. Again, this happens more frequently to those not used to the feel of the keyboard.

Missing part of a line. This is especially a problem on long lines that contain several similar commands in a row.

Skipping a line. This can be prevented by carefully marking your position in the listing.

Finding Errors That Get By

When you run programs that have errors, a variety of things can hap-

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pen. If the errors are minor, the program might actually run. Your only hint that something is wrong may be that things do not look quite right, or that the graphics do not respond in the way described by the program's documentation.

If the errors are a little more serious, the computer might recognize them and display an error message. The message will tell you the type of error and on what line it occurs.

The worst kind of error will cause your screen to go blank and your keyboard to go dead. Not to worry, though—you need only press the reset button, if you have one, or turn the power switch off, then back on. Of course, the program will now be gone from the computer. But you did *save* it, didn't you?

All the errors in your listing will be one of two types: those that result in error messages and those your computer does not recognize as errors. I call the latter hidden errors.

Error Messages

There are many possible error messages. They are all listed and explained in the back of your user's guide. However, only eight of these messages are likely to occur in the types of programs with which you will be working. Below, I have divided the eight error messages into two groups—direct and indirect error messages—and I describe a strategy for dealing with each kind.

I. Direct error messages

The following errors are located on the line indicated in the error message and can be found and corrected by going directly to the line indicated.

Syntax error. This message indicates a misspelled command word or incorrect punctuation in a command. For example, if you spelled PRINT PRIT or didn't put a colon between commands, you'd get a syntax error. The best way to correct this is to go to the line indicated by the message and search for the error.

Enter and run the following line in your computer; you will get a Syntax error.

```
10 PRINT"HI"PRINT"GOODBY"
```

This line should read:

```
10 PRINT"HI":PRINT"GOODBY"
```

Type-Mismatch error. There are three types of variables that can be used in a program: string, floating-point and integer.

A string variable is identified by a dollar sign ($) and represents a string of characters. To assign a value to a string variable, you must have the string of characters in quotation marks ("").

Floating-point and integer variables are numeric variables. To assign a value to a numeric variable, the characters must be numerals and must *not* be in quotation marks. Enter the following lines, and you will get a Type-Mismatch error message.

```
10 A$ = 100
```

This line should read:

```
10 A$ = "100"
```

```
10 WA$ = WB
```

This line should read:

```
10 WA$ = WB$
```

```
10 WA = "STOP"
```

This line should read:

```
10 WA$ = "STOP"
```

A Type-Mismatch error message can also be an indirect error message, which I describe in the next section.

Undefined-Statement error. This message will refer you to a line with an If. . . Then, Goto, Gosub or Run line-number command. These commands say, "When you are finished with this line, don't go to the next line, but to the line number indicated." The message is telling you that the indicated line number does not exist. Check the printed listing. If you've entered the correct line number, then check to see if you've entered its accompanying program line. If not, enter it.

Illegal-Quantity error. This means that you have entered a number that is too large or too small. You will see this most often in reference to a Poke statement. Poke statements take the following form: POKE memory address, quantity. What you are doing is placing a number, or quantity, into a memory address. This quantity can be any number from 0–255. Anything smaller than 0 (a negative number) or larger than 255 will result in an Illegal-Quantity error. (These messages can also be indirect, as explained in the next section.)

II. Indirect error messages

These errors are discovered on the line indicated in the message. However, the source of the error is somewhere else. To find it requires some searching on your part. If you know what to look for and have a locating strategy, your job will be much easier.

Type-Mismatch error. One way that values can be assigned to variables is through the use of Data and Read statements.

A Read statement assigns to variables the values listed in a Data statement, one at a time and in the order listed. If there are numerical and string values in the Data statement, a mismatch may occur if either the Read statement or the Data statement has an error.

If you get a Type-Mismatch error message, and the line number indicated contains a Read statement, first verify that the Read statement is correct; then examine the Data statement that it is reading. Sometimes, if there is a lot of data to check, it is helpful to have the variable values printed to the screen as they are being read.

Illegal-Quantity error. If you get an Illegal-Quantity error message, list the line that is indicated by the message. If the line has been entered correctly, the problem is that one of the variables has been assigned an illegal quantity.

To track down this error, you must determine two things: If there is more than one variable, you must determine which is the offending one and what is the offending value. You can determine both by one procedure.

When a program stops running because of an error message, the values of the variables are still in memory; you need only ask for them. In the Immediate mode, use a Print statement to determine the values of each of the variables in the line indicated by the error message. Once you find a value that is too high or too low, you will have to verify each line that assigns a value to that variable.

Bad-Subscript error. Subscripts are used to identify the elements of an array, which is a list or table of variables. The position of a particular variable in the list or table is represented by its subscript. The form of an array variable is as follows: A$(2), S(4), VT(3,6), SB(I, J) and so on, where the character string outside the parentheses is the variable name, and the number inside the parentheses is the subscript. Here are the rules for subscripts (they may vary from one form of Basic to another):

- A subscript is always good if its value falls within the range 0–10.
- A subscript is always bad if its value is less than 0 (a negative number).
- A subscript is bad if its value is greater than 10 and was not defined by a DIM statement.

Bad-Subscript error messages will

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result under the following conditions:

- The array variable name or subscript is incorrect.
- The DIM statement defining the array is incorrect.
- The subscript itself is a variable and is assigned an incorrect value.

The error message will indicate the line containing the array variable name and subscript, so check this line first for entry errors. If this line is correct, check out the DIM statements, which are usually located at the beginning of the program. If the subscript is a variable, you will have to perform a line-by-line search to determine where the variable is given its value. In some cases, its value might be determined in several different places throughout the program.

Next-Without-For error. This error message refers to a For...Next statement. These statements allow you to execute a given instruction several times. The form for a For...Next statement is as follows:

```
10 FOR I = 1 TO 10
20 (Instruction)
30 NEXT I
```

If the computer comes across a Next statement without a perfectly matching For statement, you will get this error message. It will indicate the line number containing the Next statement. This error message can be caused by four possible errors:

1. The variable name following the Next statement could be wrong.
2. The variable name following the For statement could be wrong.
3. The For statement could be missing.
4. A Goto statement, an If...Then statement or a Gosub statement somewhere in the program erroneously lists a line number within the For...Next statement.

The first step to correct a Next-Without-For error is to check the Next statement for the correct variable. Secondly, look through the listing for the corresponding For statement and check it for accuracy. This is generally easy, except that some software writers do not include the variable name after the Next statement, and some For...Next statements can be quite complex. If the situation is extremely complex, you may have to check all the For...Next, If...Then, Gosub and Goto statements for accuracy before you find the error.

Return-Without-Gosub error. This error message refers to a Gosub...Return statement. These statements allow you to branch away from a program sequence, perform an instruction set and then return to the original program sequence. The form for a Gosub...Return statement is as follows:

```
10 GOSUB 100
20 ....
.
.
.
100 (Subroutine)
110 RETURN
```

In this program, the computer will come to line 10, skip down to line 100, perform the instruction, move to line 110, then return to the end of line 10 and go on to line 20.

If the computer comes across a Return statement with no matching Gosub statement, you will get this error message, which will indicate the line number containing the Return statement. This message is caused by the computer entering the subroutine without a Gosub statement or by one of these conditions:

- The Gosub statement is erroneously replaced by a Goto statement.
- An If...Then or Goto statement lists a line within the subroutine.
- The lines above the subroutine allow sequential entry into it.

A well-written subroutine will begin with a REM statement. The end of a subroutine is marked with a Return statement. If the subroutine is correctly marked, it is much easier to troubleshoot this error message.

If the subroutine is not marked, look for a statement that protects the subroutine from above, such as a Return statement for another subroutine, a Goto statement or an End statement. Make sure that the statement protecting the top of the subroutine is correctly entered. Once the top of the subroutine is identified, note the range of line numbers in the subroutine. You will then have to go through your listing looking for If...Then statements and Goto statements that contain line numbers within this range.

Out-of-Data error. This error message indicates that a Read statement has run out of data. The first place to look for the error is in the Read statement. Usually, this is part of a

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For...Next statement, and the data is read into a matrix or Poked into memory. Make sure that there are no extra loops in this For...Next statement. Occasionally, within the For...Next statement there is a conditional If...Goto statement for exiting the For...Next loop. The most common way of doing this is:

```
100 FOR I = 1 TO 100 READ A(I) : IF A(I) = -1
    GOTO 110 : NEXT I
```

In this case, the −1 is a flag for getting out of the loop. If the If...Goto statement is incorrect, the loop will continue and the Read statement will run out of data. The second place to look is the Data statements. This job can seem to be overwhelming at times because of the great number of data elements in some programs. However, there are two things to keep in mind.

First, this error message concerns the *amount* of data, not the accuracy. Second, most programmers are quite orderly when working with large numbers of data elements. They have to be. So, the first thing to do is make sure that you have entered all of the program lines that contain Data statements. Next, notice that there is usually a pattern to the number of items in the Data statements.

For example, the Data statements for custom characters have groups of eight pieces of data. This is because each custom character is made up of eight bytes of information. When Poking machine language programs, there is no inherent pattern, but most programmers will put the data in standard group size.

Once you have identified the pattern, simply count the number of data elements in each statement. When you find a data statement that has less data than you think it should have, check the accuracy of that program line. Also, if the Read statement is looking for a flag, like a −1, make sure that the flag exists as the last data entry.

Out-of-Memory error. There are two causes for an Out-of-Memory error. First, there is not enough memory to load or run a program. Second, the computer "thinks" that there isn't enough memory.

When you are entering published program listings written for your particular computer configuration, there should be enough memory. There is, however, one important exception. Often, programs for the VIC-20 are compressed so as to take up as little space as possible.

To do this, the programmer uses multiple-command lines and eliminates all unnecessary spaces. If you add in some of these spaces when entering the program, you may get an Out-of-Memory error. So, when entering programs for the unexpanded VIC-20, enter them exactly as published.

Now, let's take a look at situations where the computer "thinks" that there is not enough memory. Some programs require that a portion of the Basic memory area be set aside for the storing of a custom-character set or a machine language program. When this is done, the Basic program area is redefined by Poking values into memory locations 55, 56, 51 and 52. If this is done incorrectly, an Out-of-Memory error could result. So, look for these Poke statements and make sure that you have entered them correctly.

When checking these Pokes, also make sure that the CLR command follows. The computer may not recognize the newly-defined Basic memory area if there is no CLR command. Incorrect Pokes to other locations can also cause Out-of-Memory problems, so you may have to check all Poke statements.

There are other causes of Out-of-Memory errors that are beyond explanation. Once, while I was working with a program, I kept getting this error message for no apparent reason. The only way I could get out of it was to save the program as it was, turn the computer off and on and then reload the program. The program then ran without error.

Hidden Errors

After you have eliminated all the causes of error messages, your program still may not run. This is because some of your typing mistakes are not interpreted as errors by the computer's operating system. Therefore, execution does not result in an error message. However, an error must exist, because the program is not accomplishing its goal.

For example, if the programmer intended that a character be Poked to the screen, he might write the command POKE 8000,42. This would place an asterisk somewhere on the VIC-20 screen. However, if you mistakenly typed POKE 5000,42, the

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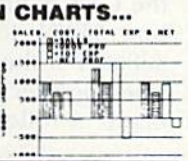

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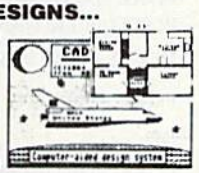

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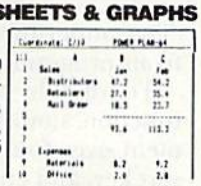

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computer would execute the command without an error message, but no asterisk would appear on the screen.

Usually, errors that remain hidden from Basic are somehow related to Poke statements. The only way to find these errors is to carefully check all the Poke statements. This can be difficult when the memory location or the value is in the form of a variable, a Peek statement or a Data statement. Using the following techniques can be helpful in finding hidden errors.

Print statement. If the memory location or the value of a Poke statement is in the form of a variable, insert Print statements just before the Poke statements, and the value of the variable will be printed on the screen.

Print...Stop statement. To use the Print...Stop statement, you insert PRINT "1":STOP, PRINT "2":STOP and so on, throughout the program. (If you know what the program should be doing, you can place them in strategic places.) Then run the program. When the computer reaches the first statement, a 1 will be printed on the screen along with a Break message that includes a line number. If the program executed correctly, then type in the CONT command. The program will then continue until the next Print...Stop statement, and so on.

Run or Goto statement. Use the Run or Goto statement to start the program at a point other than the beginning. To do this, simply type in RUN and a line number or GOTO and a line number. You can also insert the Stop statement so that you are only running small sections of the program. One of the problems in using this approach is that the values of some of the variables will not be correct, causing the program to execute incorrectly.

Gosub...End statements. Run the subroutines independently from the rest of the program. To do this, use the Immediate mode (without line numbers) and type: GOSUB{line number}: END. The line number that you address is the first line of the subroutine that you will be running. Again, some of the variables in the subroutine may not be correct, causing the subroutine to execute incorrectly.

Custom Characters

Whenever custom characters are used in a program, it can be very difficult to read error statements. The error statements will be displayed in the custom characters or will be completely unreadable. There are three ways to make the error statements legible:

1. Use the cursor controls to bring the cursor up to the error statement. Then move the cursor along the statement. As the cursor flashes, it is actually changing the character from non-reversed to reversed and then back again. As a result, you are accessing a second character set, which you hope will be readable.

2. A second alternative is to blindly Poke in the instructions necessary to tell the computer to use the normal character set. Be very careful when using this method, because Poking to the wrong place or an incorrect value could cause a minor setback in your work. For the C-64, the correct Pokes are:

```
POKE1,PEEK(1)OR4:POKE 53272, (PEEK
(53272)AND240)OR4
```

For the VIC-20, the correct Pokes are:

```
POKE 36869,PEEK(36869)AND240
```

3. The third and probably best method, if you have a lot of troubleshooting to do, is to disable the custom-character function and run the program using the normal character set. This will affect the program's graphics, but the program will run correctly in all other respects.

To disable the custom-character function, find the place in the program listing where the character-set pointer is changed. This pointer for the C-64 is located at memory location 53272; for the VIC-20, it is at 36869. For the C-64, the custom-character pointer is set by a Poke command as follows:

```
POKE 53272, (PEEK(53272)AND240)OR12:
POKE1,PEEK(1)AND251
```

For the VIC-20, it is:

```
POKE 36869,254
```

or

```
POKE 36869,(PEEK(36869)AND240) + 14
```

(The underlined values will change from program to program.)

To disable the custom-character function, simply move the Poke statement over four spaces, using the insert key, and enter a REM command. For the C-64, enter:

```
REM POKE 53272,(PEEK(53272)AND240)OR
12:POKE1,PEEK(1)AND251
```

For the VIC-20, enter:

```
REM POKE 36869,254
```

By doing this, the Poke statements will be ignored when the program is run, and the normal character set will be used. When you have finished troubleshooting the program, simply remove the REM commands, and the program will run with the custom-character set.

Programming Aids

Programming aids, such as the Programmers' Aid Cartridge for the VIC-20 (from Commodore) or Basic Aid 64 (from Richvale Telecommunications) for the C-64, are very valuable tools for the programmer, but are also very useful for the person entering published program listings.

The most useful functions for troubleshooting are the Find, Trace, Step and Help commands, explained below. (These are the command names used in the Programmers' Aid Cartridge. Other programming aids will have the same functions, but may have different names and syntax.)

Find. This is a search-and-print function. For example, if you want to check all of the Poke statements, simply enter the command FIND POKE. All the program lines that contain Poke statements would then be listed on the screen.

Trace. As the program is being executed, the last five line numbers are printed on the upper right-hand corner of the screen. This is especially helpful when the program has an endless loop.

Step. This is the same as Trace, except only one program line is executed at a time. You press the return key to advance to the next line.

Help. This command is useful when troubleshooting error messages. When you get an error message, simply enter HELP. The program line being executed at the time of the error will be displayed on the screen, and a character in the program line will be shown in reverse video.

Another useful function of a programming aid is the ability to scroll through a program listing, rather than being limited to one screen section at a time.

I hope that the troubleshooting suggestions presented here will make your computing a little more enjoyable. R

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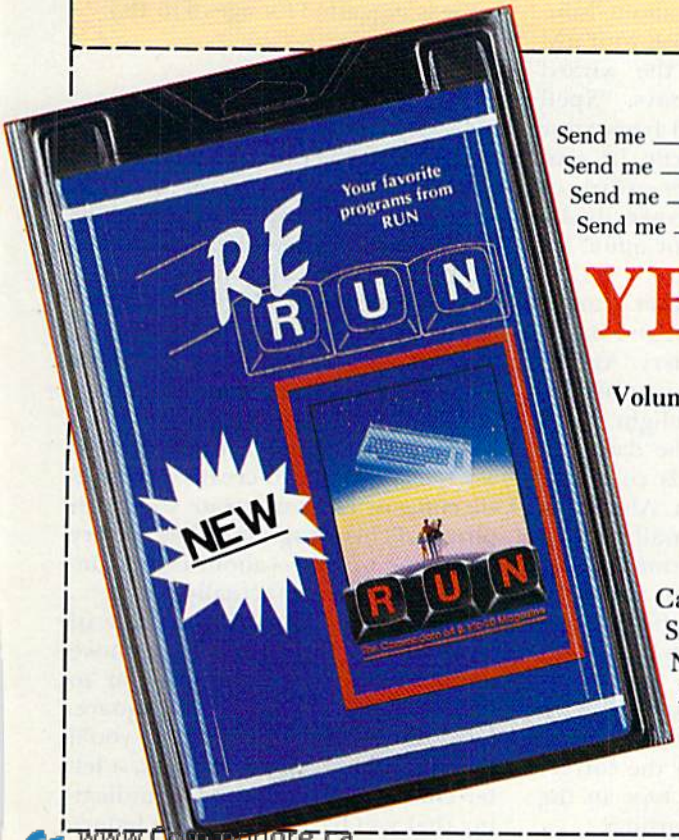

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CHRISTINE ADAMEC

RUN's education columnist, Christine Adamec, takes a look at what's available for C-64 spelling programs.

Whether your children aspire to grow up and become brain surgeons or carpenters, they'll need to be able to communicate clearly. Spelling is one important facet of communication, so if your children are learning the basics now, or if they've passed that stage and are still having trouble, one of the following spelling programs may help them along. (All are for the C-64.)

Cave of the Word Wizard

Cave of the Word Wizard, from Timeworks (444 Lake Cook Road, Deerfield, IL 60015; $34.95, disk), is a fascinating and unusual spelling program. My own children (ages 6 and 7) were mesmerized by it, as were the third-graders who helped me review it. (In fact, a month later, the schoolchildren eagerly asked me if I'd brought the "wizard game" back again.)

One feature that makes it so appealing is the exceptionally clear voice of the wizard. The wizard appears periodically and, in a deep voice, orders you to spell a word. (The children were very excited when the computer "talked" to them!) Other reasons for this program's success are the attractive graphics and the compelling adventure theme.

To begin, you must first decide whether you want Becky or Mark to search the cave. (Of course, all the boys want to be Mark, and all the girls want to be Becky.) You must also choose which word list to use, from the easy words in List 1 (air, fat, ice, etc.) to the toughies in list 10 (photosynthesis, reservoir, deciduous—challenging to an adult!). You must also select the level of difficulty, from 1 to 4.

Let's say you choose Mark. He must search the various levels of the cave and find the four magic crystals. But he'll have to jump over pits, climb up ladders, leap over scorpions and generally keep his wits about him. (Move Mark and Becky with your joystick.) Every so often, the wizard suddenly appears and says, "Spell 'battle'" or another word from your list. If you spell it correctly, he says, "Super!" or some other word of praise. If you spell it incorrectly, he may say, "Almost, but not quite" or "It's getting darker!"

This leads you to another feature of the game: the flashlight and Band-Aids Mark and Becky carry. As you move through the cave, you use up the power in your flashlight. (You lose if you end up in the dark!) If, however, you spell words correctly, you get more light power. Also, each time you crash into a wall or trip over a rock, you use up one of your five Band-Aids. The game also ends when all of these have been used. (Again, you can earn extra Band-Aids with correct spellings.)

If you don't know how to spell a word, try anyway, and if you're wrong, the computer will display the correct spelling. You must then type in the word, reinforcing your learning.

You can keep track of your progress through the cave with the little "map" shown at the top of your screen. Once you find all the sparkling crystals, your next goal is to find your way out of the cave to the outside world.

Any criticisms? Some moves are tough to make—for example, jumping over two pits close together right after you climbed up a ladder. So, this might not be the best game for easily frustrated children. Also, your child will need an attention span of about 40 minutes, because it takes at least that long to get out of the cave. (The game is suggested for ages 6 to 18.)

Crypto Cube

Crypto Cube, by Design Ware (185 Berry St., San Francisco, CA 94107; $39.95, disk), is a sort of three-dimensional crossword puzzle for kids age 8 and up. The game can be played alone or with an opponent.

The program includes 50 different word lists, made up of such subjects as transportation (containing words like car, truck, bus) and astronomy (containing words like pulsar, spectrum, etc.). Choose a category and ask the computer to create your puzzle cube; or you can create your own puzzle. (The program takes a very long time to load—about eight minutes until you can actually play.)

Your goal is to solve each side of the cube. Use the arrow keys to move around and press the space bar to register that you've selected a square. Each time you select a square, you'll receive either a filled-in blank, a letter clue or a question mark (indicating that you have to guess the letter).

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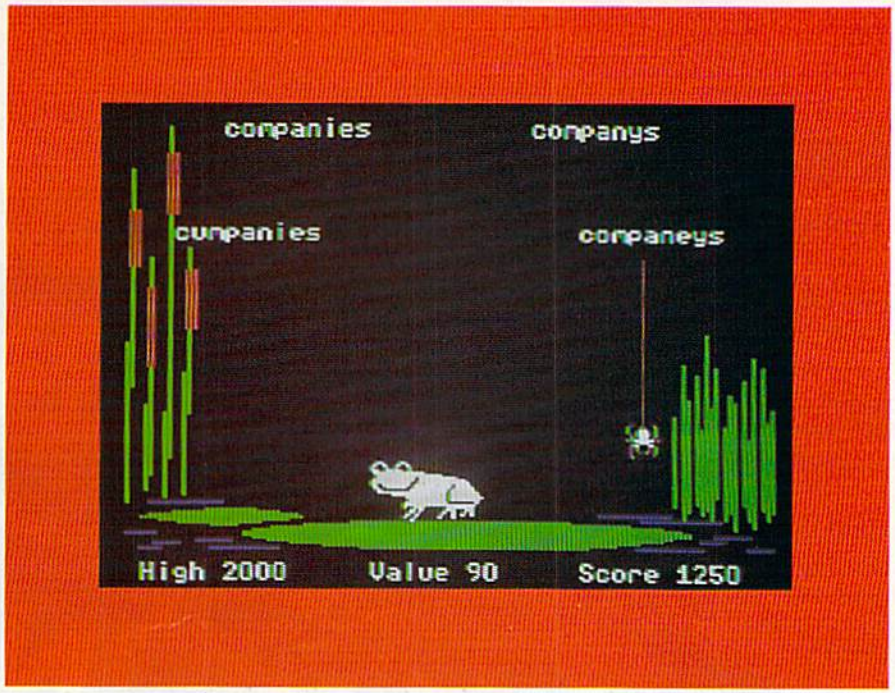

As you fill up the squares on one side of the cube, the words become more obvious. For instance, if you have C and then an open square and then a T, you can pretty much guess you have "cat" there. Once you've filled up one side, order the computer to "turn" the cube and move to the next side. (The kids loved turning the cube!)

If you're stumped, you can periodically ask for a review of the words on your list. (I guess this is somewhat like looking at the answers at the end of a crossword puzzle book, but I rationalized that it reinforced learning.)

I thought this game might be a little intellectual for my nine-year-old group (there's not a lot of fast action), but after they figured it out, the kids didn't want to quit.

My main criticism: The children and I agreed that the game would be a lot easier to play if you could use a joystick. To move left or up on the C-64, you have to remember to press the shift key. This was annoying, and most children are quite adept with the joystick.

Crypto Cube isn't a game you can merely load up and leave, expecting your child to amuse herself while you're gone. Instead, stay with her until you feel the basics are clear. I found it to be a very comprehensive game and a positive learning experience for children at home or in school.

Magic Spells

Magic Spells, from the Learning Company (545 Middlefield Road, Menlo Park, CA 94025; disk), offers your child two primary options: Scramble Spells or Flash Spells. Start with the computer's words, categories such as colors, animals and so on. The word will then appear, in scrambled form; for example, urplep. Type it correctly—"purple"—and a magic box will open. (This is your treasure chest filled with gold.)

Answer incorrectly, and you'll be given a hint; for example, p--ple. A demon will then appear from one of the boxes, but don't worry—he looks more like a jack-in-the-box than a demon. (You get an empty box with him.) After all the boxes are filled up, you're rewarded with a pleasant song and a colorful scene.

Flash Spells is pretty much as it sounds. The word is shown (for example, MONDAY), then disappears, and you must type it. The same mode of opened boxes and demons is used. Your progress of hits and misses is recorded as you play, and after you go through a line of boxes, a brightly colored scenario is displayed.

An option many children will enjoy is the chance to create their own word lists and then drill themselves.

Magic Spells is for kids of ages 6–10. It's not quite as complex as the first two programs described, and it uses block, rather than hi-res, graphics. However, it's fun in a straightforward way and is ideally suited for children in a classroom environment with limited time available on the computer.

Spell It!

Spell It!, from Davidson & Associates (6060 Groveoak Place #12, Rancho Palos Verdes, CA 90274; $49.95, disk), is Dr. Janice Davidson's latest educational offering. This two-disk program is for children from the "novice" level on up to "grand master" (ages 10 to adults), and each of the five skill levels includes ten word lists.

The program comprises five basic parts: See It, Practice It, Unscramble It, Spell It, and Study a New List. The first four exercises reinforce basic spelling skills—for example, displaying a word, using it in a sentence, then telling you to spell it.

An important facet of the program is that it uses frequently misspelled words, like rhythmic or sergeant, so it's a highly practical program.

Most children will appreciate the Spell It option. In this mode, a smiling green frog waits under several words, and your goal is to make him gobble up the correctly spelled words. You earn points for words devoured, and it's a lot of fun.

The program manual is well-written and includes step-by-step instructions, as well as directions on how to add in your own words.

It's ideally suited for schoolchildren because it's easy to control the amount of time each child spends. Also, the program uses tried-and-true educational tenets. R

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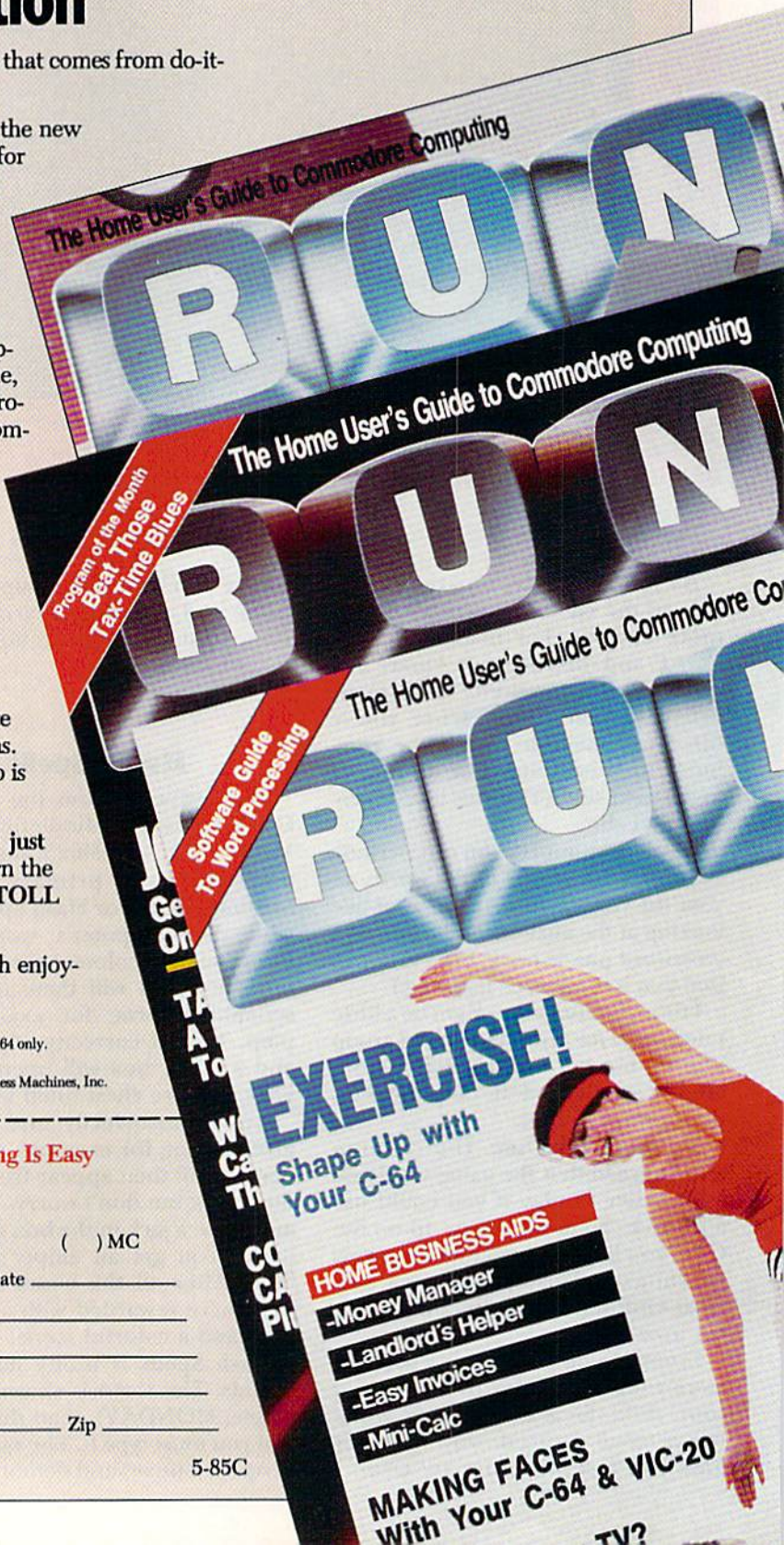

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Easy Assembly

By WILLIAM B. SANDERS

Our tutorial series on assembly language programming continues with two new features—Assembler of the Month and Questions and Answers.

One of the most useful things I ever did to help myself learn assembly language programming was to write my own assembler. For a beginner in assembly language, such a claim may seem farfetched. How can you write an assembler when you don't know how to program in assembly language?

Well, if you understand programming in Basic, you will soon see how writing your own assembler will help you understand assembly language.

In last month's column, I noted that assembly language enables you to enter mnemonic code in place of machine language numeric code. For example, you can enter,

LDA #10

instead of

$A9 $0A (hexadecimal)

or

169 10 (decimal)

When the 6510 microprocessor in your Commodore interprets a range of addresses, it "sees" only the values. It does not see "LDA" any more than it sees "GOSUB" in Basic. Furthermore, the values are all interpreted in binary code.

However, since what you enter from Basic can be sent directly to memory in decimal values and automatically converted into binary, you need only concern yourself with the placement of machine code into consecutive addresses in your Commodore 64's memory. As you probably know, to put a value into memory from Basic, you use the Poke statement. (Last month, we built a monitor that Peeked and Poked values into memory.)

Therefore, to send a machine language command to an address, you simply Poke the decimal value for the machine language command into a given location. For example, POKE 49152,169 would place the LDA instruction in location 49152.

Now, if you wrote a program in Basic, how difficult would it be to have the program accept LDA to be an instruction to POKE {address}, 169? It would be *very* simple. Look at the following Basic program:

```
10 PRINT CHR$(147) : REM CLEAR
   SCREEN
20 AD = 49152 : REM ADDRESS
30 INPUT "OPCODE";OC$
40 IF OC$ = "LDA" THEN POKE AD,169
50 END
```

Fundamentally, that's all an assembler does. It gets a mnemonic opcode and then stores the corresponding machine opcode (a number) in a given address. The simple monitor we built last month only accepted numeric values, but it worked on the same principle.

How Many Bytes?

As you may remember from last month, besides having an opcode, assemblers also have operands. Thus, the assembler you write is also going to have to store values for operands. Note: all opcodes take one byte; operands take one *or* two bytes.

Another way of stating a single byte is to refer to a single address. If an opcode and operand combined take two bytes, then they occupy two addresses. For example:

LDA #10 (mnemonic opcode)
169 10 (decimal machine code)

Addresses:

49152 169 first byte
49153 10 second byte

Think of the number of bytes (or addresses) an opcode and operand will take up as 1, 2 or 3.

Opcodes that are all by themselves, with no operand, take up one byte (for example, RTS).

A second group of opcodes deals with values of 255 ($FF) or less. In this case, two bytes are required, one for the opcode and one for the operand. For example, LDA in the Immediate mode can only reference operands of 255 or less.

Finally, three bytes are required when opcodes reference operands from 256 ($100) to 65535 ($FFFF). One byte is used for the opcode and two for the operand. For example, LDA in the Absolute mode uses three bytes, since it references a non-zero page address.

For the time being, don't lose sleep over what all this means. Basically, I'm trying to show you that assembly language instructions take up from one to three addresses. Therefore, depending on the type of instruction you issue, the assembler must know if one, two or three bytes will be used. The nice thing about an assembler is that all this stuff about bytes is handled automatically for you.

There's a lot more to consider in building an assembler, but since this column is for beginners, I'll concen-

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trate on the most fundamental elements and explain the various parts of the assembler as you build it. For now, though, remember two critical elements:

- The function of an assembler is merely to place machine language opcodes into memory locations.
- All opcode/operand combinations use either 1, 2 or 3 bytes (addresses).

A Basic Assembler

The assembler you will develop here is essentially the same as the Kid's Assembler from my book *Assembly Language for Kids: Commodore 64*. If you have a VIC-20, there are a couple of changes you can make so that this assembler will work on your VIC. The main differences will be in screen formatting, and the changes should be easy.

Since this assembler is for learning assembly language, the addresses used will be listed in decimal. In that way, you will be able to see the number of bytes used in a program. At the same time, you'll have the assembler accept either decimal or hexadecimal values in the operand field. As the addresses get larger, you will find it increasingly simple to remember hexadecimal numbers. I'll break the process into segments so that you can understand what's happening.

Setup

```
10 POKE 53281,1 : POKE 53280,1 : PRINT
   CHR$(144)
20 GOSUB 4000
30 X = 0
40 READ A : IF A = 255 THEN 60
50 READ B$ : READ C : X = X + 1 :
   GOTO 40
60 DIM DEC%(X),OPCODE$(X),BYTE%(X)
70 DIM AD(255),S$(255),C$(255)
80 ER = X - 1
90 RESTORE
100 FOR K = 0 TO X - 1 : READ DEC%(K) :
    READ OPCODE$(K) : READ
    BYTE%(K)
110 NEXT K
120 PRINT CHR$(146);CHR$(147)
130 PRINT "ADRS"; TAB(10);"OPCODE";
    TAB(25);"OPERAND"
140 FOR X = 1 TO 40 : PRINT CHR$(114); :
    NEXT
150 PRINT
```

In this first segment, line 10 changes the screen colors so those of you using a monitor can clearly see what is going on. (For the VIC-20, change the two Pokes to a single POKE 36879,25 and leave the PRINT CHR$(144) as it is.)

Next, in line 20, you include a title page up in line 4000. Then, beginning in line 40, you read in data that has the necessary information for the opcodes. This includes the machine code value in decimal, the mnemonic opcode and the number of bytes.

All of this information is stored in the array in line 100. Finally, you print a heading for the assembler fields—address (ADRS), opcode and operand. Those of you with a VIC-20, change the Tab values so that everything will fit on your screen.

Entering Opcode

```
160 REM ***************************
170 REM SET ADDRESS AND INPUT
    OPCODE
180 REM ***************************
190 SA = 0 : PRINT "PRESS <RETURN>
    TO DEFAULT TO 49152"
200 N = 0
210 INPUT "STARTING ADDR";SA : IF
    SA = 0 THEN SA = 49152
220 BA = SA
230 PRINT SA;TAB(10);
240 INPUT OC$ : IF OC$ = "Q" THEN 760
250 C = 0
260 IF OC$ = OPCODE$(C) THEN
    D% = DEC%(C) : B% = BYTE%(C) :
    GOTO 290
270 C = C + 1 : IF C > ER THEN PRINT
    TAB(10);CHR$(18);"ERROR";CHR$(146)
    : GOTO 230
280 GOTO 260
```


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```
290 IF B% = 1 THEN POKE SA,D% :
    SA = SA + 1
300 IF B% = 1 THEN S$(N) = OC$ :
    AD(N) = SA - 1 : N = N + 1 : GOTO 230
```

In the second segment, you set the starting address for storing the object code. The default value for the C-64 is set to 49152 ($C000), since that's a good block of free RAM. On a VIC-20, you would want to set it to 38912, or 828 if you're not using a cassette tape.

In line 240, the mnemonic opcode is entered. Line 260 searches through the array to find the decimal machine opcode and the number of bytes. They are stored in the variables D% and B%, respectively. In line 290, the machine opcode (D%) is Poked into the next available address (SA) if the opcode's mode uses only a single byte. Line 300 keeps track of the source code to be saved to disk.

```
310 REM **********
320 REM ENTER OPERAND
330 REM **********
340 PRINT TAB(25); : PRINT CHR$(145); :
    INPUT OPR$
350 AD(N) = SA : S$(N) = OC$ :
    C$(N) = OPR$ : N = N + 1
360 IF LEFT$(OPR$,1) < > "$" THEN
    OPER = VAL(OPR$)
370 IF LEFT$(OPR$,1) = "$" THEN GOSUB
    490
380 IF OPER > 65535 THEN GOSUB 630 :
    OPER = 0: GOTO 340
390 IF OC$ = "BNE" OR OC$ = "BEQ"
    THEN GOSUB 700
400 IF OPER > 255 AND B% < 3 THEN
    GOSUB 560: OPER = 0 : GOTO 340
410 IF OPER > 255 THEN GOSUB 640
```

Once the opcode is entered, and single byte opcodes are put into memory, the program then jumps to the operand field and you enter the operand in line 340. After updating the source code array in line 350, the program determines, in lines 360–370, whether the value entered is decimal or hexadecimal. Line 390 determines whether a branch instruction has been given, and 380 and 400 are error detectors.

In the next installment, we'll finish up our Basic assembler. In the meantime, you may want to consider purchasing a commercial assembler. There are several good ones available for the C-64. To give you an idea of what's on the market, our "Assembler of the Month" section, which begins this month, will describe (not review) the features of various assemblers for the C-64 and VIC-20.

Assembler of the Month

Merlin 64

(Roger Wagner Publishing Company, 10761 Woodside Ave., Suite E, Santee, CA 92071. (619)-562-3670. $49.95.)

This assembler package includes a line and global editor with insertion, replacement, block move and delete, several pseudo opcodes, macro capabilities, printer and screen formatting, 80-column software character generator, cross referencing, co-resident monitor, disassembler and the Sourceror utility, which generates pseudo source code from binary files.

The 112-page instruction manual includes descriptions of Merlin 64's many functions, technical information, a glossary and an index.

Questions and Answers

This section is for questions regarding assembly language programming. More general questions concerning the Commodore 64 and the VIC-20 should be directed to Jim Strasma's Commodore Clinic column.

Q: What's the difference between the microprocessors in the VIC-20 and those in the Commodore 64?

A: The VIC's 6502 and the C-64's 6510 are for all intents and purposes identical. The only difference between the two microprocessors has to do with I/O functions in locations 0 and 1. Both use the same machine language opcodes.

Q: What are the assembly language equivalents of Poke and Peek?

A: Storage mnemonics such as STA, STX or STY would be the closest to Poke since they place values from registers into addresses. Conversely, the Load instructions such as LDA, LDX and LDY would constitute Peek equivalents.

Q: Where's the best place to store assembled machine code?

A: On the Commodore 64, the 4K block beginning at $C000 (49152); on the VIC-20, the 2K block beginning at 38912. Code in these areas generally does not interfere with plug-in ROMs, Basic, screen memory, I/O or other functions. R

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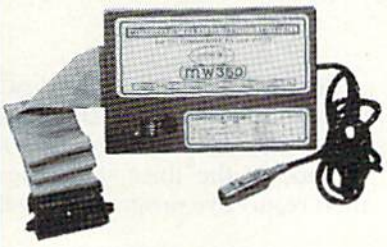

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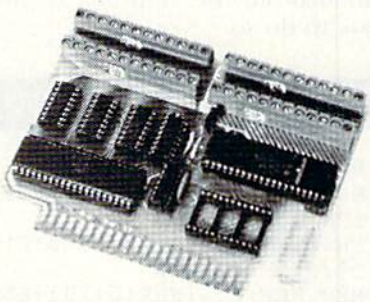

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Datafile Update

Datafile, published in the November and December 1984 issues of RUN, *created considerable interest among our readers. The three-part database program has been adopted by many for both home and small-business applications. The three listings originally published are correct, but the author, Mike Konshak, has received hundreds of helpful modifications to these programs, which we would like to share with you.—**Editors.***

The following compilation of modifications to the Datafile programs will make them run even smoother than originally programmed. Many error traps have been added, but probably the most important addition is in DFREPORT, which now has a feature that lets you calculate the sum of a column in your printed report. The last column in your report can hold numeric data that will be totaled at the bottom, if you choose to do so.

The listings include changes to all three programs: DATAFILE, DFREPORT and DFMAIL. Be careful to add or modify the lines that belong to their respective programs, as follows:

DATAFILE—Lines 10 to 499
DFREPORT—Lines 500 to 898
DFMAIL—Lines 1000 to 1324

Treat these as three separate programs, not as one large program. Load in one of the three programs that you have already typed in from the November and December issues; then start typing in the new lines listed for that one program. New lines will be automatically added and replaced simply by typing the new line and pressing the return key.

When you finish entering these new lines, save the particular program immediately on another disk, before trying it out. Keep your original version (2.6), just in case your revision has a typographical error in it. R

Listing 1. *DATAFILE revision.*

```
10 REM DATAFILE 2.9          BY MIKE KONSHAK
16 D$=CHR$(0):MR$=D$:DR$=D$:S=0:B1$=D$:PW=0
   :CW=0:B$=CHR$(32)
22 EN=0:EM$=D$:ET=0:ES=0:A1$=D$:A2$=D$:A3$=
   D$:S1$=D$:FL=0
23 MEM=FRE(0)-(FRE(0)<0)*65536-500:RETURN
44 PRINT"{HOME}{4 CRSR DNs}{CTRL 9}FIELD #"
   ;I:PRINT"{CRSR DN}TITLE ? >{27 SPACEs}"
46 PRINT"LENGTH? 0{27 SPACEs}{HOME}"
47 PRINT"{5 CRSR DNs}";TAB(6);:INPUTF$(I):I
   FF$(I)=""THENF$(I)=">"
48 PRINTTAB(6);:INPUTL%(I):IFL%(I)=0THEN68
49 NEXTI
59 IFA$="A"THENGOSUB26:CK=1
60 FORI=1TOF:IFLEN(F$(I))>S1THENS1=LEN(F$(I
   ))
62 NEXTI:GOTO68
66 PRINT"{SHFT CLR} {CTRL 9} DATAFILE 2.9
        BY MIKE KONSHAK ":GOTO70
78 PRINT"{CRSR DN}{5 SPACEs}{CTRL 9}V{CTRL
   0}IEW FILE ON SCREEN
```

→

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Listing 1 continued.

```
8Ø PRINT"{CRSR DN}{5 SPACEs}{CTRL 9}S{CTRL
   Ø}ORT RECORDS BY FIELD
82 PRINT"{CRSR DN}{5 SPACEs}{CTRL 9}P{CTRL
   Ø}RINT RECORDS BY SELECTION
84 PRINT"{CRSR DN}{5 SPACEs}{CTRL 9}R{CTRL
   Ø}EAD OLD FILE FROM DISK"
88 PRINT"{CRSR DN}{5 SPACEs}{CTRL 9}@{CTRL
   Ø} DISK DRIVE COMMANDS
96 GOSUB3Ø:IFA$="A"THENGOSUB35Ø:IFFL=ØTHEN1
   24
98 IFA$="M"THENGOSUB354:IFFL=ØTHEN244
1ØØ IFA$="D"THENGOSUB354:IFFL=ØTHEN272
1Ø6 IFA$="P"THENGOSUB354:IFFL=ØTHEN358
1Ø8 IFA$="V"THENGOSUB354:IFFL=ØTHEN192
11Ø IFA$="W"THENGOSUB35Ø:IFFL=ØTHEN144
112 IFA$="S"THENGOSUB354:IFFL=ØTHEN3Ø4
116 IFA$="@"THEN462
118 IFFL<>ØTHENFL=Ø:GOTO68
124 FORI=X+1TOR:PRINT"{SHFT CLR} PRESS THE
   {CTRL 9}RETURN{CTRL Ø} KEY AFTER EACH E
   NTRY"
126 PRINT" PRESS {CTRL 9}RETURN{CTRL Ø} WIT
   HOUT ANY ENTRY TO STOP{CRSR DN}"
128 PRINT" {CTRL 9}RECORD NUMBER ";I;"{CRSR
    DN}"
144 PRINT"{SHFT CLR}ENTER NAME OF CURRENT F
   ILE TO BE SAVED"
152 OPEN15,8,15:PRINT#15,"SØ:DF] "+LEFT$(NF
   $,8)+"!OLD":GOSUB414:IFET=8THEN68
154 PRINT#15,"RØ:DF] "+LEFT$(NF$,8)+"!OLD=D
   F] "+NF$:GOSUB414:IFET=8THEN68
156 OPEN5,8,5,"Ø:DF] "+NF$+",S,W":GOSUB414:
   IFET=8THEN68
158 PRINT#5,R;CR$;F;CR$;X:FORN=1TOF:PRINT#5
   ,F$(N);CR$;L%(N):NEXTN
159 GOSUB414:IFET=8THEN68
162 FORN=1TOF:PRINT#5,REC$(K%(I),N):NEXTN:N
   EXTI:PRINT:GOSUB414:IFET=8THEN68
164 FORI=1TOX:PRINT"{CRSR DN} SAVING POINTE
   RS";I;"{2 CRSR UPs}":PRINT#5,K%(I):NEXT
   I
165 PRINT#5,E$:GOSUB414:IFET=8THEN68
166 CLOSE5:CLOSE15:CK=Ø:GOTO68
172 CLR:GOSUB16:PRINT"{SHFT CLR} ENTER NAME
    OF FILE TO BE LOADED{2 CRSR DNs}":INPU
   TNF$
173 IFNF$=""THEN68
174 OPEN15,8,15:OPEN5,8,5,"Ø:DF] "+NF$+",S,
   R":GOSUB414:IFET=8THEN68
175 IFEN=62THENGOSUB416:GOTO68
176 INPUT#5,R,F,X:GOSUB414:IFET=8THEN68
177 GOSUB24:GOSUB26:FORN=1TOF:INPUT#5,F$(N)
   ,L%(N):NEXTN:GOSUB414:IFET=8THEN68
18Ø FORN=1TOF:INPUT#5,REC$(I,N):NEXTN:NEXTI
   :PRINT:GOSUB414:IFET=8THEN68
184 S=ST:IFS<>ØTHEN188
186 INPUT#5,E$:GOSUB414:IFET=8THEN68
188 CLOSE5:CLOSE15:GOTO6Ø
198 PRINT"{SHFT CLR} {CTRL 9}RECORD NUMBER:
   "+STR$(I)+"{2 SPACEs}FILE:"+NF$+"{CRSR
   DN}"
244 PRINT"{SHFT CLR} MODIFY WHICH RECORD? E
   NTER {CTRL 9}#{CTRL Ø} OR {CTRL 9}A{CTR
   L Ø}LL{2 CRSR DNs}":INPUTMR$:IFMR$=D$TH
   EN68
272 PRINT"{SHFT CLR} DELETE WHICH RECORD? E
   NTER {CTRL 9}#{CTRL Ø} OR {CTRL 9}A{CTR
   L Ø}LL{2 CRSR DNs}"
284 PRINT"{SHFT CLR} TO DELETE RECORD NUMBE
   R";I;", PRESS"
286 PRINT" {CTRL 9}SHIFT{CTRL Ø} {CTRL 9}D{
   CTRL Ø}, PRESS {CTRL 9}SPACE BAR{CTRL Ø
   } TO ADVANCE{CRSR DN}"
3Ø4 PRINT"{SHFT CLR} {CTRL 9}{4 SPACEs}SORT
    RECORDS IN ASCENDING ORDER{3 SPACEs}{C
   RSR DN}"
334 PRINT"{SHFT CLR}{2 CRSR DNs} {COMD 3}{C
   TRL 9}YOU HAVE NOT SAVED YOUR CHANGES!{
   CTRL 8}"
348 PRINT" {COMD 3}NO SUCH RECORD EXISTS{CT
   RL 8}":RETURN
352 PRINT"{HOME} {COMD 3}{CTRL 9}{4 SPACEs}
   NO RECORDS OR FILES IN MEMORY{5 SPACEs}
   {CTRL 8}{CTRL Ø} "
353 FORI=1TO5ØØ:NEXTI:FL=1:RETURN
354 IFX>ØTHENRETURN
355 GOSUB352:RETURN
385 REM PRINT"{SHFT CLR}{3 CRSR DNs}{3 SPAC
   Es}LOADING CALCULATIONS SUBPROGRAM":LOA
   D"DFCALC",8
389 OPEN15,8,15:OPEN5,8,5,"Ø:"+SB$+",P,R":G
   OSUB414:IFEN=62THENGOSUB416:GOTO358
39Ø CLOSE5:CLOSE15:LOADSB$,8
394 PRINT"{SHFT CLR}{CRSR DN} {COMD 3}{CTRL
    9}THIS WILL DESTROY THE FILE IN MEMORY
   !{CTRL 8}"
4Ø2 PRINT"{SHFT CLR}{CRSR DN}{COMD 3} THIS
   WILL ERASE THE DISK!{CTRL 8}"
4Ø3 PRINT"{CRSR DN} ARE YOU SURE? {CTRL 9}Y
   {CTRL Ø} OR {CTRL 9}N{CTRL Ø}
41Ø OPEN15,8,15:PRINT#15,"NEWØ:"+HN$+","+ID
   $:GOSUB414:IFET=8THEN462
411 CLOSE15:GOTO462
414 INPUT#15,EN,EM$,ET,ES:IF(EN<2Ø)OR(EN=62
   )THENET=Ø:RETURN
416 PRINT"{CRSR DN} {CTRL 9}{COMD 3}DISK ER
   ROR{CTRL Ø}"EN"{CRSR LF}, "EM$","ET"{CR
   SR LF},"ES"{CTRL 8}":ET=8
418 PRINT"{CRSR DN} PRESS {CTRL 9}ANY KEY{C
   TRL Ø} TO RETURN TO MENU":GOSUB3Ø:CLOSE
   5:CLOSE15:RETURN
422 OPEN15,8,15:OPEN5,8,Ø,"$Ø":PRINT"{SHFT
   CLR}":GOSUB414:IFET=8THEN462
424 GET#5,A1$,A2$
426 GET#5,A1$,A2$
428 GET#5,A1$,A2$
436 GET#5,A2$:IFST<>ØTHEN454
44Ø GET#5,A2$:IFA2$<>CHR$(34)THENPRINT"{CTR
   L 9}"A2$"{CTRL Ø}";:GOTO44Ø
442 GET#5,A2$:IFA2$=CHR$(32)THEN442
446 A3$=A3$+A2$:GET#5,A2$:IFA2$<>""THEN446
456 CLOSE5:CLOSE15:PRINTTAB(25)"PRESS {CTRL
    9}ANY KEY{CTRL Ø}":GOSUB3Ø:GOTO462
46Ø REM---DISK COMMANDS
462 PRINT"{SHFT CLR} {CTRL 9}{9 SPACEs}DISK
    COMMANDS MENU{11 SPACEs}"
464 PRINT"{2 CRSR DNs}{9 SPACEs}{CTRL 9}${C
   TRL Ø} DISK DIRECTORY
466 PRINT"{CRSR DN}{9 SPACEs}{CTRL 9}F{CTRL
   Ø}ORMAT A BLANK DISK
468 PRINT"{CRSR DN}{9 SPACEs}{CTRL 9}S{CTRL
   Ø}CRATCH A SEQ FILE
47Ø PRINT"{CRSR DN}{9 SPACEs}{CTRL 9}R{CTRL
   Ø}ENAME A SEQ FILE
472 PRINT"{CRSR DN}{9 SPACEs}{CTRL 9}E{CTRL
   Ø}XIT TO MAIN MENU
474 PRINT"{CRSR DN} {CTRL 9}{6 SPACEs}PRESS
    THE APPROPRIATE KEY{7 SPACEs}"
476 GOSUB3Ø:MR$=D$:DR$=D$:IFA$="$"THEN422
478 IFA$="F"THEN4Ø2
48Ø IFA$="S"THENGOSUB498:GOTO488
482 IFA$="E"THEN68
484 IFA$="R"THENGOSUB498:GOTO493
486 GOTO476
488 INPUT"{CRSR DN} {CTRL 9}SCRATCH FILE NA
   ME {CTRL Ø}";DR$:IFDR$=D$THEN462
49Ø OPEN15,8,15:OPEN5,8,5,"Ø:"+DR$+",S,R":G
   OSUB414:IFET=8THEN462
492 CLOSE5:PRINT#15,"SØ:"+DR$:CLOSE15:GOTO4
   62
493 INPUT"{CRSR DN} {CTRL 9}RENAME OLD FILE
    {CTRL Ø}";DR$:IFDR$=D$THEN462
```

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Listing 1 continued.

```
494 INPUT"{CRSR DN} {CTRL 9}{4 SPACEs}TO NE
    W FILE {CTRL Ø}";MR$:IFMR$=D$THEN462
495 OPEN15,8,15:OPEN5,8,5,"Ø:"+DR$+",S,R":G
    OSUB414:IFET=8THEN462
496 CLOSE5:PRINT#15,"RØ:"+MR$+"="+DR$:OPEN5
    ,8,5:GOSUB414:IFET=8THEN462
497 CLOSE5:CLOSE15:GOTO462
498 PRINT"{SHFT CLR} ENTER FILE NAMES EXACT
    LY AS SHOWN"
499 PRINT" ON THE DIRECTORY":RETURN
```

Listing 2. *DFREPORT revision.*

```
5ØØ REM-DATAFILE 2.9 SUBPROGRAM DFREPORT BY
     MIKE KONSHAK
5Ø4 OPEN4,4:IFPW=ØTHENPW=8Ø
515 LOAD"DFMAIL",8
516 PRINT"{SHFT CLR}{2 CRSR DNs}{2 SPACEs}L
    OADING CALCULATIONS SUBPROGRAM"
517 LOAD"DFCALC",8
532 CLOSE4:PRINT"{SHFT CLR}{2 CRSR DNs}SUBP
    ROGRAM TERMINATED"
56Ø IFC$="S"THENFL=Ø:GOTO57Ø
57Ø INPUT"{SHFT CLR}{CRSR DN}PRINT WHICH RE
    CORD ({CTRL 9}Ø{CTRL Ø} TO EXIT)";I$:I=
    VAL(I$):IFI=ØTHEN89Ø
574 IFK=2ANDFL=ØTHENGOSUB81Ø:GOSUB824:GOSUB
    842:GOSUB888:FL=1:GOTO57Ø
575 IFK=2ANDFL=1THEN:GOSUB842:GOSUB888:GOTO
    57Ø
576 GOSUB798:PRINT#4,B1$:GOTO538
598 IFT$=LEFT$(REC$(K%(I),SF),LEN(T$))THENO
    NKGOSUB798,842:GOSUB888
6Ø2 GOTO89Ø
6Ø8 FORI=1TOX:PRINT"{CRSR UP} PRINTING RECO
    RD #";I:ONKGOSUB798,842:GOSUB888:NEXTI
61Ø GOTO89Ø
625 REM PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}C{
    CTRL Ø}ALCULATED REPORTS PROGRAM"
636 IFC$="E"THENCLOSE4:GOTO51Ø
638 IFC$="M"THENCLOSE4:GOTO514
639 REM IFC$="C"THENCLOSE4:GOTO516
642 IFC$="Q"THEN52Ø
7Ø6 PRINTTAB(32);"{CRSR UP}";:INPUTML$(J,L)
    :NEXTL:NEXTJ
7Ø8 PRINT"{SHFT CLR}DO YOU WISH TO SUM THE
    DATA IN COLUMN"+STR$(NC)+"?"
7Ø9 PRINT"THIS COLUMN MUST ONLY BE FORMATTE
    D WITH"
71Ø PRINT"ONLY ONE FIELD. ENTER {CTRL 9}1{C
    TRL Ø} (YES) OR {CTRL 9}Ø{CTRL Ø} (NØ)"
711 PRINT"?";Z:INPUT"{CRSR UP}";Z
74Ø OPEN15,8,15:PRINT#15,"SØ:RP] "+NF$:GOSU
    B876:IFET=8THEN614
742 OPEN5,8,5,"Ø:RP] "+NF$+",S,W":GOSUB876:
    IFET=8THEN614
744 PRINT#5,PW;CR$;NL;CR$;NC:GOSUB876:IFET=
    8THEN614
748 PRINT#5,TT$(J):GOSUB876:IFET=8THEN614
754 PRINT#5,PC(I);CR$;HC$(I):GOSUB876:IFET=
    8THEN614
758 PRINT#5,ML$(I,N):GOSUB876:IFET=8THEN614
76Ø NEXTN:NEXTI:PRINT#5,STR$(Z);CR$;E$:GOSU
    B876:IFET=8THEN614
762 CLOSE5:CLOSE15:GOTO538
77Ø OPEN15,8,15:OPEN5,8,5,"Ø:RP] "+NF$+",S,
    R":GOSUB876:IFET=8THEN614
771 IFEN=62THENGOSUB878:GOTO614
772 INPUT#5,PW,NL,NC:GOSUB876:IFET=8THEN614
776 INPUT#5,TT$(J):GOSUB876:IFET=8THEN614
782 INPUT#5,PC(I),HC$(I):GOSUB876:IFET=8THE
    N614
786 INPUT#5,ML$(I,N):GOSUB876:IFET=8THEN614
788 NEXTN:NEXTI:INPUT#5,A1$:Z=VAL(A1$)
798 PRINT#4,"[ RECORD #";I;"{3 SPACEs}]";:F
    ORJ=1TO62:PRINT#4,"-";:NEXTJ:PRINT#4,B1
    $
8Ø6 NEXTN:PRINT#4,B1$:RETURN
82Ø PRINT#4,LEFT$(S$,B)+TT$(J);B1$:PG=PG+1:
    RETURN
834 NEXTJ:PRINT#4,B1$:GOSUB838:PG=PG+3:RETU
    RN
838 FORJ=1TOPW:PRINT#4,"-";:NEXTJ:PRINT#4,B
    1$:RETURN
868 NEXTJ:PRINT#4,B1$:PG=PG+1
87Ø IFPG=6ØTHENFORJ=1TO6:PRINT#4,B1$:NEXTJ:
    PG=Ø:GOSUB824
876 INPUT#15,EN,EM$,ET,ES:IF(EN<2Ø)OR(EN=62
    )THENET=Ø:RETURN
884 ET=8:CLOSE5:CLOSE15:RETURN
886 REM----ADD LAST COLUMN
888 AØ=AØ+VAL(REC$(K%(I),VAL(ML$(NC,1)))):R
    ETURN
89Ø IFZ<>1THENPRINT#4,B1$:GOTO538
892 PRINT#4,LEFT$(S$,PC(NC)-1);
894 FORI=1TOPW-PC(NC)+1:PRINT#4,"-";:NEXTI:
    PRINT#4,B1$
896 PRINT#4,LEFT$(S$,PC(NC)-9)+"TOTAL= "+ST
    R$(AØ)
898 PRINT#4,B1$:GOTO538
```

Listing 3. *DFMAIL revision.*

```
1ØØØ REM-DATAFILE 2.9 SUBPROGRAM DFMAIL BY
     MIKE KONSHAK
1ØØ8 OPEN4,4:GOSUB128Ø:GOTO11Ø2
1Ø17 LOAD"DFREPORT",8
1Ø18 PRINT"{SHFT CLR}{2 CRSR DNs}{2 SPACEs}
     LOADING CALCULATIONS SUBPROGRAM"
1Ø19 LOAD"DFCALC",8
1Ø34 CLOSE4:PRINT"{SHFT CLR}{2 CRSR DNs}SUB
     PROGRAM TERMINATED"
1113 REM PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}C
     {CTRL Ø}ALCULATED REPORTS PROGRAM"
1124 IFC$="E"THENCLOSE4:GOTO1Ø12
1126 IFC$="R"THENCLOSE4:GOTO1Ø16
1127 REM IFC$="C"THENCLOSE4:GOTO1Ø18
113Ø IFC$="Q"THEN1Ø22
1198 OPEN15,8,15:PRINT#15,"SØ:ML] "+NF$:GOS
     UB1316:IFET=8THEN11Ø2
12ØØ OPEN5,8,5,"Ø:ML] "+NF$+",S,W":GOSUB131
     6:IFET=8THEN11Ø2
12Ø6 PRINT#5,ML$(I,N):GOSUB1316:IFET=8THEN1
     1Ø2
1212 PRINT#5,"EOF":GOSUB1316:IFET=8THEN11Ø2
1224 OPEN15,8,15:OPEN5,8,5,"Ø:ML] "+NF$+",S
     ,R":GOSUB1316:IFET=8THEN11Ø2
1225 IFEN=62THENGOSUB1318:GOTO11Ø2
123Ø INPUT#5,ML$(I,N):GOSUB1316:IFET=8THEN1
     1Ø2
1253 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}E{CTR
     L Ø}XIT TO MENU
1257 IFA$="E"THEN11Ø2
126Ø FORI=1TORW:FORJ=1TOLW:PRINT#4,RIGHT$(S
     TR$(J),1);:NEXTJ:PRINT#4,B1$:NEXTI
1262 FORI=1TOT%-RW:PRINT#4,B1$:NEXTI
1274 FORS=1TOT%-RW:PRINT#4,B1$:NEXTS
13Ø2 IFC$="S"THENT%=6:RW=5:LW=32:RETURN
13Ø4 IFC$="L"THENT%=9:RW=8:LW=32:RETURN
131Ø INPUT"{CRSR DN} ENTER NUMBER OF ROWS O
     N LABEL";RW:T%=RW+1
1316 INPUT#15,EN,EM$,ET,ES:IF(EN<2Ø)OR(EN=6
     2)THENET=Ø:RETURN
1324 ET=8:CLOSE5:CLOSE15:RETURN
```


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From p. 10.

6 are ON, the number is 5 × 7 × 13 = 455. Set X% = 455, and you can use statements like

```
101 IF X%/2 = INT(X%/2) THEN PRINT "CONDITION 1 IS ON"
102 IF X%/3 = INT(X%/3) THEN PRINT "CONDITION 2 IS ON"
103 IF X%/5 = INT(X%/5) THEN PRINT "CONDITION 3 IS ON"
104 Etc.
```

to determine which conditions are ON. This works because X% is evenly divisible by each of the prime numbers that were multiplied together to get X% in the first place, but is not evenly divisible by any other prime. The technique fails if X% = 0.

David Hall
Saskatoon, Saskatchewan
Canada

$1E9 Binary flags—Often when reading about programming, you see references to setting or clearing a certain bit (turning it on or off). Doing this is not difficult at all, once you know the magic. If the eight bits in a byte are numbered from 0 (low-order bit) through 7 (high-order bit), you can clear a single bit in memory location X by entering:

```
POKE X,PEEK(X) AND (255 - 2↑ bitnumber)
```

You can set a bit in location X by entering:

```
POKE X,PEEK(X) OR (2↑ bitnumber)
```

Robert Rovinsky
Duluth, MN

$1EA Bug busters—The Save With Replace bug—does it exist, or doesn't it? Nobody knows for sure, but we're determined to find out. If you own a disk that's been slimed by SAVE@, we'd like to run it through our lab. Send the sick disk to Magic, with a description of what seems to be wrong. Tell us which file(s) got corrupted, and include a detailed history of the disk. If we examine enough disks, we're sure to see a pattern. When we do, the bug is doomed.

Send a label and return postage, and we'll send back your disk when we're done with it. Otherwise, we'll consider it your contribution to science and will dispose of it in a dignified and caring way.

SAVE@ problems only, please—we're *not* the Commodore Clinic.

L.F.S.

$1EB Scintillating screenwork—This gives an especially interesting pattern on 40-column screens:

```
10 GET A$ : PRINT A$" see text "; : GOTO10
```

Between the quotes, type the *shifted* letters DDCCFRF CCDDEE. Notice their nice grouping on the keyboard. Put your machine in Graphics mode, then run the program. You can change colors by pressing the Commodore key with one of the number keys.

Other interesting patterns can be made with these shifted letters, and {COMD Y} and {COMD P} can add to the fun. My best results came from strings 13, 14 or 19 characters long.

Eric Haver
Squirrel Hill, PA

$1EC Screen layout aids—A 12-inch flexible steel ruler, of the type made by Bates and sold in office supply stores, makes a superb screen layout tool. Use the metric scale to measure CRT distances, and hi-res positioning will be easier than you've ever imagined.

To simplify the counting of text lines, draw a dot at the start of every fifth line on your screen, about 1 mm into the border. I use a Sharpie brand marker for permanence, and I make the dots as tiny as possible, to keep them from polluting the display.

Louis F. Sander
Pittsburgh, PA

$1ED Vertical tabbing—You can easily have a vertical tab function, similar to Commodore's horizontal TAB, by using:

```
100 DIM VTAB$(25) : A$ = "{HOME}" : VTAB$(0) = A$
110 FOR J = 1 TO 25 : A$ = A$ + "{CRSR DN}" :
    VTAB$(J) = A$ : NEXT
```

Then, if you enter PRINT VTAB$(n), the cursor will move to the start of screen line n, in the same way that PRINT TAB(n) moves it to column n. As usual, the first line and column are numbered 0, rather than 1.

L.F.S.

$1EE Magazine indexes—Some of the most useful information in the computer field is found in the back issues of magazines. A wonderful tool for finding it is the Microcomputer Index (2464 El Camino Real, Santa Clara, CA 95051; 408-984-1097). It's also available on-line through the Dialog information service (800-227-1927). Many libraries subscribe to this treasure trove of computeriana, and some will search Dialog for you.

Once you've determined where a piece was published, ask for it at the library or order the back issue from the publisher. If all else fails, try to get a microfilm, from which a hard copy can easily be made. University Microfilms (300 N. Zeeb Road, Ann Arbor, MI 48106; 800-521-0600) provides this type of service.

Frank Biondi
Pittsburgh, PA

$1EF Computerese—In some computer publications, the space character is signified by ␢—a lowercase b with a slash through it. It's easier to see and count than an empty space, and the b is a mnemonic for blank.

Rula Lenska
New York, NY

$1F0 Junkyard computing—Every GM car contains lengths of plastic wire tubing, split lengthwise and used for harnessing cables. This material is excellent for wrapping the many loose wires coming out of your computer and is readily available in any automobile junkyard. There are two sizes of tubing in most cars; the larger one is best for most applications. I bought 50 cents worth,

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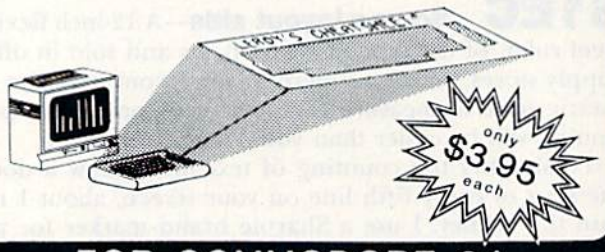

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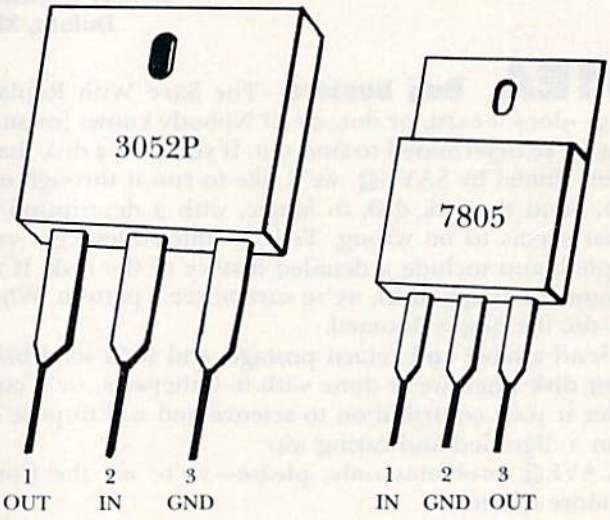
and the area behind my computer is cleaner and better looking than I thought it ever would be.

Patrick Kiser
Silver Lake, IN

$1F1 Power supply repairs—Commodore power supplies are subject to self-destruction, because of a weakness in the 3052P voltage regulator inside. Not only is it unreliable, but the 3052P isn't available in the United States. If your power supply fails, chances are that the problem is the 3052P. But you're in luck if your power supply is of the type that can be opened for servicing, because there's a widely available replacement regulator, the Philips ECG-7805. [Equivalent to the Radio Shack 276-1770. Ed.]

The pin configurations of the two units are different, as illustrated below. I soldered a heavy wire onto pin 3 of the new regulator, then inserted the assembly into the 3052P socket, sliding the 7805 one hole to the right to line up the "in" and "gnd" pins with the original wiring. Then I soldered the 7805's new wire to the left hole of the 3052P socket.

Marty Irons, K2MI
Goshen, NY



$1F2 Drive not ready—Some disk operations confuse the 1541 disk drive, resulting in a maddening Drive Not Ready error. If you're using the wedge, this can be easily remedied by typing @UJ. It causes the drive to reset itself and is an easy way out of most 1541 quirks.

John Patrick
Bourbonnais, IL

$1F3 Video audio—Many TVs have an annoying speaker buzz even when the sound is turned to its lowest setting. If you're using such a TV for a monitor, just plug a headphone into its headphone jack, and the

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buzz should disappear. Sometimes you can use just a plug, with nothing connected, and achieve the same effect.

Fred Lacey
Corvallis, OR

$1F4 Printer cable hang-up—Some sophisticated programs, especially those involving the disk drive, seem to be sensitive to the presence of other peripheral devices. I found several fast-copy programs that hung up the computer whenever a printer cable was connected. Disabling the printer didn't help—I had to physically remove the printer cable from the serial bus. If you have a similar problem, try removing the printer cable first, then look to the other ports for possible remedies: cassette port, user port, cartridge slot and, perhaps, even the joystick ports.

Karl Thurber, W8FX
Millbrook, AL

$1F5 MPS-801 and labels—This printer can take a minimum of 4½-inch paper. Before buying labels to use with it, carefully check their width, since many are only 4¼ inches wide and cannot be used with the MPS-801.

James Llanos
Ketchikan, AK

$1F6 Modem intercom—This little trick has helped solve many modem problems. If you have two computers and two modems, you can get them to talk to each other over two phones on one line in your home. With both ends of the link in one building, troubleshooting becomes a snap.

Simply pick up the phone and wait for the loud beeping to stop. It will take a minute or two, but it will eventually stop. Plug that phone into your modem (or switch from T to D if you have a 1650). Then pick up an extension phone and do the same for that. You should now be able to converse between two computers on a single line!

Mike Mann
New Smyrna Beach, FL

$1F7 Beware of humidifiers—The new ultrasonic humidifiers can be hazardous to your computer's health. Some of the manufacturers are including a small warning that they may deposit harmful mineral films on disks and computer equipment. Unlike other humidifiers, which depend on evaporation and leave the minerals behind in the tank, these new ones physically spray the water—minerals and all—into the air. Distilled or specially filtered water is one solution to the problem.

Tom Grayczyk
Chicago, IL

$1F8 Character codes—To get some experience with character codes on the C-64, try this recipe for Feminist's Delight:

```
5  POKE 53281,14:PRINT CHR$(19)CHR$(5)
10 X=X+1:PRINT CHR$(18)CHR$(69)CHR$(82)CHR$(65)
   CHR$(146)CHR$(32);:IF X<240 GOTO 10
20 GOTO 20
```

Elizabeth Oman
Lindsborg, KS

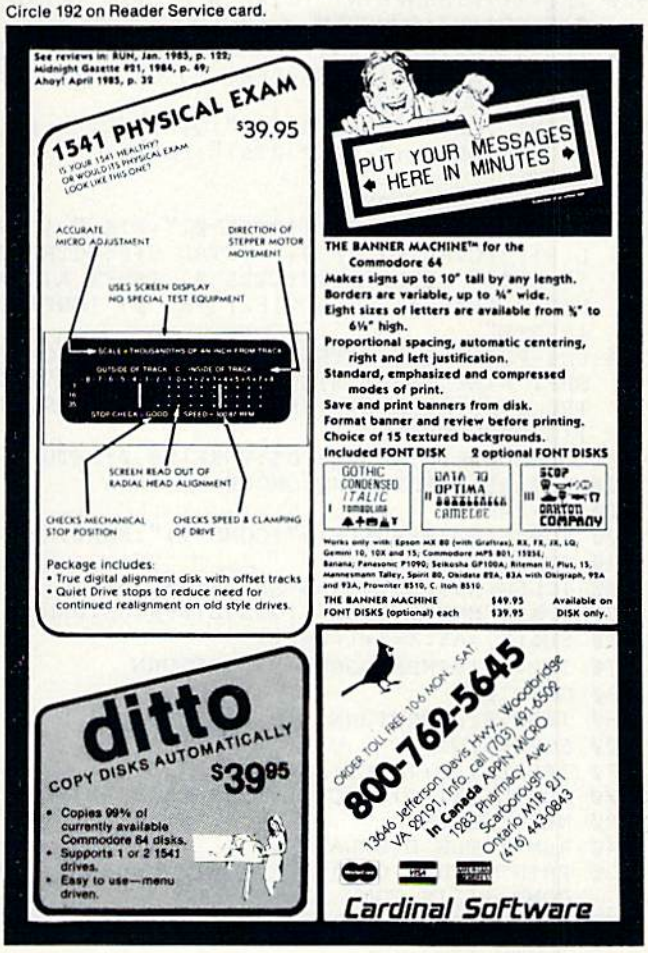
$1F9 Answer screen—You can use the following line to acknowledge correct responses in educational programs. (To squeeze it into one line, you must abbreviate every Basic keyword.) It flashes the word "RIGHT!" in the center of a blank screen.

```
500 PRINT"{SHFT CLR}":FORX=1TO12:PRINTTAB(17)
    "{10 CRSR DNs}RIGHT!":FORY=1TO80:NEXT:PRINT
    "{SHFT CLR}":FORZ=1TO80:NEXT:NEXT
```

It would be easy to use the line in a subroutine or to change the word it prints.

Marlene Dunn
Miami, FL

Circle 192 on Reader Service card.



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From p. 36.

```
61Ø PRINT"{HOME}";TAB(37)"{CTRL 9}";I
62Ø RETURN
63Ø FORX=1TO3ØØØ:NEXT:REM DELAY LOOP
64Ø RETURN
65Ø GETA$:IFA$=""THEN65Ø:REM WAIT FOR A KEY
    STROKE
66Ø RETURN
67Ø REM UPDATE DISPLAY AFTER SELECTION
68Ø PRINT"{HOME}";
69Ø FORX=1TOZQ-Q:PRINT"{CRSR DN}";:NEXT:IFZ
    Q>99THENPRINT"{CRSR RT}";
7ØØ PRINT"{3 CRSR RTs}";SD$(ZQ-Q):RETURN
71Ø REM SOUND SUBROUTINES
72Ø POKEH(Ø),13Ø:POKEA(Ø),9:POKEH(2),3Ø:POK
    EV,VØ
73Ø POKEW(Ø),21
74Ø MM=TI
75Ø IFTI<MM+6THEN75Ø
76Ø POKEW(Ø),2Ø
77Ø GOTO88Ø
78Ø POKEV,2*VØ/3:FORC=ØTO2
79Ø POKEA(C),9:POKES(C),24Ø:POKEH(C),34:POK
    EL(C),75:POKEW(C),17
8ØØ NEXT
81Ø GOTO88Ø
82Ø POKEV,VØ:FORC=ØTO2:POKEA(C),128:POKES(C
    ),Ø:POKEH(C),34:POKEL(C),75:NEXT
83Ø FORLL=1TON1:FORC=ØTO2:POKEW(C),129:NEXT
    :FORMM=1TO5:NEXT
84Ø FORMM=ØTO2:POKEW(MM),128:NEXT
85Ø MM=TI
86Ø IFTI<MM+4THEN86Ø
87Ø NEXT
88Ø FORMM=54272TO54295:POKEMM,Ø:NEXT:RETURN
89Ø REM SCREEN DISPLAY
9ØØ PRINTSD$(Ø)
91Ø FORX=1TO18:IFSD$(X)="{COMD +}"THENX=18:
    GOTO95Ø
92Ø IFQ+X<1ØTHENPRINT"{CTRL 9}";Q+X;"{CTRL
    Ø}";SD$(X):GOTO95Ø
93Ø IFQ+X<1ØØTHENPRINT"{CRSR LF}{CTRL 9}";Q
    +X;"{CTRL Ø}{4 CRSR LFs} {3 CRSR RTs}";
    SD$(X):GOTO95Ø
94Ø PRINT"{CRSR LF}{CTRL 9}";Q+X;"{CTRL Ø}{
    5 CRSR LFs} {4 CRSR RTs}";SD$(X)
95Ø NEXT
96Ø IFR=1THENRETURN
97Ø FD$=C1$+"{CTRL 9}F1{CTRL Ø}"+F1$+" {CTR
    L 9}F3{CTRL Ø}"+F3$+" {CTRL 9}F5{CTRL Ø
    }"+F5$+" {CTRL 9}F7{CTRL Ø} {SHFT A}DVA
    NCE{2 SPACEs}{CTRL 9}F2{CTRL Ø} {SHFT D
    }ELETE"
98Ø FD$=FD$+C2$+" {CTRL 9}{SHFT F}UNCTION {
    SHFT K}EY {SHFT M}ENU{CTRL Ø}"+C1$+" {C
    TRL 9}F8{CTRL Ø} {SHFT B}ACK UP {CTRL 1
    }{2 CRSR UPs}"
99Ø GOSUB6ØØ:PRINTZ1$;FD$:POKE198,Ø:RETURN
1ØØØ REM READ THE NEXT GROUP OF DATA
1Ø1Ø GC=FRE(Ø)
1Ø2Ø FORX=1TO18:SD$(X)="{COMD +}":NEXT:X=1
1Ø3Ø READA$
1Ø4Ø IFLEN(A$)>35THENA$=LEFT$(A$,35)
1Ø5Ø IFA$="END"THENED=1:GOSUB1Ø9Ø:RETURN
1Ø6Ø SD$(X)=A$:X=X+1:P=P+1
1Ø7Ø IFP=Q+18THEN:GOSUB1Ø9Ø:RETURN
1Ø8Ø GOTO1Ø3Ø
1Ø9Ø IFKB=ØTHENRETURN
11ØØ FORX=ØTOI
111Ø IFLI(X)<Q+1ORLI(X)>PTHEN113Ø
112Ø SD$(LI(X)-Q)="{CTRL 9}"+SD$(LI(X)-Q)
113Ø NEXT:RETURN
114Ø REM TITLE DISPLAY
115Ø PRINT"{SHFT CLR}"SP$C1$"{3 CRSR DNs} {
    COMD I}{19 COMD LB.s}{COMD I}"
116Ø PRINTSP$;" {CTRL 9}{COMD +}{19 SPACEs}
    {COMD +}"
117Ø PRINTSP$;" {CTRL 9}{COMD +}{3 SPACEs}{
    SHFT C}OMMODORE 64{4 SPACEs}{COMD +}"
118Ø PRINTSP$;" {CTRL 9}{COMD +}{19 SPACEs}
    {COMD +}"
119Ø PRINTSP$;" {CTRL 9}{COMD +}{5 SPACEs}{
    SHFT S}HOPPER'S{5 SPACEs}{COMD +}"
12ØØ PRINTSP$;" {CTRL 9}{COMD +}{19 SPACEs}
    {COMD +}"
121Ø PRINTSP$;" {CTRL 9}{COMD +}{5 SPACEs}{
    SHFT C}OMPANION{5 SPACEs}{COMD +}"
122Ø PRINTSP$;" {CTRL 9}{COMD +}{19 COMD LB
    .s}{COMD +}{CTRL 1}{CRSR DN}"
123Ø PRINTSP$;"{9 SPACEs}{SHFT B}Y{CRSR DN}
    "
124Ø PRINTSP$;"{SHFT J}OSEPH {SHFT J}. {SHF
    T S}HAUGHNESSY
125Ø PRINTSP$;"{SHFT S}ERENDIPITY {SHFT S}O
    FTWARE
126Ø PRINTSP$;"8438 {SHFT L}YNDA {SHFT S}UE
     {SHFT L}ANE {SHFT W}.
127Ø PRINTSP$;"{SHFT J}ACKSONVILLE, {SHFT F
    }LA. 32217
128Ø PRINTSP$;"PHONE{2 SPACEs}9Ø4-737-8182
129Ø PRINTSP$;"{CRSR DN}{6 SPACEs}(C) 1985"
13ØØ RESTORE:GOSUB63Ø
131Ø REM SPECIFICS FOR TV AND PRINTER
132Ø PRINT"{SHFT CLR}";SP$;"{6 CRSR DNs}{2
    SPACEs}{SHFT A}RE YOU USING A"
133Ø PRINTSP$;"{CRSR DN}{2 SPACEs}{SHFT T}{
    SHFT V} OR A {SHFT M}ONITOR{2 CRSR DNs
    }"
134Ø GOSUB65Ø
135Ø IFA$="T"THENC1$="":C2$="":GOSUB72Ø:GOT
    O139Ø
136Ø IFA$="M"THENGOSUB72Ø:GOTO139Ø
137Ø PRINTSP$;"{2 SPACEs}TYPE ";Q$;"T";Q$;"
     OR ";Q$;"M";Q$;"{CRSR UP}"
138Ø FORBB=1TO3:GOSUB72Ø:NEXT:GOTO134Ø
139Ø PRINTSP$;"{3 CRSR DNs}{2 SPACEs}{SHFT
    A}RE YOU USING A"
14ØØ PRINTSP$;" {SHFT C}OMMODORE PRINTER"
141Ø PRINTSP$;"{CRSR DN}{3 SPACEs}({CTRL 9}
    Y{CTRL Ø}ES OR {CTRL 9}N{CTRL Ø}O ?){C
    RSR DN}"
142Ø GOSUB65Ø
143Ø IFA$="Y"THENCP=7:P1$="{SHFT @}":P2$="
    {3 COMD Ts}":GOTO144Ø
1435 GOTO146Ø
144Ø P3$="{5 COMD @s} ":CP$=" {CTRL 9} * CO
    UPON * {CTRL Ø}"
145Ø PC=1:GOTO157Ø
146Ø IFA$="N"THEN:P1$="{SHFT X}":P2$=" ---"
    :P3$="{5 LEFT ARROWs} ":CP$=" ** COUPO
    N ** ":GOTO149Ø
147Ø PRINTSP$;"{2 SPACEs}TYPE ";Q$;"Y";Q$;"
     OR ";Q$;"N";Q$;"{CRSR UP}"
148Ø FORBB=1TO3:GOSUB72Ø:NEXT:GOTO142Ø
149Ø GOSUB72Ø
1495 PRINT"{SHFT CLR}{6 CRSR DNs}{SHFT T}YP
    E YOUR PRINTER SECONDARY ADDRESS:(*)":
    P8$="":P9$=""
15ØØ PRINT"{7 SPACEs}(AS IN FORMAT - OPEN4,
    4,*)":INPUT"{2 SPACEs}*{3 CRSR LFs}";C
    P
151Ø GOSUB72Ø:PRINT"{CRSR DN}{SHFT S}END LI
    NE FEEDS ({CTRL 9}Y{CTRL Ø}ES OR {CTRL
     9}N{CTRL Ø}O)?{CRSR DN}"
152Ø GOSUB65Ø
153Ø IFA$="Y"THENPF=PF+128:GOTO157Ø
154Ø IFA$="N"THEN157Ø
155Ø PRINTSP$;"{2 SPACEs}TYPE ";Q$;"Y";Q$;"
     OR ";Q$;"N";Q$;"{CRSR UP}"
156Ø FORBB=1TO3:GOSUB72Ø:NEXT:GOTO152Ø
157Ø SL$=" $$ SALE $$":GOSUB72Ø
158Ø REM MAIN PROGRAM LOOP
159Ø IFBK=1THENGOSUB41Ø:BK=Ø:GOTO162Ø
```

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→

Listing 1 continued.

```
16ØØ IFED=1THEN195Ø
161Ø GOSUB1Ø1Ø
162Ø GOSUB9ØØ:R=Ø:GOSUB49Ø
163Ø GETZ$:IFZ$=""THEN163Ø
164Ø IFZ$<CHR$(133)THEN172Ø
165Ø IFZ$=CHR$(133)THENGOSUB49Ø:GOSUB72Ø:RE
     M CANCEL
166Ø IFZ$=CHR$(134)THENGOSUB53Ø:GOSUB72Ø:RE
     M COUPON ITEM
167Ø IFZ$=CHR$(135)THENGOSUB55Ø:GOSUB72Ø:RE
     M SALE ITEM
168Ø IFZ$=CHR$(136)THENN1=3:GOSUB82Ø:Q=P:GO
     TO159Ø:REM ADVANCE
169Ø REM DELETE AN ITEM
17ØØ IFZ$=CHR$(137)THENGOSUB49Ø:GOSUB72Ø:D=
     1:NM$="":GOSUB3ØØ:D=Ø:GOTO162Ø
171Ø IFZ$=CHR$(14Ø)THENN1=4:GOSUB82Ø:BK=1:K
     B=1:NM$="":ED=Ø:GOTO159Ø:REM BACK UP
172Ø IFZ$=CHR$(13)THEN176Ø:REM CARR. RET.
173Ø IFZ$<"Ø"ORZ$>"9"THEN163Ø:REM CHECK FOR
      NUMERICAL INPUT
174Ø IFLEN(NM$)>2THEN163Ø:REM CHECK FOR MAX
     . OF 3 DIDGETS
175Ø NM$=NM$+Z$:GOSUB78Ø:GOSUB6ØØ:GOTO163Ø:
     REM BUILD THE ITEM NO.
176Ø ZQ=VAL(NM$):GOSUB72Ø
177Ø IFZQ<Q+1ORZQ>PTHEN179Ø:REM IS IT CURRE
     NTLY ON THE SCREEN
178Ø GOTO183Ø
179Ø PRINTZ1$;"{2 CRSR UPs}{CTRL 9}";C2$;"{
     6 SPACEs}* * NUMBER OUT OF RANGE{2 SPA
     CEs}* *{6 SPACEs}{CTRL 1}":NM$=""
18ØØ FORBB=1TO5:GOSUB72Ø:NEXT
181Ø PRINTZ1$;"{2 CRSR UPs}";Y$:IFD=1THENRE
     TURN
182Ø I=I-1:GOTO193Ø
183Ø IFLEFT$(SD$(ZQ-Q),1)="{CTRL 9}"THENGOS
     UB21Ø:REM WAS IT SELECTED BEFORE
184Ø L$(I)=SD$(ZQ-Q):LI(I)=ZQ:REM PUT ITEM
     ON THE LIST
185Ø REM CHANGE SCREEN DISPLAY OF ITEM TO R
     EVERSE
186Ø SD$(ZQ-Q)="{CTRL 9}"+SD$(ZQ-Q)
187Ø GOSUB68Ø
188Ø IFF3=1THENL$(I)=L$(I)+"{COMD -}":REM A
     DD COUPON FLAG TO ITEM ON LIST
189Ø IFF5=1THENL$(I)=L$(I)+"{COMD LB.}":REM
      ADD SALE FLAG TO ITEM ON LIST
19ØØ IFI=98THEN191Ø
19Ø5 GOTO193Ø
191Ø PRINTZ1$;"{2 CRSR UPs}{CTRL 9}";C2$;"{
     4 SPACEs}{SHFT T}HAT WAS THE LAST ITEM
      - MAX 99{5 SPACEs}{CTRL 1}"
192Ø FORBB=1TO5:GOSUB72Ø:NEXT:L$(I+1)="{COM
     D +}":FORX=1TO15ØØ:NEXT:N1=1Ø:GOTO195Ø
193Ø I=I+1:GOSUB49Ø:GOTO163Ø
194Ø REM PRINTOUT OF SHOPPING LIST
195Ø PRINT"{SHFT CLR}{CRSR DN}{4 SPACEs}{SH
     FT T}HIS COMPLETES THE SHOPPING LIST."
196Ø PRINT"{CRSR DN} {SHFT M}AKE SURE THAT
     YOUR PRINTER IS ON AND"
197Ø PRINT"{8 SPACEs}THE PAPER IS POSITIONE
     D.":Z=8Ø
198Ø PRINTSP$;"{2 CRSR DNs}{SHFT H}IT ANY K
     EY WHEN YOU"
199Ø PRINTSP$;"ARE READY FOR PRINTOUT":GOSU
     B65Ø
2ØØØ CLOSEPF:OPENPF,4,CP:CR$=CHR$(1Ø)
2Ø1Ø PRINT#PF,P8$;"{6 SPACEs}{SHFT S}{SHFT
     H}{SHFT O}{2 SHFT Ps}{SHFT E}{SHFT R}'
     {SHFT S}{SHFT SPACE}{SHFT C}{SHFT O}{S
     HFT M}{SHFT P}{SHFT A}{SHFT N}{SHFT I}
     {SHFT O}{SHFT N}{4 SPACEs}"
2Ø2Ø PRINT#PF,"{11 SPACEs}**********
     **********";P9$;CR$
2Ø3Ø PRINT#PF
2Ø4Ø PRINT#PF
2Ø5Ø PRINT#PF,"{2 SPACEs}";P1$
2Ø6Ø PRINT#PF,P2$
2Ø7Ø FORPR=ØTO99:IFL$(PR)="{COMD +}"THENPS=
     PR:PR=99
2Ø8Ø NEXTPR
2Ø9Ø FORPR=ØTOPS-1
21ØØ REM CHECK FOR COUPON & SALE FLAGS
211Ø MD=LEN(L$(PR))-1
212Ø E1$=RIGHT$(L$(PR),1):E2$=MID$(L$(PR),M
     D,1)
213Ø IFE2$="{COMD -}"ORE2$="{COMD LB.}"THEN
     L$(PR)=LEFT$(L$(PR),MD-1):GOTO215Ø
214Ø IFE1$="{COMD -}"ORE1$="{COMD LB.}"THEN
     L$(PR)=LEFT$(L$(PR),MD)
215Ø IFE1$="{COMD -}"ORE2$="{COMD -}"THENL$
     (PR)=L$(PR)+CP$
216Ø IFE1$="{COMD LB.}"ORE2$="{COMD LB.}"TH
     ENL$(PR)=L$(PR)+SL$
217Ø PRINT#PF,P3$;L$(PR)
218Ø NEXT
219Ø PRINT#PF,CR$;CR$
22ØØ PRINT#PF,"{SHFT T}OTAL ITEMS SELECTED
     =";I:PRINT#PF:PRINT#PF,CHR$(12)
221Ø IFCP=7ANDPC=1THENFORX=1TO1Ø:PRINT#PF,C
     R$;CR$;CR$:NEXT
222Ø CLOSEPF
223Ø REM PRINTER PROBLEM DEFAULT
224Ø PRINT"{SHFT CLR}{3 CRSR DNs}{SHFT W}OU
     LD YOU LIKE TO HAVE ANOTHER PRINTOUT?"
225Ø PRINTSP$;"{3 SPACEs}TYPE ";Q$;"Y";Q$;"
      OR ";Q$;"N";Q$;"{CRSR UP}"
226Ø GOSUB65Ø
227Ø IFA$="Y"THENTN=Ø:GOSUB78Ø:GOTO196Ø
228Ø IFA$="N"THENEND
229Ø PRINTSP$;"{3 SPACEs}TYPE ";Q$;"Y";Q$;"
      OR ";Q$;"N";Q$;"{CRSR UP}"
23ØØ FORBB=1TO3:GOSUB72Ø:NEXT:GOTO226Ø
3ØØØ DATACORN,KALE,MILK,CHEESE,BREAD,ROUND
     STEAK,DOZEN EGGS,BAGELS
3Ø1Ø DATASUGAR,SALT,PEPPER,VANILLA,GROUND B
     EEF,LAMB,HAM,PRK CHOPS,COFFEE
3Ø2Ø DATACHICKEN,TOILET PAPER,PAPER TOWELS,
     GRAVY MIX,CREAM CHEESE,ARTICHOKES
3Ø3Ø DATAVITAMIN PILLS,SODA POP, POTATOE CH
     IPS,CHEESE CURLS,PRETZELS,CANDY BARS
3Ø4Ø DATAPOTATOES,BEANS,TOMATOES,TURNIPS,PA
     RSNIPS,OATMEAL,CREAM OF WHEAT, SPAM
3Ø5Ø DATAMARSHMALLOWS,CHOCOLATE DRINK MIX,C
     OOKING OIL,POPCORN
3Ø6Ø DATAZUCCHINI,BRUSSEL SPROUTS,CREAM SAU
     CE,KETCHUP,MUSTARD, CASH A CHECK
5ØØØ DATAEND
```

Listing 2. *The Shopper's Companion program for the VIC-20.*

```
1Ø REM VIC-2Ø SHOPPER'S COMPANION
2Ø REM BY J. SHAUGHNESSY - 1985
3Ø REM SET UP CONDITIONS
4Ø PRINTCHR$(14)
5Ø POKE36879,221:PRINT"{CTRL 1}":P=Ø:I=Ø:Q$
   =CHR$(34)
6Ø DIMLI(99)
7Ø DIML$(99),SD$(16)
8Ø N1=1Ø:PF=4
9Ø S1=36874:S2=S1+1:S3=S1+2:V=S1+4
13Ø Z1$="{HOME}{19 CRSR DNs}":Y$="{22 SPACE
   s}"
14Ø C1$="{CTRL 7}":C2$="{CTRL 3}":P8$=CHR$(
   14):P9$=CHR$(15)
15Ø SD$(Ø)="{SHFT CLR}{CTRL 9}"+C1$+"SHOPPE
   R'S COMPANION"
```

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Listing 2 continued.

```
16Ø V=15:POKEV,VØ:Q=Ø:ED=Ø:BK=Ø:KB=Ø
17Ø FORX=ØTO99:L$(X)="{COMD +}":NEXT
18Ø R=1:GOSUB49Ø:R=Ø:GOTO115Ø
19Ø REM SUBROUTINES
2ØØ REM REMOVE REVERSE PRINT FROM SCREEN DI
    SPLAY AND CLOSE GAP IN LIST
21Ø ER=LEN(SD$(ZQ-Q))-1
22Ø SD$(ZQ-Q)=RIGHT$(SD$(ZQ-Q),ER)
23Ø FORS=ØTOI-1
24Ø IFZQ=LI(S)THENT=S:S=I-1
25Ø NEXT
26Ø FORS=TTOI-1
27Ø L$(S)=L$(S+1):LI(S)=LI(S+1)
28Ø NEXT:I=I-1:RETURN
29Ø REM DELETE SUBROUTINE
3ØØ PRINTZ1$;C2$;"{2 CRSR UPs}{CTRL 9} {SHF
    T D}ELETE {SHFT I}TEM # :{CTRL Ø}{5 SPA
    CEs}{CTRL 9}{4 CRSR LFs}";NM$
31Ø GETZ$:IFZ$=""THEN31Ø
32Ø IFZ$=CHR$(13)THEN37Ø:REM CARR. RET.
33Ø IFZ$=CHR$(133)THENR=1:GOSUB49Ø:GOSUB72Ø
    :RETURN:REM CANCEL
34Ø IFZ$<"Ø"ORZ$>"9"THEN3ØØ:REM CHECK FOR N
    UMERICAL INPUT
35Ø IFLEN(NM$)>2THEN3ØØ:REM CHECK FOR MAX.
    OF 3 DIDGETS
36Ø NM$=NM$+Z$:GOSUB78Ø:GOTO3ØØ:REM BUILD T
    HE ITEM NO.
37Ø ZQ=VAL(NM$):GOSUB72Ø
38Ø IFZQ<Q+1ORZQ>PTHENGOSUB179Ø:GOSUB49Ø:GO
    TO162Ø:REM IS IT NOW ON THE SCREEN ?
39Ø IFLEFT$(SD$(ZQ-Q),1)<>"{CTRL 9}"THENGOT
    O162Ø:REM IS IT DELETABLE
4ØØ GOSUB21Ø:L$(I)="{COMD +}":LI(I)=Ø:RETUR
    N
41Ø IFQ=ØTHENRETURN
42Ø RESTORE:REM BACK UP SUBROUTINE
43Ø P=Ø
44Ø IFQ=16THEN46Ø
45Ø FORX=1TOQ-16:READA$:P=P+1:NEXT
46Ø Q=Q-16:GOSUB1Ø1Ø
47Ø RETURN
48Ø REM INITIALIZE FUNCTION KEY MENU
49Ø F1$="{SHFT C}ANCL":NM$=""
5ØØ F3$="{SHFT C}OUPN":F3=Ø
51Ø F5$="{SHFT S}ALE":F5=Ø:GOTO57Ø
52Ø REM FUNCTION KEY SELECTED DISPLAY
53Ø IFF3=1THENF3=Ø:F3$="{SHFT C}OUPN":GOTO5
    7Ø
54Ø F3=1:F3$="{CTRL 9}"+F3$+"{CTRL Ø}":GOTO
    57Ø
55Ø IFF5=1THENF5=Ø:F5$="{SHFT S}ALE":GOTO57
    Ø
56Ø F5=1:F5$="{CTRL 9}"+F5$+"{CTRL Ø}"
57Ø GOSUB96Ø
58Ø RETURN
59Ø REM UPDATE SELECTION AND ITEM COUNT
6ØØ PRINTZ1$;"{2 CRSR UPs}{CTRL 9} {SHFT S}
    ELECT {SHFT I}TEM # :{CTRL Ø}{5 SPACEs}
    {CTRL 9}{4 CRSR LFs}";NM$
61Ø PRINT"{HOME}";TAB(19)"{CTRL 9}";I
62Ø RETURN
63Ø FORX=1TO5ØØØ:NEXT:REM DELAY LOOP
64Ø RETURN
65Ø GETA$:IFA$=""THEN65Ø:REM WAIT FOR A KEY
    STROKE
66Ø RETURN
67Ø REM UPDATE DISPLAY AFTER SELECTION
68Ø PRINT"{HOME}";
69Ø FORX=1TOZQ-Q:PRINT"{CRSR DN}";:NEXT:IFZ
    Q>99THENPRINT"{CRSR RT}";
7ØØ PRINT"{3 CRSR RTs}";SD$(ZQ-Q):RETURN
71Ø REM SOUND SUBROUTINES
72Ø POKEV,2*VØ/3:FORX=15ØTO24ØSTEP9:POKES3,
    X:NEXT
73Ø POKEV,Ø:POKES3,Ø:FORX=1TO2Ø:NEXT:RETURN
78Ø POKEV,VØ/3:POKES2,22Ø:FORX=1TO5Ø:NEXT:P
    OKEV,Ø:POKES2,Ø:RETURN
82Ø POKEV,VØ:FORLL=1TON1Ø:POKES1,2ØØ:FORX=1
    TO1Ø:NEXT
83Ø POKES1,Ø:FORX=1TO65:NEXT:NEXT:POKEV,Ø:R
    ETURN
89Ø REM SCREEN DISPLAY
9ØØ PRINTSD$(Ø)
91Ø FORX=1TO16:IFSD$(X)="{COMD +}"THENX=16:
    GOTO95Ø
92Ø IFQ+X<1ØTHENPRINT"{CTRL 9}";Q+X;"{CTRL
    Ø}";SD$(X):GOTO95Ø
93Ø IFQ+X<1ØØTHENPRINT"{CRSR LF}{CTRL 9}";Q
    +X;"{CTRL Ø}{4 CRSR LFs} {3 CRSR RTs}";
    SD$(X):GOTO95Ø
94Ø PRINT"{CRSR LF}{CTRL 9}";Q+X;"{CTRL Ø}{
    5 CRSR LFs} {4 CRSR RTs}";SD$(X)
95Ø NEXT
96Ø IFR=1THENRETURN
97Ø FD$=C1$+"{CTRL 9}F1{CTRL Ø}"+F1$+" {CTR
    L 9}F3{CTRL Ø}"+F3$+" {CTRL 9}F5{CTRL Ø
    }"+F5$+"{CTRL 9}F7{CTRL Ø}{SHFT A}DVNC
    {CTRL 9}F2{CTRL Ø}{SHFT D}ELET"
98Ø FD$=FD$+" {CTRL 9}F8{CTRL Ø}{SHFT B}ACK
    "+C2$+"{CTRL 9}{2 SPACEs}{SHFT F}UNCTIO
    N {SHFT K}EY {SHFT M}ENU{3 SPACEs}{CTRL
     Ø}{CTRL 1}{4 CRSR UPs}"
99Ø GOSUB6ØØ:PRINTZ1$;FD$:POKE198,Ø:RETURN
1ØØØ REM READ THE NEXT GROUP OF DATA
1Ø1Ø GC=FRE(Ø)
1Ø2Ø FORX=1TO16:SD$(X)="{COMD +}":NEXT:X=1
1Ø3Ø READA$
1Ø4Ø IFLEN(A$)>17THENA$=LEFT$(A$,17)
1Ø5Ø IFA$="END"THENED=1:GOSUB1Ø9Ø:RETURN
1Ø6Ø SD$(X)=A$:X=X+1:P=P+1
1Ø7Ø IFP=Q+16THEN:GOSUB1Ø9Ø:RETURN
1Ø8Ø GOTO1Ø3Ø
1Ø9Ø IFKB=ØTHENRETURN
11ØØ FORX=ØTOI
111Ø IFLI(X)<Q+1ORLI(X)>PTHEN113Ø
112Ø SD$(LI(X)-Q)="{CTRL 9}"+SD$(LI(X)-Q)
113Ø NEXT:RETURN
114Ø REM TITLE DISPLAY
115Ø PRINT"{SHFT CLR}"C1$"{2 CRSR DNs}{COMD
     I}{2Ø COMD LB.s}{COMD I}";
116Ø PRINT"{CTRL 9}{COMD +}{2Ø SPACEs}{COMD
    +}";
117Ø PRINT"{CTRL 9}{COMD +}{6 SPACEs}{SHFT
    V}{SHFT I}{SHFT C}-2Ø{8 SPACEs}{COMD +
    }";
118Ø PRINT"{CTRL 9}{COMD +}{2Ø SPACEs}{COMD
    +}";
119Ø PRINT"{CTRL 9}{COMD +}{5 SPACEs}{SHFT
    S}{SHFT H}{SHFT O}{2 SHFT Ps}{SHFT E}{
    SHFT R}'{SHFT S}{6 SPACEs}{COMD +}";
12ØØ PRINT"{CTRL 9}{COMD +}{2Ø SPACEs}{COMD
    +}";
121Ø PRINT"{CTRL 9}{COMD +}{5 SPACEs}{SHFT
    C}{SHFT O}{SHFT M}{SHFT P}{SHFT A}{SHF
    T N}{SHFT I}{SHFT O}{SHFT N}{5 SHFT SP
    ACEs} {COMD +}";
122Ø PRINT"{CTRL 9}{COMD +}{2Ø COMD LB.s}{C
    OMD +}{CTRL 1}"
123Ø PRINT"{9 SPACEs}{SHFT B}Y{CRSR DN}"
124Ø PRINT"{SHFT J}OSEPH {SHFT J}. {SHFT S}
    HAUGHNESSY
125Ø PRINT"{SHFT S}ERENDIPITY {SHFT S}OFTWA
    RE
126Ø PRINT"8438 {SHFT L}YNDA {SHFT S}UE {SH
    FT L}ANE {SHFT W}
127Ø PRINT"{SHFT J}ACKSONVILLE,{SHFT F}L.32
    217
128Ø PRINT"PHONE{2 SPACEs}9Ø4-737-8182
129Ø PRINT"{CRSR DN}{6 SPACEs}(C) 1985"
13ØØ RESTORE:GOSUB63Ø
131Ø REM SPECIFICS FOR TV AND PRINTER
```


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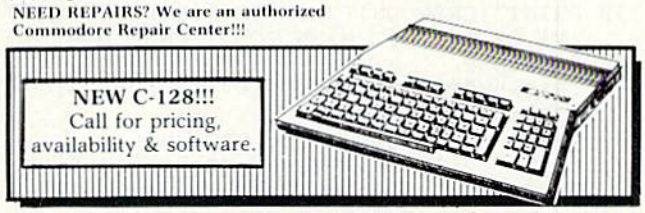

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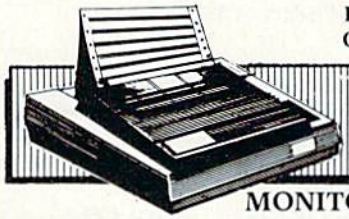

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Listing 2 continued.

```
132Ø PRINT"{SHFT CLR}{6 CRSR DNs}{2 SPACEs}
     {SHFT A}RE YOU USING A"
133Ø PRINT"{CRSR DN}{2 SPACEs}{SHFT T}{SHFT
      V} OR A {SHFT M}ONITOR{2 CRSR DNs}"
134Ø GOSUB65Ø
135Ø IFA$="T"THENC1$="":C2$="":GOSUB72Ø:GOT
     O139Ø
136Ø IFA$="M"THENGOSUB72Ø:GOTO139Ø
137Ø PRINT"{2 SPACEs}TYPE ";Q$;"T";Q$;" OR
     ";Q$;"M";Q$;"{CRSR UP}"
138Ø FORBB=1TO3:GOSUB72Ø:NEXT:GOTO134Ø
139Ø PRINT"{3 CRSR DNs}{2 SPACEs}{SHFT A}RE
      YOU USING A"
14ØØ PRINT" {SHFT C}OMMODORE PRINTER"
141Ø PRINT"{CRSR DN}{3 SPACEs}({CTRL 9}Y{CT
     RL Ø}ES OR {CTRL 9}N{CTRL Ø}O ?){CRSR
     DN}"
142Ø GOSUB65Ø
143Ø IFA$<>"Y"THEN146Ø
1435 CP=7:P1$="{SHFT @}":P2$=" {3 COMD Ts}"
     :P3$="{5 COMD @s} ":CP$=" {CTRL 9} * C
     OUPON * {CTRL Ø}":GOTO145Ø
144Ø GOTO146Ø
145Ø PC=1:GOTO157Ø
146Ø IFA$="N"THEN:P1$="{SHFT X}":P2$=" ---"
     :P3$="{5 LEFT ARROWs} ":CP$=" ** COUPO
     N ** ":GOTO149Ø
147Ø PRINT"{2 SPACEs}TYPE ";Q$;"Y";Q$;" OR
     ";Q$;"N";Q$;"{CRSR UP}"
148Ø FORBB=1TO3:GOSUB72Ø:NEXT:GOTO142Ø
149Ø GOSUB72Ø:PRINT"{SHFT CLR}{6 CRSR DNs}{
     SHFT T}YPE YOUR PRINTER'S"
1495 PRINT"SECONDARY ADDRESS:(*)":P8$="":P9
     $=""
15ØØ PRINT"(FORMAT - OPEN4,4,*)":INPUT"{2 S
     PACEs}*{3 CRSR LFs}";CP
151Ø GOSUB72Ø:PRINT"{CRSR DN}{SHFT S}END LI
     NE FEEDS"
1515 PRINT"({CTRL 9}Y{CTRL Ø}ES OR {CTRL 9}
     N{CTRL Ø}O)?{CRSR DN}"
152Ø GOSUB65Ø
153Ø IFA$="Y"THENPF=PF+128:GOTO157Ø
154Ø IFA$="N"THEN157Ø
155Ø PRINT"{2 SPACEs}TYPE ";Q$;"Y";Q$;" OR
     ";Q$;"N";Q$;"{CRSR UP}"
156Ø FORBB=1TO3:GOSUB72Ø:NEXT:GOTO152Ø
157Ø SL$=" $$ SALE $$":GOSUB72Ø
158Ø REM MAIN PROGRAM LOOP
159Ø IFBK=1THENGOSUB41Ø:BK=Ø:GOTO162Ø
16ØØ IFED=1THEN195Ø
161Ø GOSUB1Ø1Ø
162Ø GOSUB9ØØ:R=Ø:GOSUB49Ø
163Ø GETZ$:IFZ$=""THEN163Ø
164Ø IFZ$<CHR$(133)THEN172Ø
165Ø IFZ$=CHR$(133)THENGOSUB49Ø:GOSUB72Ø:RE
     M CANCEL
166Ø IFZ$=CHR$(134)THENGOSUB53Ø:GOSUB72Ø:RE
     M COUPON ITEM
167Ø IFZ$=CHR$(135)THENGOSUB55Ø:GOSUB72Ø:RE
     M SALE ITEM
168Ø IFZ$=CHR$(136)THENN1=3:GOSUB82Ø:Q=P:GO
     TO159Ø:REM ADVANCE
169Ø REM DELETE AN ITEM
17ØØ IFZ$=CHR$(137)THENGOSUB49Ø:GOSUB72Ø:D=
     1:NM$="":GOSUB3ØØ:D=Ø:GOTO162Ø
171Ø IFZ$=CHR$(14Ø)THENN1=4:GOSUB82Ø:BK=1:K
     B=1:NM$="":ED=Ø:GOTO159Ø:REM BACK UP
172Ø IFZ$=CHR$(13)THEN176Ø:REM CARR. RET.
173Ø IFZ$<"Ø"ORZ$>"9"THEN163Ø:REM CHECK FOR
      NUMERICAL INPUT
174Ø IFLEN(NM$)>2THEN163Ø:REM CHECK FOR MAX
     . OF 3 DIGITS
175Ø NM$=NM$+Z$:GOSUB78Ø:GOSUB6ØØ:GOTO163Ø:
     REM BUILD THE ITEM NO.
176Ø ZQ=VAL(NM$):GOSUB72Ø
177Ø IFZQ<Q+1ORZQ>PTHEN179Ø:REM IS IT CURRE
     NTLY ON THE SCREEN
178Ø GOTO183Ø
179Ø PRINTZ1$;"{2 CRSR UPs}{CTRL 9}";C2$;"*
     NUMBER OUT OF RANGE* {CTRL 1}":NM$=""
18ØØ FORBB=1TO5:GOSUB72Ø:NEXT
181Ø PRINTZ1$;"{2 CRSR UPs}";Y$:IFD=1THENRE
     TURN
182Ø I=I-1:GOTO193Ø
183Ø IFLEFT$(SD$(ZQ-Q),1)="{CTRL 9}"THENGOS
     UB21Ø:REM WAS IT SELECTED BEFORE
184Ø L$(I)=SD$(ZQ-Q):LI(I)=ZQ:REM PUT ITEM
     ON THE LIST
185Ø REM CHANGE SCREEN DISPLAY OF ITEM TO R
     EVERSE
186Ø SD$(ZQ-Q)="{CTRL 9}"+SD$(ZQ-Q)
187Ø GOSUB68Ø
188Ø IFF3=1THENL$(I)=L$(I)+"{COMD -}":REM A
     DD COUPON FLAG TO ITEM ON LIST
189Ø IFF5=1THENL$(I)=L$(I)+"{COMD LB.}":REM
      ADD SALE FLAG TO ITEM ON LIST
19ØØ IFI=98THENPRINTZ1$;"{2 CRSR UPs}{CTRL
     9}";C2$;"{SHFT Y}OUR LAST ITEM -MAX 99
     {CTRL 1}":GOTO192Ø
191Ø GOTO193Ø
192Ø FORBB=1TO5:GOSUB72Ø:NEXT:L$(I+1)="{COM
     D +}":FORX=1TO15ØØ:NEXT:N1=1Ø:GOTO195Ø
193Ø I=I+1:GOSUB49Ø:GOTO163Ø
194Ø REM PRINTOUT OF SHOPPING LIST
```


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Listing 2 continued.

```
195Ø PRINT"{SHFT CLR}{CRSR DN}{SHFT T}HIS C
     OMPLETES THE"
1955 PRINT"SHOPPING LIST."
196Ø PRINT"{CRSR DN}{SHFT M}AKE SURE THAT Y
     OUR"
1965 PRINT"PRINTER IS ON AND THE"
197Ø PRINT"PAPER IS POSITIONED.":Z=8Ø
198Ø PRINT"{2 CRSR DNs}{SHFT H}IT ANY KEY W
     HEN YOU"
199Ø PRINT"ARE READY FOR PRINTOUT":GOSUB65Ø
2ØØØ CLOSEPF:OPENPF,4,CP:CR$=CHR$(1Ø)
2Ø1Ø PRINT#PF,P8$;"{8 SPACEs}{SHFT S}{SHFT
     H}{SHFT O}{2 SHFT Ps}{SHFT E}{SHFT R}'
     {SHFT S}{SHFT SPACE}{SHFT C}{SHFT O}{S
     HFT M}{SHFT P}{SHFT A}{SHFT N}{SHFT I}
     {SHFT O}{SHFT N}"
2Ø2Ø PRINT#PF,"{16 SPACEs}**********
     **********";P9$;CR$
2Ø3Ø PRINT#PF
2Ø4Ø PRINT#PF
2Ø5Ø PRINT#PF,"{2 SPACEs}";P1$
2Ø6Ø PRINT#PF,P2$
2Ø7Ø FORPR=ØTO99:IFL$(PR)="{COMD +}"THENPS=
     PR:PR=99
2Ø8Ø NEXTPR
2Ø9Ø FORPR=ØTOPS-1
21ØØ REM CHECK FOR COUPON & SALE FLAGS
211Ø MD=LEN(L$(PR))-1
212Ø E1$=RIGHT$(L$(PR),1):E2$=MID$(L$(PR),M
     D,1)
213Ø IFE2$="{COMD -}"ORE2$="{COMD LB.}"THEN
     L$(PR)=LEFT$(L$(PR),MD-1):GOTO215Ø
214Ø IFE1$="{COMD -}"ORE1$="{COMD LB.}"THEN
     L$(PR)=LEFT$(L$(PR),MD)
215Ø IFE1$="{COMD -}"ORE2$="{COMD -}"THENL$
     (PR)=L$(PR)+CP$
216Ø IFE1$="{COMD LB.}"ORE2$="{COMD LB.}"TH
     ENL$(PR)=L$(PR)+SL$
217Ø PRINT#PF,P3$;L$(PR)
218Ø NEXT
219Ø PRINT#PF,CR$;CR$
22ØØ PRINT#PF,"{SHFT T}OTAL ITEMS SELECTED
     =";I:PRINT#PF:PRINT#PF,CHR$(12)
221Ø IFCP=7ANDPC=1THENFORX=1TO1Ø:PRINT#PF,C
     R$;CR$;CR$:NEXT
222Ø CLOSEPF
223Ø REM PRINTER PROBLEM DEFAULT
224Ø PRINT"{SHFT CLR}{3 CRSR DNs}{SHFT W}OU
     LD YOU LIKE TO HAVEANOTHER PRINTOUT?"
225Ø PRINT"{3 SPACEs}TYPE ";Q$;"Y";Q$;" OR
     ";Q$;"N";Q$;"{CRSR UP}"
226Ø GOSUB65Ø
227Ø IFA$="Y"THENTN=Ø:GOSUB78Ø:GOTO196Ø
228Ø IFA$="N"THENEND
229Ø PRINT"{3 SPACEs}TYPE ";Q$;"Y";Q$;" OR
     ";Q$;"N";Q$;"{CRSR UP}"
23ØØ FORBB=1TO3:GOSUB72Ø:NEXT:GOTO226Ø
3ØØØ DATACORN,KALE,MILK,CHEESE,BREAD,ROUND
     STEAK,DOZEN EGGS,BAGELS
3Ø1Ø DATASUGAR,SALT,PEPPER,VANILLA,GROUND B
     EEF,LAMB,HAM,PORK CHOPS,COFFEE
3Ø2Ø DATACHICKEN,TOILET PAPER,PAPER TOWELS,
     GRAVY MIX,CREAM CHEESE,ARTICHOKES
3Ø3Ø DATAVITAMIN PILLS,SODA POP, POTATOE CH
     IPS,CHEESE CURLS,PRETZELS,CANDY BARS
3Ø4Ø DATAPOTATOES,BEANS,TOMATOES,TURNIPS,PA
     RSNIPS,OATMEAL,CREAM OF WHEAT, SPAM
3Ø5Ø DATAMARSHMALLOWS,CHOCOLATE DRINK MIX,C
     OOKING OIL,POPCORN
3Ø6Ø DATAZUCCHINI,BRUSSEL SPROUTS,CREAM SAU
     CE,KETCHUP,MUSTARD, CASH A CHECK
5ØØØ DATAEND
```


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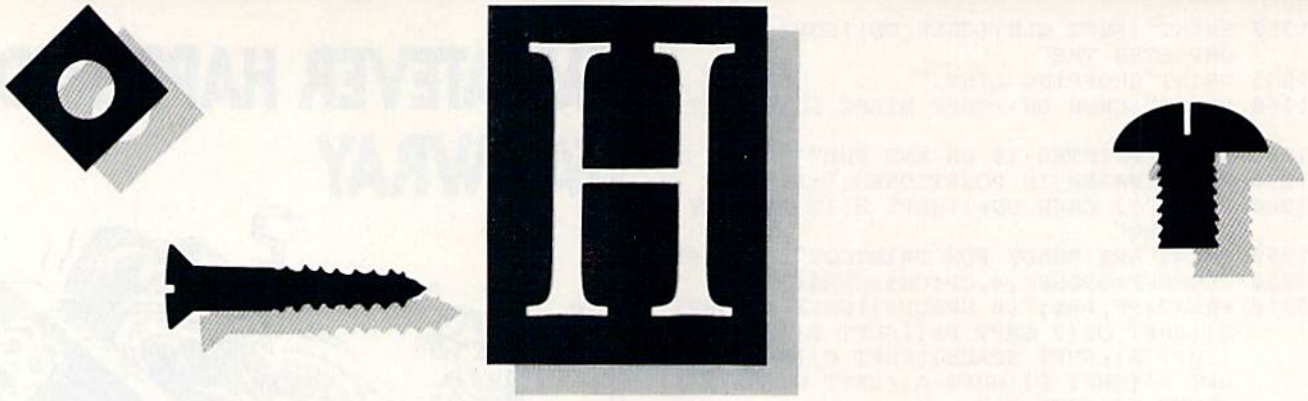

Compiled by SUSAN TANONA

1541 Flash!

Speed Up those Loads And Saves and Get More from Your C-64

Skyles Electric Works' 1541 Flash! is a hardware enhancement that connects to the C-64 and the 1541 disk drive, enabling much faster loads and saves of programs and data.

To load a directory using 1541 Flash!, you simply type: LOAD "$. You then simultaneously press the run/stop and shift keys, and the first program on the disk will load into the machine in its original memory location. Loads and saves are about three times faster than normal.

1541 Flash! consists of a new kernal ROM assembly (with a piggyback attachment for the original kernal), a cable that runs between the disk drive and computer, a device that plugs into the computer's user port and a new operating ROM chip for the 1541. The user port is extended out with a CableCard.

It should take you no longer than 30 minutes to connect 1541 Flash! to your computer system. You simply unplug the original kernal and install the new items. There is a small switch on the CableCard that allows you to disable Flash! and return to the computer's original operation.

The section of the 52-page manual that covers installation is accompanied by numerous photos and drawings to help you along. The step-by-step instructions make this process fairly straightforward, taking into account the various factory updates in computers and disk drives.

A tiny wedge is included, and if you enjoy using the wedge as part of your computer operations, you will really appreciate this feature. Internal operations of the drive are performed at the normal rate of speed. In addition to speeding up data transfer, 1541 Flash! simplifies the actual preliminary operations required to locate and begin loading a program.

The utilities added by Flash! include single, double and simultaneous keystroke implementation of: delete line, escape quote, cursor to bottom of screen, 16-character tab and return without line execution. Also, several items for using your printer within Basic programs are included.

The manual describes some new machine language abilities that will allow loading and saving at up to ten times the normal rate of speed. (I have not yet attempted these, as I've been too busy enjoying the additional speed and added commands to move on.)

I have run across a few limitations with the package, one of which involves the manual, which seems to have been compiled and printed in a hurry. Also, I've encountered some problems using a word processor while my printer and its interface are plugged in and powered up, but it could be that mine is a hardware-specific problem that you may not encounter with your particular system.

1541 Flash! will save you much of the time required in normal disk drive and computer interactions. Overall, I'm very pleased with its operation, and won't hesitate to recommend it to those who would like faster loads and saves and some additional flexibility and power at a moderate price. *(Skyles Electric Works, 231-E South Whisman Road, Mountain View, CA 94041. C-64/$90.)*

Dan Linscheid
Sheridan, OR

Learning Express: How to Operate The Commodore 64

A C-64 Tutorial That's Perfect for The Computer Novice

FlipTrack Learning System's *How to Operate the Commodore 64* is an excellent introduction to the 64. It takes computer beginners from unpacking the computer through basic operations and keyboard functions.

The course consists of two audio tapes, several programs on cassette and a reference guide that summarizes the main points from the tapes. The course provides lots of confidence-building, hands-on exercises, with easy-to-understand instructions.

This tutorial is designed for users who have had no previous experience with computers. It uses simple words—no jargon without an explanation—and everyday examples.

The flip-track feature lets you choose how much you want to learn. The main course is recorded on the first side of the tape and covers es-

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sential material. At intervals, the teacher invites you to flip the tape over for additional, but not essential, information.

Tape 1 explores the keyboard, screen-editing and command operations, such as Load, Run and List. It covers changing character color, playing with keyboard graphics and using cursor control. In addition to operating commands, the teacher covers some points on programming, including variables, string handling, random numbers and loops.

The flip track adds depth to the information on using Print statements, screen color and music. The course designers apparently expected most students to use disk drives, because all the information on using the tape drive is on the flip side.

Tape 2 is devoted to using the disk drive and the 1525 VIC printer. The lesson has no general material on using printers.

The material on using the disk drive is well done. The teacher guides you through all disk operations. He even covers the seldom-used Copy command. All disk operations use the DOS wedge. I do wish the course addressed the matter of using the disk drive with the Open commands. The wedge doesn't work with all programs, and it doesn't save time if you plan to load just one program.

The reference guide is a pamphlet that is meant to provide hardcopy notes for the material on the audio tapes. As a supplement, it is satisfactory. However, it is not complete enough to be useful without the tapes. My copy of the reference guide contains material not covered on the tapes, which could confuse a novice.

How to Operate the Commodore 64 is a good investment for someone new to computers. The tutorial is perfect for guiding you through your first steps. You can move at your own pace and avoid the confusion that well-meaning, experienced friends are likely to cause.

I do wish the course went into more detail on using the disk drive, and it also could have provided some general information on using non-Commodore printers. However, the material that is included is chosen and presented well. It is a solid beginning for a novice computerist. *(FlipTrack Learning Systems, 999 Main St., Suite 200, Glen Ellyn, IL 60137. C-64/$25.)*

Annette Hinshaw
Tulsa, OK

XL 80

A Low-Cost, Comprehensive Package For Serious Applications

If you run a small business, do serious word processing or have to keep track of figures and appointments, the XL 80 is a product that you should consider buying for your C-64. It is a polished combination of 80-column video expansion board with Basic enhancements, word processor, spreadsheet with graphing option, smart terminal for telecommunications, mailing list, appointment calendar and disk-copy utility. It makes your C-64 behave and look like a much higher-priced computer system.

The 80-column board connects to the expansion port on your computer and is intended for use with a monochrome video monitor.

The word processor that comes on disk with the XL 80 is Data 20's Word Manager, which has been revised since its first release over a year ago. This word processor is one of the easiest to use and most sophisticated of the many that have been created for the C-64. The most impressive feature is the visual clarity of the 80-column display. This outstanding program has true word-wrap and on-screen justification left and right, so that what you see on your monitor is exactly what will be printed out.

Another strong feature of this word processor is the very flexible cut-and-paste function that allows you to easily delete, move and insert words, phrases and blocks of text. The Word Manager will work with parallel, serial or RS-232 printers, and it accommodates printer codes for particular brands.

The Plan Manager Spreadsheet has also been revised since its first release. This command-driven program has extensive on-screen Help menus and eight major functions for working with the 63 × 254 matrix.

With two keystrokes, the Plan Manager will make an excellent quality bar graph for any row or column of your spreadsheet. It is quite easy to label and print your graph, or to print out any section of your entire spreadsheet.

Telecommunications has also been addressed in the XL 80. The interface has a built-in dumb terminal for instant on-line communications without any disk access. On disk, the new Com-Manager Terminal package is a smart terminal that will let you autodial, receive data into the buffer, transmit buffer data and more. It is command driven and has Help menus for ease of use.

The Mail List program that is included on the XL 80 menu allows you to create an address file. The strength of this program is that you can later merge these addresses into your own letters and then print them out. At the time of this review, this program was not as professionally developed as the other applications, and Data 20 was working to improve it. However, they were also considering replacing it with a database program, a potentially strong alternative.

The fifth application of the XL 80 is its calendar program, which is

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really a sophisticated daily appointment book. You can request a particular month, day and year, and the program will pull up the appropriate calendar.

It is difficult to find fault with the XL 80. One weakness in the package that I reviewed was that Word Manager didn't provide for double-spacing, a limitation for those of us who submit papers to editors or instructors. However, Data 20 assured me that before the release of the XL 80 this would be included, as well as these other enhancements: 1) an increase to 99 pages per document; 2) block load and save for boilerplating; 3) multiple-format line capability for changing margins easily in mid-document. With these enhancements, you will have a superb word processor in the XL 80.

The only glaring problem with the package that I reviewed was the incomplete documentation, which left out reference to the as yet undeveloped communications and calendar programs.

This package is a sound investment and a valuable enhancement for your C-64. I recommend it for any C-64 owner who needs to use professional-quality business application programs on a daily basis. *(Data 20 Corp., 23011 Moulton Parkway., Suite B10, Laguna Hills, CA 92653. C-64/$99 disk.)*

Margaret Morabito
***RUN* staff**

Mitey Mo

Do You Want To Get On-Line? Mitey Mo to the Rescue!

Mitey Mo, along with the Smart 64 Terminal software that is included, is one of the best telecommunications packages you can buy. Mitey Mo offers an impressive array of features, including auto-dial, auto-answer and auto-redial, plus something virtually unheard-of in the industry—a full three-year warranty.

The unit itself is compact and lightweight, plugging directly into the user port. Your phone line connects into one side of the modem, and your phone into the other side, using standard modular jacks.

The modem's only external moving part is a switch that allows you to select either Data, for when your computer is on-line or dialing, or Voice, so that you can interrupt the electronic conversation and input some of your own. When you are not using the modem, you can leave it plugged in without affecting the use of either your phone or computer.

The software included in the package gives you complete control over all communication parameters, and lets you select either full or half duplexing. (And if you're new to telecommunications, the documentation will quickly clear up any questions you might have.) In addition, the software's default settings for these parameters allow you to access most on-line services and bulletin boards immediately, without changing a thing.

With Mitey Mo, you can also upload and download text and program files. As information is downloaded from some outside source to your C-64, it can be stored in the modem's 28K buffer. When the buffer is full, you can automatically save the data as a sequential file on a specially-prepared user disk.

You can program function keys 1–7 with any message (up to 80 characters long) that you'd like to send with a single keystroke while on-line.

Other features include an on-screen clock with an audible alarm, numerous Help screens, user-selectable screen colors and the ability to automatically print the contents of the screen with a single keystroke while on-line.

Although Mitey Mo costs roughly twice as much as some other C-64 modems, when you consider the unit's many excellent features and the unbeatable warranty, it is easily the most outstanding value in telecommunications hardware available today. *(Computer Devices International, 1345 Doolittle Drive, San Leandro, CA 94577. C-64/$119.95.)*

Bob Guerra
Charlestown, MA

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HARDWARE

Q: I have a C-64, a 1541 disk drive and a Gemini 10X printer. I use Word Pro 3 Plus/64 and an 80-column board with a spreadsheet. I am interested in a portable system compatible with my 64. The SX-64 is a possibility if it is compatible with Word Pro 3 disks.

W. Russell Jones
Juneau, AK

A: I used an SX-64 for two weeks last summer and found it worked well with every Commodore 64 product I tried on it, including a word processor compatible with yours, and the Gemini 10X printer.

Though I've not tested the 80-column card you used on the SX, the Batteries Included BI-80 card works well with it on an external monitor. Now that the price of the SX has dropped markedly, I've bought one, and can't imagine why Commodore discontinued it.

As for alternatives, the only one I know of is a carrying case offered by the Computer Case Company of Columbus, OH. It holds a 64, 1541 and power supply in a sturdy wooden case that travels easily.

Q: When will Commodore's new Amiga Lorraine computer be on the market?

David Atkinson
Morrilton, AR

A: Commodore hasn't revealed that yet, but when it does...you'll hear about it first in *RUN*.

Q: What is meant by "protected by a dongle"?

Philip Ternes
Bismark, ND

A: In computer use, a dongle is a small circuit required by some commercial programs. Before you run the program, you insert it into a port of your computer. Companies use them to allow customers to copy their programs and prevent improper use of the copies. The copies are useless without the one dongle, and only one copy can run at a time. Most dongles are far more durable than disks, but must be protected from theft.

Q: I have had my 1541 disk drive for approximately one year, having little or no trouble with it. I am beginning to see more and more advertisements for disk drive cooling units. Are they really worth buying?

Darrell Dopkin
York, PA

A: If your drive were failing or constantly going out of alignment due to overheating, a cooling unit might help. Since your disk is working properly, just enjoy it. I'd only recommend a cooling fan or heat sink for a properly functioning 1541 if it were mounted where air can't circulate or where temperatures often exceed 90 degrees F.

Q: I am a VIC owner and want to know if the W65SC802 chip mentioned in the January 1985 Clinic will allow the VIC to run IBM or Apple programs from disk and tape without a large number of program modifications.

Kenneth Dewitt
Brooklyn, NY

A: No. You can't plug anything into a VIC to make it a 64, let alone an Apple or IBM. However, the newly announced Commodore C-128, due out as you read this, reportedly *can* load standard 80-column CP/M programs from a popular disk format, opening up the possibility of sharing programs and data among several brands of computer.

SOFTWARE

Q: Commodore has the most available software of any personal computer on the market. Has anyone developed an emulator to run Commodore software on an Apple or IBM PC-compatible computer?

Vince Rendenna
Rutherford, NJ

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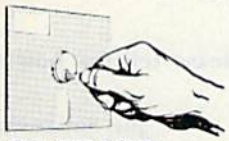

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A: You have no idea what joy your letter gave me. For seven years, I've put up with Apple owners bragging about good programs I couldn't get on my Commodore. If Commodore continues to outsell other brands, emulators will eventually appear. But I've not seen any yet, except for a public domain program, PET to Apple Loader.

This program allows cassette-based Apples to load unprotected Commodore programs from cassette, as long as they are written entirely in Basic. Unfortunately, it can't convert some Commodore options into equivalent Apple commands. This means you'll have to change some parts yourself and can't use it on the best Commodore programs; nearly all use machine language and special features extensively.

Q: When I try to run C-64 disks on my Plus/4, I get the message "Before running this program on an 8032, load the CBM 4032 program." What is this program, and is there a way to make C-64 programs run on the Plus/4?

David Okerberg
Santa Fe, NM

A: CBM 4032 is for 8032 users, not Plus/4. It temporarily converts a Commodore 80-column display to a 40-column display. Since the Plus/4 already has a 40-column display, you don't need CBM 4032. You may, however, have some trouble convincing your program of this fact.

As for making C-64 programs work on the Plus/4, most Basic-only programs that use Peek and Poke statements can be changed to use equivalent new Plus/4 commands. Those that use SYS or USR will probably need more extensive changes at the machine language level.

Q: Why are C-64 programs not compatible with the Plus/4?

Mike Ross
Plattsburgh, NY

A: Commodore's view is that the Plus/4's new and improved features, including a new chip design, are so different that incompatibility with the 64 was unavoidable and didn't matter, anyway, since the two machines were aimed at different markets. To my knowledge, the newly announced C-128 is the first model they've ever introduced that is fully compatible with software and hardware for an earlier model.

Q: I have recently become interested in machine language. When attempting to "fall below" Basic, it has become apparent that my 64 does not contain the monitor program. Could you offer suggestions as to how I could either trade in my 64 for one with a monitor or acquire a monitor program on disk?

Aaron Starr
Salem, OR

A: Almost any user group can supply you with a copy of Micromon or Supermon for the 64, on disk at little or no cost. Both are excellent learning tools for machine language. If you need a built-in monitor, the closest you'll come on the 64 is Eastern House Software's (Winston-Salem, NC) $25 cartridge version of Micromon.

PROGRAMMING

Q: I am having trouble making a program add up numbers the user enters, like this:

```
10 INPUT A$
20 INPUT B$
```

Could you please tell me how to do this?

Joe Sadauskas
Chicago, IL

A: There are at least two ways to add a column of numbers in Basic. One is just like your program, except

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that the string symbol ($) is left off the variable names, making them numeric:

```
10 INPUT A
20 INPUT B
30 ? A+B
```

The other approach keeps your original lines and uses the VAL statement to convert the string variables into numeric values for adding:

```
10 INPUT A$
20 INPUT B$
30 ? VAL(A$)+VAL(B$)
```

Q: Is there a simple routine that lets you count the keystrokes of the whole keyboard, display the count of each stroke in the corner of the screen, and, after a certain number of keystrokes, do something?

Eugene Vitale
South Bend, IN

A: Here's a simple routine to do this using the Get statement:

```
10 REM GET 9 CHARACTERS
20 M$=""
30 FOR I=1 TO 9
40 : GET K$
50 : IF K$="" THEN 40
60 : M$=M$+K$
70 : ? CHR$(19);I
80 NEXT I
90 ? M$
```

Now, can anyone do it in fewer lines with the little-known Wait statement?

Q: In my program, I repeatedly use the Gosub statement to access a subroutine I sometimes don't have to return from. As a result, I quickly get an Out of Memory error. I know there is a stack somewhere in memory that holds the return, and that I have to pop it to avoid filling the stack. The problem is that I don't know the Poke to do this. Can you help me?

Larry Cohen
Englishtown, NJ

A: Exiting a subroutine in any other way than via a Return statement at its end is a very bad programming practice that will bite you when you least expect. Don't do it!

Instead, set a flag variable to indicate your wish to change course in the program, exit the subroutine normally and branch from that point according to the value of the flag variable. Here is an example:

```
10 C$="FRED"
20 ? "WHAT'S THE PASSWORD";
30 GOSUB 100
40 IF F>0 THEN ?"GUESS!":GOTO 20
50 ? "WOW, WHAT FUN!"
60 END
100 F=0
110 INPUT A$
120 IF A$="?" THEN F=1:GOTO 150
130 IF A$=C$ THEN ? "CORRECT"
140 IF A$<>C$ THEN ? "SORRY"
150 RETURN
```

Q: I was experimenting with files on my Datassette, and it gave me a File Data error. What is it, and what did I do to cause it?

David Rainbolt
Marshall, AR

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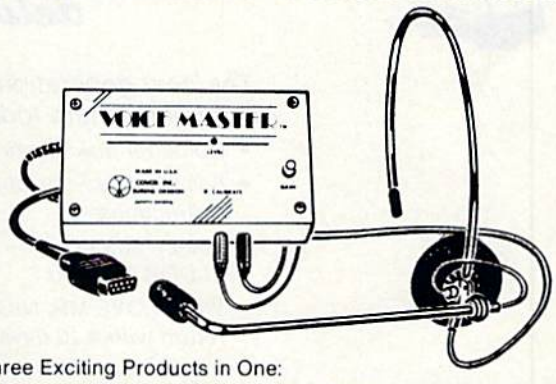

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A: This error is incorrectly identified in the VIC and 64 programmer's reference guides as a Bad Data error. What actually appears on your screen is the more descriptive phrase, File Data error.

However, Commodore's explanation of the error is correct. You were trying to read a non-numeric character into a numeric (real or integer) variable. It is the file-handling equivalent of Redo From Start, which you'll see if you attempt to do the same thing in an Input statement. One cure is to use only string variables when working with files, and use the VAL( ) statement later to convert those that must be numeric into proper form.

Q: I find I can't write to an individual field in a relative record (except the last field), without botching the record. How can I emulate the U2 command used with random files for this use?

John Menke
Mt. Vernon, IL

A: No need to emulate it—use it if you want. Relative records are stored in physical sectors that U2 can alter, just like any other file. You need only trace the pointers through one more step than with random files, including the side sectors in your calculations.

However, the proper way to edit a relative record is all at once—inside the computer, not on disk. Using a readily available public domain utility like String Thing, you can easily read a record of any size into memory, alter it with Basic's standard string-handling commands (Left$, Mid$, Right$), and finish by rewriting it with a single Print# statement.

Q: When we type out something in upper- and lowercase on the 64's screen and then want it printed on paper, it comes out in symbols rather than words. If you can help us better understand the use of the 64, my children and I will be very thankful.

Robert Preston
Roseville, MI

A: You already know that in order to make your screen show upper- and lowercase, you have to change your 64 from Graphics mode to Text mode, by simultaneously pressing the Commodore logo key and the shift key. What isn't clear to you yet is that you must also do the same thing to your printer, to switch it from graphics to text.

Unfortunately, you can't do it by pressing a key or two. Instead, you'll have to modify the statement in your program that establishes communication with the printer. Instead of entering

```
100 OPEN 4,4
```

you'll need to enter

```
100 OPEN 4,4,7
```

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Q: **I have been trying, unsuccessfully, to find a way to turn off the underline feature of my Gemini 15X printer from within a program. It requires CHR$(0), which appears to be lacking on the 64. Is there some way to use CHR$(0) within a running program?**

George Jorgensen
San Diego, CA

A: You are correct that the obvious method, press the CTRL and @ keys at the same time, fails to generate the expected CHR$(0). However, you can generate it another way. Simply choose another key you don't currently use in your program, such as &, and add a line to your program to turn it into CHR$(0).

```
100 GET A$:IF A$ = "" THEN 100
110 IF A$ = "&" THEN A$ = CHR$(0)
120 PRINT#4,A$;
```

Line 110 does that in the example above. Since your real goal is to generate a full command, you can extend this notion. On Epson-compatible printers, you turn off underlining by sending the printer three characters: CHR$(27) + "–" + CHR$(0). Therefore, let your program do all three at once:

```
100 GET A$:IF A$ = "" THEN 100
110 IF A$ = "&" THEN
    A$ = CHR$(27) + "–" + CHR$(0)
120 PRINT#4,A$;
```

REPAIRS

Q: **As a cardiologist, I am asking for a heart consultation in your medical clinic. The patient is my 1541 (two months old), which, suddenly, during reading a file, kept running and turned the red light on permanently. It now does only that, until I turn it off with the back switch. It seems like a cardiac arrest and ventricular tachycardia (forgive the analogy). Can you help?**

Lelis Borges do Couto
Rio de Janeiro, Brazil

A: I presume from the analogy that the failure was complete—that is, nothing loads anymore, neither the file you were using nor any other files, programs or directories. If this is not the case, there may be something wrong with your file-reading program, such as a failure to check the file-status variable ST for the end of file (ST = 64).

If everything is dead, I'd first try to return the drive for a replacement. In the U.S. at least, you still have a month of warranty left and can let your dealer take care of it. If that is not possible, find and try out another 1541. If it works, the trouble is in your 1541; if not, the trouble may be in the 64.

Next, if you find a cooperative 1541 owner, you could try swapping the removable chips on the two 1541 circuit boards, hoping some swap will make a difference. If one does, you've found the bad chip. Also use a volt meter to be sure the 1541 has power. If not, the 5-volt bridge rectifier may be bad, as mentioned in the February 1985 Clinic.

If swapping the removable chips makes no difference, you could try swapping the entire circuit board. If this doesn't help either, the trouble could be in the drive itself. By now, you'll be ready either to buy and install the needed part or to defer to the specialist's skills of your dealer.

Q: **If the power supply, the 64 or the 1541 overheat, how can you tell?**

Mike Gross
Bethlehem, PA

A: Smoke curling up out of the cooling vents would be a dead giveaway. (Computer chips run on smoke, and if the smoke ever gets out, they won't work anymore.)

Short of a fire, the clearest sign of a heat problem is a system that works well when first turned on, but fails anywhere from a minute to two hours later. One way to trace the problem is to cool the suspected device, with a fan or a can of Frost Test (although some folks recommend against using the latter on grounds it may cause a static shock to your chips). If the cooled device begins working properly again, you've found the trouble.

Q: **After two years of saving, I bought a C-64 last October. The "powerful sound capabilities" are what caught my ear. But it sounds more like clicks and pops. Is there any way to improve the output? When you connect the audio-out plug to a stereo, it just sounds like louder clicks and pops.**

Timothy Hinton
Buffalo, NY

A: Sounds like there's something wrong with your 64. You may have to return it. Most 64s have sound quality rivaling synthesizers that cost a good bit more than the 64. If you hadn't mentioned using your stereo with the 64, I'd guess that your TV was simply mistuned; that's the most common cause of poor sound on a 64 and takes only a quick twist of the fine-tuning dial to check. However, if you're getting bad results on a stereo, too, your SID (Sound Interface Device) chip may be sick. Try hooking up another 64; I think you'll notice a difference. R

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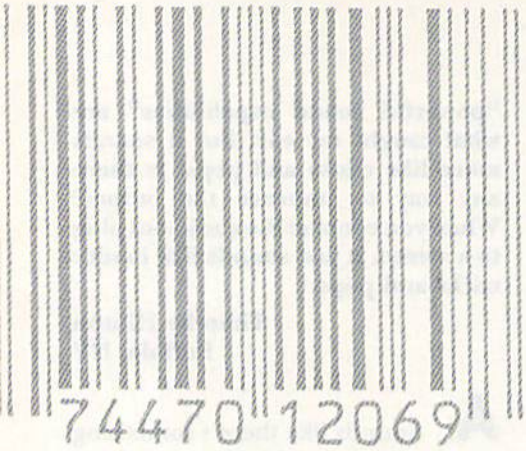

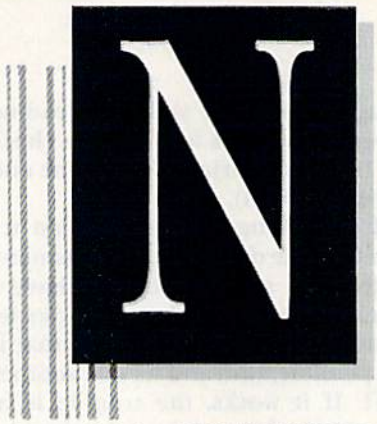

Compiled by SUSAN TANONA

MicolMon

MicolMon is a machine-language monitor and user-to-computer interface that is designed to help you debug your programs.

The device is compatible with the C-64 and retails for $24.95. Micol Systems, 100 Graydon Hall Drive, Suite 2301, Don Mills, Ontario, Canada M3A 3A9.

Check Reader Service number 400.

Valiant Turtle

The Valiant Turtle, a remote-controlled programmable robot, has been released by Harvard Associates (260 Beacon St., Somerville, MA 02143).

The turtle aims to make programming concepts accessible to children as young as pre-school age. Software that uses the Logo language is included in the package, which retails for $399.95.

Check Reader Service number 401.

Learn with Stickybear

Three titles from the Stickybear series of educational programs have been released for the C-64. These are Stickybear ABC, Stickybear Numbers and Stickybear Basketbounce.

Available on disk, retail price is $29.95 each. Xerox Education Publications, 245 Long Hill Road, Middletown, CT 06457.

Check Reader Service number 402.

HomeWriter 10

Epson America, Inc. (2780 Lomita Blvd., Torrance, CA 90505) has released the HomeWriter 10 dot-matrix printer.

The HomeWriter can produce many of the popular typestyles at 100 cps. Retail price for the printer and the C-64-compatible cartridge is about $320.

Check Reader Service number 404.

You Can Do Math!

You Can Do Math! is a junior-high level mathematics tutorial that is especially designed for students who have trouble with the subject.

The tutorial is available on disk for the C-64. Retail price is $49.95. Microtechnic Solutions, PO Box 2940, New Haven, CT 06515.

Check Reader Service number 405.

The Newsroom

The Newsroom is an educational program that allows you to create and print your own newspaper and introduces you to the many aspects of the newspaper business.

The program is designed for junior and senior high-school students, but can also be used in the home. It is available on disk for the C-64, for $49.95. Springboard Software, 7807 Creekridge Circle, Minneapolis, MN 55435.

Check Reader Service number 408.

Keyboard Crazy

Waveform Corp. (1912 Bonita Way, Berkeley, CA 94704) has released Keyboard Crazy, a program that introduces the fundamentals of music to children of ages four and up.

Four educational games are included in the package. It is available on disk for the C-64 and retails for $24.95.

Check Reader Service number 406.

Simpler Disk Operations

Software Intelligence Corp. (PO Box 1390, Spring Valley, CA 92077) has released Achiever, a program that provides menu-driven commands designed to simplify disk drive operations.

It is available for the C-64. Retail price is $29.95.

Check Reader Service number 407.

Trolls and Tribulations

Creative Software (960 Hamlin Court, Sunnyvale, CA 94089) has released Trolls and Tribulations, a strategy and action game for the C-64.

You must lead your trolls through underground caverns to recover centuries-old treasures. Available on disk, retail price is $24.95.

Check Reader Service number 409.

Applesoft Emulator

FSI Software (PO Box 7096, Minneapolis, MN 55407) has released

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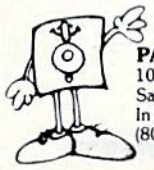

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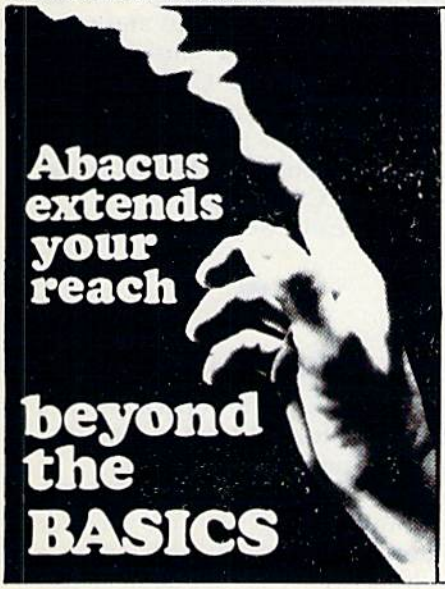

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ApSoft-64, which is an Applesoft emulator that allows you to run a variety of software designed for the Apple II family of computers.

The software is an extension to the C-64's Basic and adds many Apple commands to your computer's memory. It is available on disk for $39.95.

Check Reader Service number 410.

■

Hard-Disk System

Fiscal Information, Inc. (PO Box 10270, Daytona Beach, FL 32020) has released a new hard-disk subsystem and DOS for the C-64.

The system supports storage capacities from five to 144 megabytes and implements all 1541 DOS functions. The package consists of a cartridge-port interface, disk/controller subsystem and compatible software. Retail price is around $1500.

Check Reader Service number 403.

■

Plus/4 and C-16 Word Processor

Commodore Business Machines (1200 Wilson Drive, West Chester, PA 19380) has released Script/Plus, a word processor for the Plus/4 and C-16.

The package's capabilities include creating tables, automatic mail merge, underlining and bold print. Script/Plus is available on tape, disk or cartridge, for $50.

Check Reader Service number 418.

■

A Gem of a Challenge

Strategic Simulations, Inc. (883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043-1983) has released Gemstone Warrior, a strategy and adventure game for the C-64.

To succeed in your ultimate goal of capturing and returning the gemstone, you will need your greatest skills as an adventurer. The game is on disk and retails for $34.95.

Check Reader Service number 414.

More Summer Games

Summer Games II offers eight more ways for you to compete in the Olympic Games, from Epyx, Inc. (1043 Kiel Court, Sunnyvale, CA 94089).

Additional events include cycling, equestrian competition and fencing. The game is available on disk for the C-64. Retail price is about $30.

Check Reader Service number 411.

■

Slap Shot

Artworx Software Co., Inc. (150 North Main St., Fairport, NY 14450) has released Slap Shot Hockey, a game for the C-64.

The program features two-player breakaway action and a scrolling screen. It is available on disk for $19.95.

Check Reader Service number 413.

■

Music Videos

The Music Video Kit is a two-disk program that allows you to combine synthesized music and animated graphics, creating a music video.

The package is designed for the C-64 and retails for $49.95. Sight & Sound Music Software, 3200 South 166th St., New Berlin, WI 53151.

Check Reader Service number 412.

■

Panama Joe in Barbados

Parker Brothers (50 Dunham Road, Beverly, MA 01915) has released Barbados Booty, a game for the C-64 that is a sequel to Montezuma's Revenge.

Panama Joe returns, this time to battle the challenges of the sea in his search for underwater gems. The game disk retails for $20.

Check Reader Service number 415.

■

Blazing Paddles

Blazing Paddles is a software graphics package that you can use with such input devices as touch tablets, graphics pads and light pens. It is suitable for program development and creating charts, graphs and illustrations.

The program is available on disk for the C-64. Retail price is $34.95. Baudville, 1001 Medical Park Drive SE, Grand Rapids, MI 49506.

Check Reader Service number 416.

■

Musical Composition

The Music Shop is designed to be both a music composition tool, allowing you to create, edit and store compositions, and a music synthesizer that uses the C-64's musical capabilities.

Retail price for the disk is $44.95. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101.

Check Reader Service number 417.

■

MOD-1 Modem

Cardco, Inc. (300 S. Topeka, Wichita, KS 67202) has released the MOD-1 auto-dial/auto-answer modem.

Included with the modem is a full-function terminal software package on disk.

Check Reader Service number 423.

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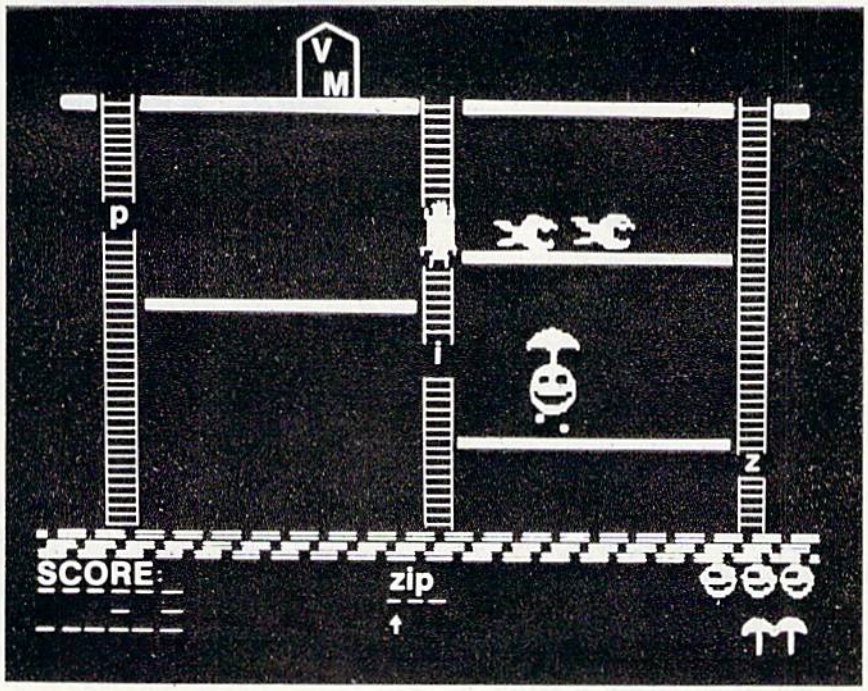
Bank Street StoryBook

The Bank Street StoryBook allows children ages eight and older to create their own stories, using animated text and graphics.The completed story can be viewed on the C-64's screen or printed out in book form.

The disk retails for $39.95. Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062.

Check Reader Service number 419.



Mega Management

Mega-Base I is a database manager that will handle both personal and small-business accounts, and offers such features as deposit and withdrawal listings, account balancing and scanning for a particular check.

The program is available on disk for the C-64. Retail price is $19.95. Mega-Systems, PO Box 415, Spring House, PA 19477.

Check Reader Service number 422.

The Great Word Chase

DLM Teaching Resources (One DLM Park, Allen, TX 75002) has released Boppie's Great Word Chase, an arcade-type game that teaches word recognition, word creation and spelling.

The eight levels of the program offer words appropriate for grades 1–8. It is available for the C-64 at $29.95.

Check Reader Service number 425.

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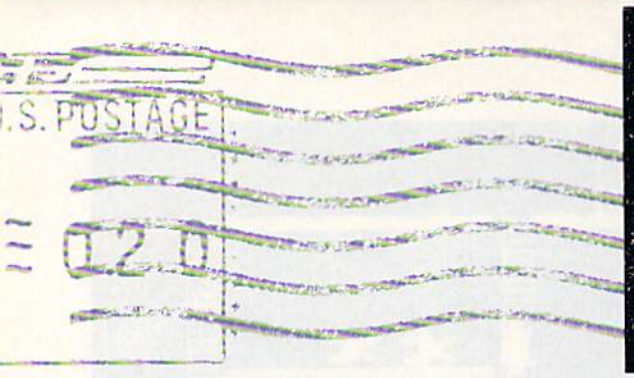

A Real Joy!

Thanks for the great articles on joysticks in your February 1985 issue. I used what I learned from Mark Jordan's article ("The Real Story Behind Joysticks") to figure out how to read my Intellivision joystick. I couldn't believe how easy it was!

Philip Crabb
Harvey, LA

A Morale Booster

The executive board of the Castle Commodores would like to thank you for mentioning our user's club in your magazine, especially the lucky 13th issue! I have received about 15 phone calls in less than two weeks—a boost to the morale of any club.

I also want to thank you for being the only one of four magazines to keep the club information correct in the new year.

Dean G. Thomas, Secretary
Edinburg, PA

Outstanding Database

I have just finished typing in Mike Konshak's Datafile, DFMail and DFReport ("Datafile" and "Datafile II," November and December 1984), and it is with a sincere thrill that I write to say *outstanding*!

Mike Konshak is to be highly commended for his efforts and admired for his talent. This program is probably the best I have found in any magazine and is already at use in my business applications as well as my personal library.

David A. Rice
Sterling, IL

Rather than type in Mike Konshak's Datafile program, I purchased a copy from the author. I promptly received the disk along with a small form letter informing me that the program now included some improvements and apologizing for any delay in receipt.

It took only a minimum of references back to the articles before I had the program down pat. I found it easy to use and a real bargain ($8 including the cost of the disk and shipping). Datafile is at least as useful as some commercial file managers that cost $20 to $30.

I have been very pleased with the friendly professionalism Mr. Konshak has shown in our dealings. *RUN* is to be complimented on its choice of authors. I hope to see more of such serious and useful programs in your magazine.

Bruce D. Alt
Orlando, FL

One Man's Cure: The Plus/4

I enjoyed Margaret Morabito's article "The Plus/4's Spreadsheet and Graph-maker" (February 1985) very much indeed.

I am 36 years old and a professional hospital administrator. Over the years, I have administratively led the fight for computerization of any facility that I have managed.

I received a Plus/4 for my birthday in late October 1984. Through perseverance and many hours of studying and using the Plus/4, I am today the proud founder of HospiServe, my own company. In four short months, a birthday gift called the Plus/4 has transformed my life from an employed executive to master of my own fate, creator of my own destiny!

The doomsayers and ne'er-do-wells (and even Commodore, I'm afraid) have proclaimed the death of the "turkey Plus/4"! It makes me so angry! The Plus/4 has been compared in print to an Edsel automobile. However, there was absolutely nothing inherently wrong with the Edsel. In fact, it utilized Lincoln technology and was actually very much ahead of its time. The error was in the Ford Motor Company's marketing.

While I admit that Commodore made some mistakes with the Plus/4, every one of them can be traced directly to Commodore's lack of support for the machine—another marketing error. The gripes voiced by some C-64 users could easily be cured via enhancements at a nominal cost to current registered owners and by building them into future production. The C-128 is Commodore's current obsession, and the poor Plus/4 is proclaimed to be already a collectors' item.

I know that, in the future, I must acquire for my company a second, more sophisticated system, such as a 16- or 32-bit CPU, which allows multiple users. However, if Commodore's deliberate "compucide" of the Plus/4 is any indication of their support to consumers, you can bet the new system will most assuredly be another brand, like IBM or Tandy, and *not* Commodore!

Jack D. Rash
President of HospiServe
Arlington, TX

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How to type listings from RUN

Typing in listings can be difficult enough without having to worry about strange graphics characters, charts or tables. That's why we decided to make it easy to enter listings from *RUN* by translating everything we thought might be confusing in any program.

When you see something between the curly brackets, all you have to do is press the keys indicated. For example:

{SHIFT L}—means hold down the shift key and press the L key at the same time.

{COMD J}—means hold down the Commodore key (it is on the lower left side of the keyboard) and press the J key at the same time.

{SHIFT CLR}—hold down the shift key and press the CLR/HOME key.

{HOME}—press the CLR/HOME key without shifting.

{CTRL 6}—hold down the control key and press the 6 key.

{FUNCT 2}—function 2 (in this case, you hold down the shift key and press the function 1 key).

{CRSR UP}{CRSR DN}{CRSR LF}{CRSR RT}—these are the four cursor directions.

{UP ARROW}—means the arrow key (the one with the pi sign under it).

{LB.}—the British pound sign (£).

{PI}—the pi sign key (π); (shift and press the up arrow key).

Our translating program does not designate single spaces between characters. Within quotations, these spaces are often critical to the screen display. Be sure to read the listings closely and include these single spaces as you type in your program.

In some instances, when a large number of characters or spaces are repeated in a listing, we will represent them this way: {22 spaces} or {17 CRSR LFs}.

Print vs Print#

RUN readers should be aware of difficulties that may arise when entering listings that contain the PRINT and PRINT# commands.

These two commands may look very similar, but they are different. If, for example, you use a question mark (?) to abbreviate PRINT in a line such as 10 PRINT#4,A$, then you are signaling to the Commodore computer that you are trying to print the variable #4, which is not a legal variable name.

The command PRINT#4 actually means "print to file number 4." You can abbreviate PRINT# by hitting the P key and the shift and R keys at the same time and then entering the file number. But *do not* abbreviate PRINT# with a question mark.

If you think of PRINT as one command and PRINT# as an entirely different command, then you should have no problems.

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RUN AMOK

Item: There's a potential problem in the Money Manager program (March 1985, p. 26). When the program calls for you to enter years and months, enter the number of years plus the *number* of any additional months, from 0 (if the number of years is exact) to 11. Some entry for the months must be made, or you may get an error.

Item: In the Mystery of Lane Manor (October 1984, p. 70), in order to get to 8 on the step generator, you must delete line 2220 from the program. It is of no use in the program.

Item: Magic trick $172 (January 1985) has some serious limitations. The protection method disables the computer's ability to find program lines numbered lower than the current line. As a consequence, Goto and Gosub statements involving lower-numbered lines cannot be executed. A similar problem exists with Read statements. The trick *will* protect your program, but only if it does *not* involve backward loops and Read statements.

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June

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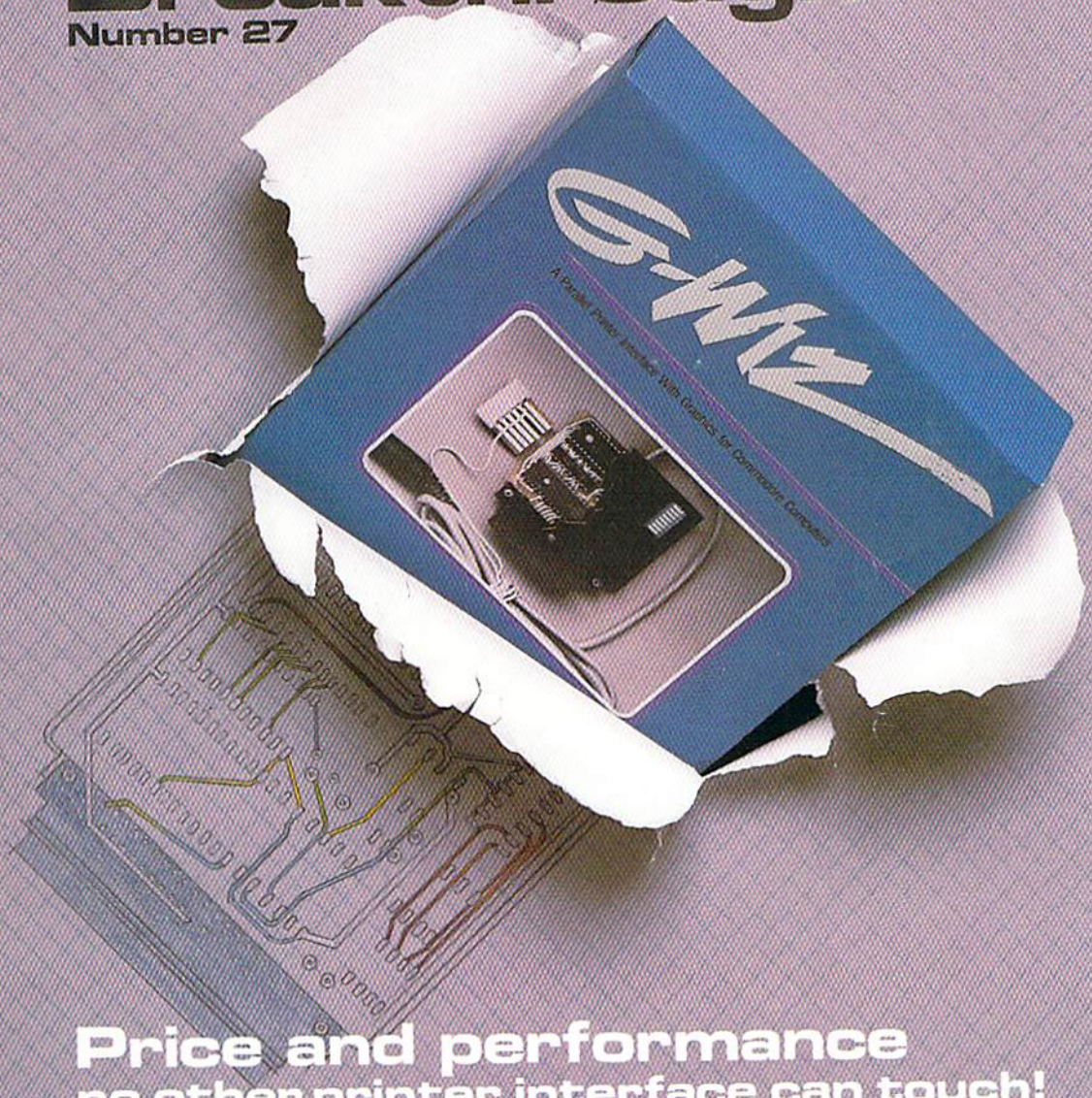

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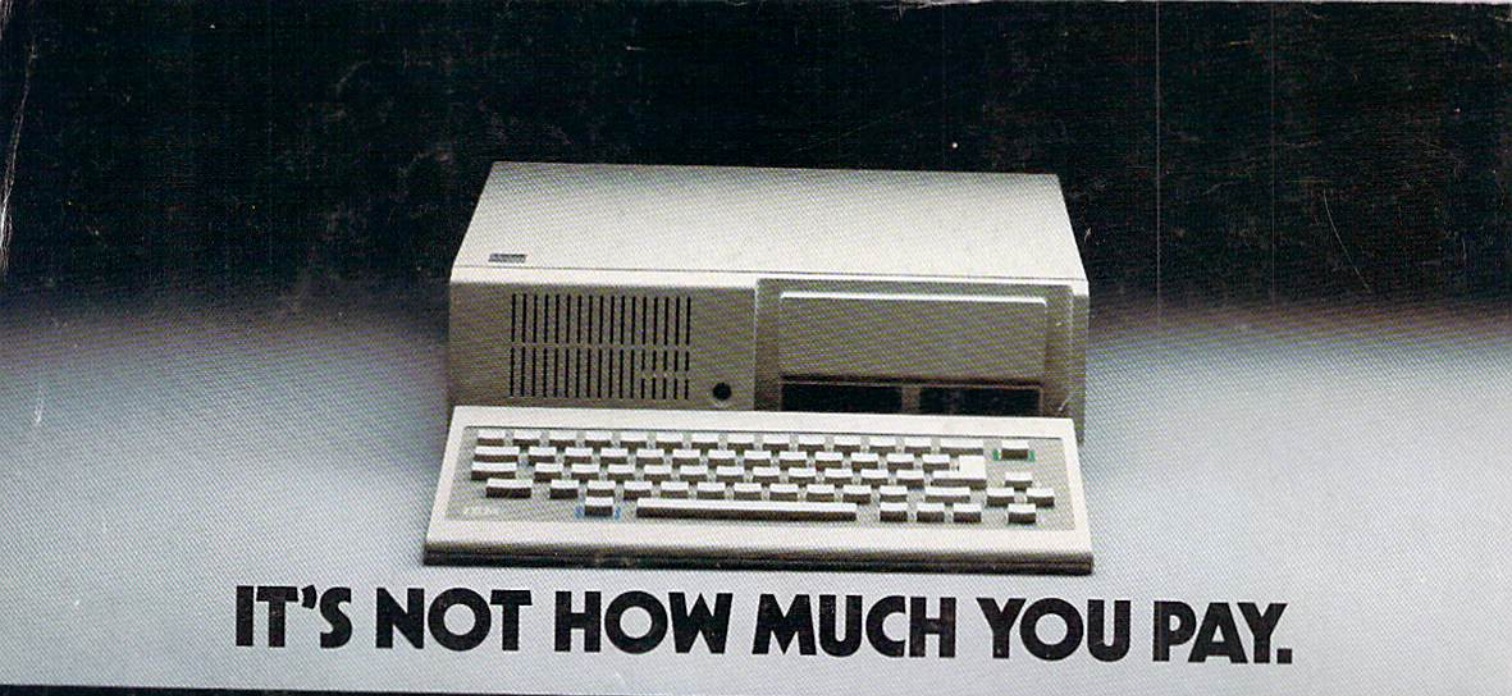

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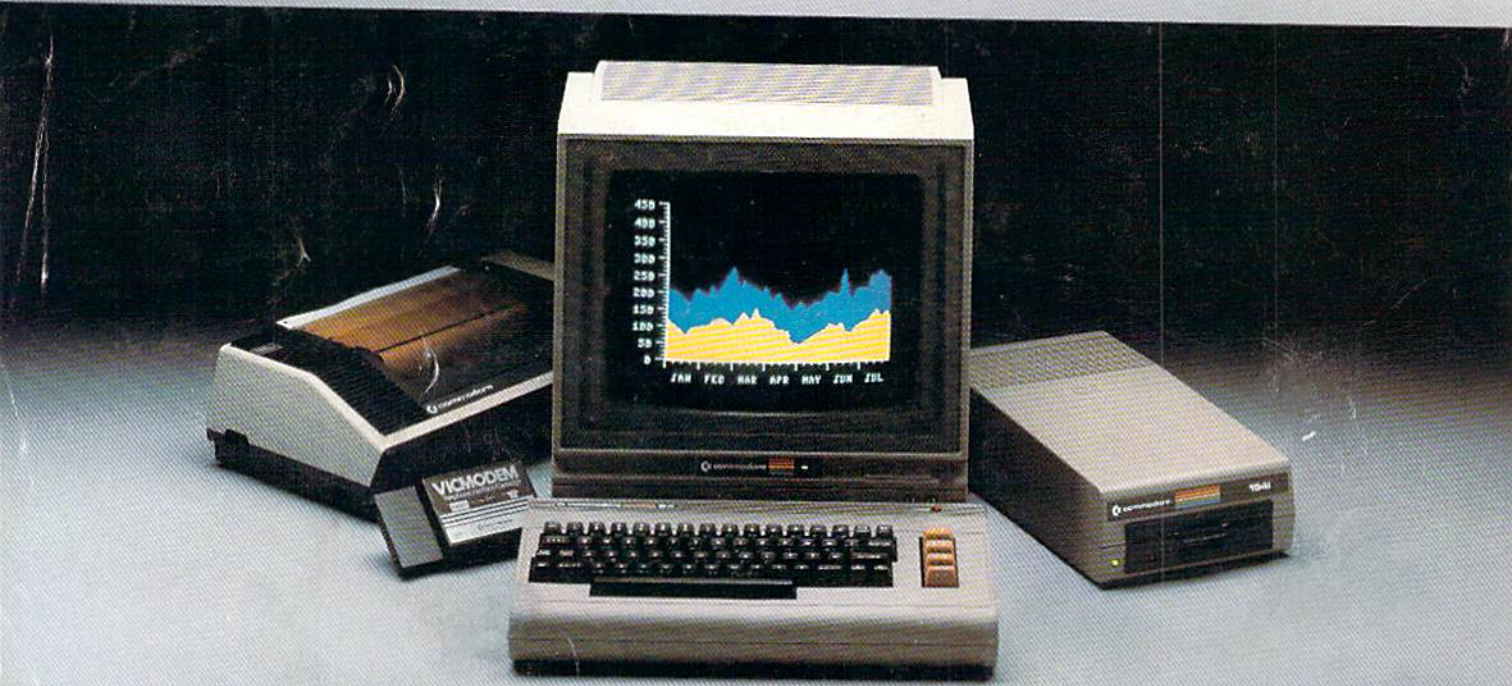

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