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spouse of number 1 must be given the ID number of 256. All nondirect spouses, children, and children's spouses must be given IDs between 257 and 597, and the numbers don't correspond to relationships. ID numbers 598 and 599 must be given to the father and mother of the spouse of number 1 (ID number 256).

Arbor-Aide provides appropriate prompts when disks should be swapped. It also provides setup charts to list cities and churches with three-letter codes. These codes are used in edit mode, and when the chart is printed, they'll translate to the full city or church information. The manual instructs you to enter dates in a certain manner (ddmmyy), you have to enter the city and church three-letter codes in lowercase, religions are given a one-letter code, and the number of children must be in two digits (02, 08, 11). There are fields for occupations, military affiliations, sources, and notes.

Each data disk has ID numbers from 1 to 599. The disks cannot be linked automatically for long ancestor charts. Even though a data disk can store information on eight generations, you can only print a five-generation ancestor chart.

Arbor-Aide produces a number of charts, including the standard ances-

tor chart and family group sheet. You also have the choice of including sources/notes on a separate disk. You need only to enter the ID number of the ancestor you wish to be in position 1, and the chart is printed with each of the ancestors positioned appropriately. You may choose to have surnames printed in capital letters or in upper- and lowercase. An alphabetical list of each data disk can also be generated and printed. The ability to search for a name in your data instead of a number is another useful feature.

Family Roots

Family Roots (\$225) from Quinsept is among the more advanced genealogy programs for Commodore machines. Besides a program for the 64, the software is also available in a 128 version. In 128 mode the program makes use of the function keys, which can be programmed for quick entry of repetitive information, such as place names or surnames.

You enter or edit information about individuals and then link them to others by using their ID numbers. You may assign the numbers or let the computer do the assigning. Data fields for each person are established by name, birth date and place, death date and place, current address, father, mother, number of marriages,

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each marriage there's room to list the spouse, marriage date and place, and marital status. For each child, you enter the appropriate ID number. I particularly like the way the records complement those of spouses, children, and parents. For instance, if I enter the 13 children of one ancestor, the program automatically places the same information in the record of the other parent and puts the parents on the corresponding field for each child.

There are up to nine fields that can be defined for your own information. You could include such information as military service, medical records, burial date and place, occupation, religion, your own numbering system, godparents, and so on. Any field in the program can be footnoted, which is nice for including the source of some data.

Once data is entered and stored, it can be used in any of the programs to make lists, charts, group sheets, person sheets, and much more. There's no limit to the number of people that can be entered, nor to the length and format of information. You can use an unlimited number of data disks. You can use up to four disk drives, in any combination of 1541, 1571, or 1581.

In the descendants chart, which is great for sharing data with others in

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the same family, you have the choice of whether to include information on spouses. You can print standard four- and five-generation pedigree charts and have them linked and numbered automatically. You can select free-form charts that print generations to fit the width of your paper, and you have the choice of which personal information to include in the charts, person sheets, and group sheets.

Printer information is determined once and then saved in a printer file. Printing can be done on various widths from labels and 3 x 5 cards to 15-inch-wide paper, with fonts and pitches determined by your printer. For further convenience, you can print data to disk and then incorporate it into your word processor.

Family Roots costs considerably more than the others mentioned in this article, but it will probably fit the needs of a more experienced genealogist. It's designed so the genealogist can use it in a way that's already comfortable and personal. It contains many more features than I've been able to describe here.

If the full program is more than you need, limited versions of *Family Roots* are available. If you start with one of the smaller versions of the program and decide later to upgrade to another *Family Roots* package, you won't have to retype your data. It can

be imported to the new program. If you change to another brand of computer, you also have the capability of transferring your genealogy data from 64 to 128 format—and even to MS-DOS.

Family Roots users share their ideas and uses of the genealogy program through a nonassociated support group, Quinsept Users Group News-

For more information about the products mentioned, contact the publishers listed here.

Arbor-Aide
 Software Solutions
 7378 Zurawski Ct.
 Custer, WI 54423
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 PFA
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- THE TOOLBOX / 6 (6184) - 40 utilities for all your PC needs.
- THE TOOLBOX / 7 (6185) - 60 utilities for all needs.
- THE TOOLBOX / 8 (6186) - 40 utilities for all needs.
- C-128 UTILITIES / 2 (6051) - Disk house-keeping, screen dumps and autoboot making.
- C-64 PROGRAMMING / 1 (6092) - Introduction to Basic programming, C-64 memory map & asst. utilities.
- C-64 UTILITIES / 1 (6087) - Assorted utilities including 4 Minute Copy, Color Test, Disk Tidy, Envelope Label, Printer Test, and more
- C-64 UTILITIES / 2 (6085) - Including Boot Maker, Data Writer, Disk Copy All, Directory Sort, Disk Catalog System, Sprint, Disk Checker, Fun Print, Fast Format, Times Square and more.
- COPY DISK (6004) - Several copy programs and disk utilities.
- DISK SYSTEMS (6219) - Disk system utilities to manage disks.
- DISK AND FILE UTILITIES (6218) - Including Mailman, File Manager, Disk Helpers, V Fast File Copy, Superclean, Ultra, Urzip, and more.
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- HAL (6220) - Home Application Library System. Req. printer.
- MENU MAKERS (6003) - A collection of menu making programs.
- OMNI SYSTEM (6217.2) - (2 disk set) The OMNI system of utilities.
- PS GRAPHICS LABEL MAKER (6016) - This is a collection of menu-driven label makers using Print Shop graphics.
- UTILITIES (6222) - Various utilities to manage your Commodore PC.

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letter. New items and product information of general interest are announced in a bimonthly newsletter. Many users share utility programs that they have created and ways of using and sharing *Family Roots* data.

All of the above programs were designed by programmers who also are genealogists. Before you enter generations of data, however, it's best to check out any program with a short test. When you first try a program, enter only 40-50 names with data, and then print out a few charts to see how the program fits your style of keeping information.

In all honesty, I didn't get any of these programs up and running the first time without some assistance and/or rereading of the manual. With a little care, though, I'm sure you'll find your 64 or 128 can be a tremendous aid when it comes to managing your family's data. Good luck, and great searching as you climb your family tree meeting new ancestors. □

Audrey Cox Vogelpohl is an administrative secretary at Rainier Beach High School in Seattle, Washington. She's a member of the National Genealogical Society, Seattle Genealogical Society, Seattle Genealogical Society Computer Interest Group, and several other regional organizations. She answers genealogical questions on QuantumLink, where her handle is AudreyV.

GAZETTE READERSHIP SURVEY

What do you like most about Gazette? What don't you like? We want it to be as useful and interesting as possible and to provide you with the coverage you want. Please take a minute to fill out and mail us this questionnaire. (Photocopies are fine.) Some questions may require more than one answer.

Mail questionnaires to Gazette Readership Survey, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

1. Which computer(s) do you own/use regularly at home?
 64 128 Amiga IBM/compatible
 Macintosh
At work? 64 128 Amiga IBM/compatible
 Macintosh
2. How long have you owned your 64/128?
_____ years _____ months
3. How many hours per week do you use your computer?

4. Do you plan to buy another computer this year?
 Yes No If so, what kind? _____
5. Do you use an online service? Yes No
If so, which one? _____
How many hours per month? _____
6. Which of the following peripherals do you own or use with your computer?
 Dot-matrix printer
 Letter-quality printer
 Modem
 Memory expansion
 Joystick
 Mouse
 Other (specify) _____
7. What topic would you like for Gazette to cover in an upcoming issue?

8. How do you get *COMPUTE*?
 Newsstand
 Subscription
 Subscription to *COMPUTE* and *Gazette Disk*
 Friend
 Other
9. What is your total household income?
 <\$20,000 \$20,000-\$30,000 \$30,001-\$50,000
 \$50,001-\$75,000 \$75,001-\$100,000 >\$100,000
10. Do you purchase hardware/software by mail order?
 Yes No
If so, how many times per year? _____
11. Do ads in Gazette significantly influence your buying decisions? Yes No
12. Are you satisfied with the *Gazette Disk*? Yes No
How could we improve it? _____
13. Would new 64/128 disk products at affordable prices interest you? Yes No
14. Do you use programs published in Gazette?
 Yes No
If so, how do you obtain them?
 Type them in
 Gazette Disk
 Other
15. What types of programs would you like to see in Gazette? _____
16. Do you belong to a user group? Yes No
17. How do you feel about our new magazine format?
 Like it
 Don't like it
 Undecided
18. Which columns do you read regularly?
 64/128 View
 News & Notes
 Feedback
 Beginner BASIC
 Programmer's Page
 Machine Language
 Features
 Type-in programs
19. Would you like to see more GEOS pages?
 Yes No Undecided
20. How do you use your computer? Use additional paper if necessary. _____



FEEDBACK

EDITORS AND READERS

In Support of Faster Chips

I am writing in response to a letter by John H. Colvin (October 1990), who wanted more speed from his 64. John pointed out that there are internal enhancement chips for the Apple II line of computers that allowed those computers to operate as fast as 10 MHz.

Since the Apple uses the same family of microprocessors as the 64/128, these chips could also be made for our computers. Installed as internal modifications, they would not tie up the overworked expansion slot as does the Schnedler Turbo Master. They could also be designed to work with RAM expansion units and the forthcoming RAMlink from Creative Micro Designs.

Representatives at Schnedler and CMD said they felt that Commodore owners were not interested in a faster processing speed that would require them to open their computers, thus voiding the warranty, and spend as much as the upgrade would cost. As an owner of JiffyDOS and a CMD HD-40 hard drive, I have no qualms about opening my computer or spending cash. The very existence of Schnedler's Turbo Master shows that there is an interest in faster processing speeds. Perhaps if more users such as John and I showed an interest, we could convince companies to support our computer. If anyone would like to have more information about the Apple chips or to try to convince these companies to support us, please contact me.

JOE TOM COLLINS
1545 ARCHER RD., APT. 5F
BRONX, NY 10462

Grounded

I recently lost my *F-15 Strike Eagle* user's manual that contained information about the controls and how to switch between different weapons. It also contained the access code to the game, which I can't remember. I would especially appreciate it if you could send me some information about the game, especially the code.

CEM KIBAR
PAPAKURA, NEW ZEALAND

We contacted Kathy Gilmore, a spokesperson for MicroProse, the company that publishes F-15 Strike Eagle. She said MicroProse would be happy to replace your manual if you would send her your disk to prove it's an original MicroProse product and not a copy. The company's address is 120 Lakefront Drive, Hunt Valley, Maryland 21030.

Who's the Real Artist?

I am sorry to burst your bubble, but that Picture of the Month, *Natalie*, in the November issue of "Gazette Gallery" came with every *Doodle* disk ever made. Now if Wayne Schmidt is the original artist, he deserves the \$50. If not, he cheated you out of the money. Someone at the new *COMPUTE* needs to do a little more research on this one.

STEVE KNIGHT
WHITEHOUSE, TX

You may have seen Natalie before, Steve, but our copy of Doodle doesn't have her picture on it. When we first started "Gazette Gallery," we contacted several talented artists and asked for submissions. Wayne Schmidt, who is indeed the artist who created Natalie and numerous other pieces of art for various software products, gave us permission to use her picture. By the way, since his picture was selected as Picture of the Month, Mr. Schmidt received \$100. Other pictures that appear on disk are paid \$50. We use several pictures each month, and we encourage submissions.

Mail-Order Mixup

I have just finished reading your article Mail-Order Maze (October 1990) and have just one complaint. You stated that you must supply a street address to mail-order firms because UPS will not deliver to a post office box address. Please allow me to share some little-known facts about this. UPS will not deliver to a post office box in large population centers but

will deliver to box holders in isolated rural areas and towns of small population.

I have had a lot of trouble from companies that refuse to do business with me due to this misunderstanding of UPS policy. I have even been accused of attempted mail fraud when I try to explain this to some firms. In all fairness, some companies—including Computer Direct, Tenex, Lyco, and Software Discounters of America—are capable of listening to reason. Please share this with your readers.

THOMAS TEJEDA
FORT STANTON, NM

When we checked with UPS, a spokesperson said that UPS is not allowed by law to make deliveries at a mailbox or any other U.S. Mail location. UPS will make deliveries in rural areas if the local driver happens knows where the post office box holder actually lives. In other cases, UPS recommends including your telephone number with an order and asking that it be included on the shipping label. When the parcel arrives in your town, the local UPS office will then call you and request delivery instructions.

Where's the Group?

I can't find anybody in my area who has a 64 and uses it as a primary computer. If any Gazette readers have a 64 and live around Tuscaloosa, Alabama, please let me know.

BRANDON PIERCE
1520 57TH AVE. E
TUSCALOOSA, AL 35404

We checked our user group records but were unable to find one listed for your city, Brandon. If you don't have any luck, you may want to contact the group mentioned in this next letter.

I live on an island with 73,000 people that doesn't have a Commodore user group. So last year I joined a group that does everything by mail. It has about 200 members worldwide and



FEEDBACK

publishes a bimonthly newsletter. Twice a year it mails a membership list that contains addresses and biographies. Members are encouraged to find others with similar computing interests and to correspond. This group is perfect for those who don't have access to a user group or who cannot attend meetings in person.

For more information contact Jan Nance, Meeting 64/128 Users Through the Mail, Rt. 1, Box 151, St. Joseph, Illinois 61873.

BRIAN P. VAUGHAN
ALAMEDA, CA

Relative Files

I own a 64 and a 1541 disk drive. I have pretty well mastered programming and using sequential files, but I have been unable to program a relative file from the instructions as stated in the 1541 user's guide. Could you give me some help?

EUGENE R. CARSON
HEMLOCK, MI

Here are a couple of short programs that should get you started with relative files. The first program creates a relative file and then asks for a filename and a record length. If you're creating a mailing list, for example, make sure your record length contains enough spaces for each name and address. Type 99999 when you're ready to quit.

The second program reads relative files. When you run it, supply the filename that you created earlier. It will retrieve the records you saved by their record numbers. These programs can be easily modified for your personal requirements.

```
SB 100 OPEN15,8,15
RF 110 PRINT"REL. FILENAME":IN
      PUT NS
XF 120 OPEN 1,8,2,NS
AS 130 INPUT"RECORD#";R
JB 140 IF R=99999 THEN CLOSE 1
      :END
CB 150 RH%=R/256:RL=R-RH%*256
QS 160 PRINT#15,"P"+CHR$(2)+CHR$
      RS(RL)+CHR$(RH%)+CHR$(1)
JQ 170 INPUT#1,R$:PRINT RS
RS 180 GOTO 130
```

```
SB 100 OPEN15,8,15
RF 110 PRINT"REL. FILENAME":IN
      PUT NS
XG 120 PRINT"RECORD LENGTH":IN
      PUT L
AB 130 OPEN 1,8,2,NS+"L,"+CHR$
      $(L+1)
QS 140 INPUT"RECORD#";R
QA 150 IF R=99999 THEN CLOSE 1
      :END
```

```
SC 160 RH%=R/256:RL=R-RH%*256
SG 170 PRINT"RECORD":INPUT RS
GQ 180 RS=LEFT$(RS,L)
KA 190 PRINT#15,"P"+CHR$(2)+CHR$
      RS(RL)+CHR$(RH%)+CHR$(1)
      )
ES 200 PRINT#1,R$
HX 210 GOTO 140
```

No Tune-Up Needed

I have a 128D and spend about two hours every day on it. I could afford a 16-bit machine, but recently when I went computer shopping for an upgrade, I decided to buy another 128D. I found it's all the computer I really need. I gave my old computer to my son, but before I did, I took it into a computer repair shop for a tune-up. I am proud to say that the shop called and said my old 128D didn't need anything done to it. It was working just fine. That's after four years and an average of two hours per day usage. With that kind of reliability, who needs anything else?

I would like to thank you for continuing your support of Commodore products. I am looking forward to receiving my new subscription of *COMPUTE*, as I have confidence that the new change will be a quality and lasting cornerstone of your publication. I will continue to buy *COMPUTE* as long as the pages that are important to me are printed within your covers.

MICHAEL GILLETTE
CARPENTERSVILLE, IL

Not the Green Frog

Most of my programming is done in Fortran, C, and Pascal on an IBM, and then I upload to a VAX mini for compiling and debugging. I use a shareware package that uses the Kermit transmission protocol to upload to the VAX. I was wondering if there is any such software for the 64 that would allow me to use the Kermit protocol? This way I could use the editor on a word processor to type in my programs and upload a text file to the VAX.

RHODY R. HOLTHAUS
GLEN BURNIE, MD

Kermit is an advanced file-transfer protocol developed at Columbia University that guarantees that data will be transferred correctly over telephone lines. Kermit supports a batch mode that permits multiple file transfer without the user's intervening. We published a telecommu-

nications program called KTerm (December 1989) that uses this transmission protocol. Back issues of the magazine and the disk are available for \$6.00 and \$11.95 respectively, or you may purchase both for \$12.95 through our Greensboro office.

Help Doesn't Help

I have a Final Cartridge III for my 64 and find it very useful. In fact, it's almost always in my expansion port. The BASIC extender, however, has a mysterious HELP command that is not mentioned in the instruction book and when executed doesn't seem to have any effect. Do you know anything about it?

DAVID RICHARDS
NIDDRIE, VIC.
AUSTRALIA

It's a mysterious command, David. It's mentioned on the cartridge's package and listed as an option on the desktop's pull-down menu but nowhere else. Art Hunkins, who reviewed the product (January 1990), says Replace is another mysterious and spurious command that's mentioned but does not actually appear on the cartridge. Presumably it's a search-and-replace feature that he would've liked to have seen. Hunkins checked with the U.S. distributors of this Dutch import, and they feel these commands were planned in the upgrade from version II but were never implemented.

No Notification

When *COMPUTE's Gazette* stopped publishing last summer, it came as a complete shock. I thought I would have to go buy that "other" magazine. I'm glad that I'll still be able to monitor the Commodore market while stationed here in Europe. Why weren't *Gazette* readers informed about the merger with *COMPUTE* before the last issue hit the newsstands?

STEVEN L. WILKEY
U.S. ARMY, EUROPE

When General Media purchased COMPUTE Publications, we weren't sure what changes were in store for our four computer magazines. The new format was still in the planning stages after the final issue of the old Gazette (June 1990)



FEEDBACK

went to the printers. As plans developed, subscribers were informed in July of the impending changes; we sent them a letter of explanation and a copy of OMNI magazine, another General Media publication. There was no way, unfortunately, for us to notify readers who buy the magazine from newsstands.

How About Those Kits?

I've been trying to find out why I can't save, copy, or format any disk. I get a lot of 21 and 22 read errors, and it's very hard to track them down to one error. If it's a head alignment problem, have any of your readers had success with any of the alignment kits that I see advertised?

JAMES TILLMAN
CALUMET PARK, IL

If your drive can load some programs, a directory, or anything at all, then its electronic components are probably operating satisfactorily.

ly. This often indicates a head alignment problem. Alignment should also be suspected if you have problems formatting a disk, loading commercial software, or loading a program that was saved to disk on someone else's disk drive. We've heard mixed reports about the disk drive alignment kits that are on the market. One Commodore repair person we contacted said he sees a lot of drives that have been knocked further out of alignment by owners who try to align them with such kits. He says nothing beats an oscilloscope for aligning disk drives, but it's a piece of equipment not often found around the house.

If you have a question, comment, or problem, we want to hear from you. Send your letters to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

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D'IVERSIONS

F R E D D ' I G N A Z I O

Years ago I saw a picture of a computer chip, an enlarged image of a computer's RAM (Random Access Memory). I was so inspired by its likeness to an aerial photograph of a city that I wrote a book called *Katie and the Computer* (Creative Computing Press, 1979). The heroine of the book, Katie, shrinks down to microscopic size and falls through the picture screen of the computer, somewhat like Alice falling through her family's looking glass.

Katie, like Alice, discovers a kind of wonderland on the other side of the computer looking glass. It is the world of Cybernia, where city streets take the place of computer circuits and Flower Painters perform the functions of a graphics paint program. Katie and her friend the Colonel (the computer's operating system) narrowly escape the clutches of a giant program bug which ambushes them and tries to snare them with his bubblegum lasso.

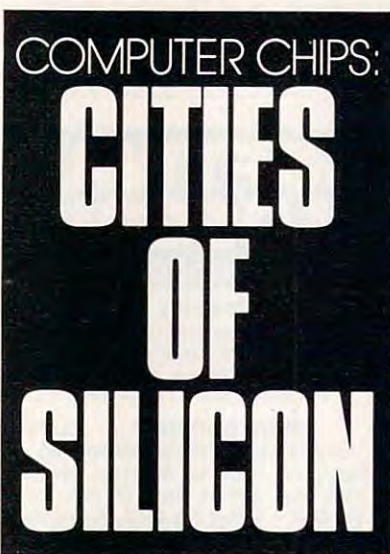
Katie fetches the Flower Painters by parachuting (direct-access style) onto the uppermost balcony of RAM Tower. They take a bus to an open-air stadium (the TV picture tube) filled with cheering crowds. They watch as three ancient pirates' cannons (the electron guns) blast glowing paint—red, green, and blue—to burst into beautiful, exploding flowers splattered across the nighttime sky. Katie returns home from Cybernia by bravely crawling into one of the cannons and being fired into the heavens.

The chip that inspired me was the old Motorola 68000 CPU. Motorola has released several newer, more complex versions of the chip, including the 68010, 68020, 68030, and 68040. Intel, Motorola's competitor, has also kept pace with the 8086, 80186, 80286, 80386, and 80486.

The advances have been prodigious. Intel, Motorola, and other chip makers can now fit over a million transistors on a single chip. Under a microscope one of these chips resembles a beautiful city, constructed out of gleaming silicon. With a little imagination you can see wide boule-

wards, tree-lined avenues, parks, squares, railroad yards, subways, factories, even circus parades!

The Wall Street Journal reported recently on a new AT & T chip. The chip is described as revolutionary because (1) it will allow a computer to manipulate full-motion video, human speech and high-fidelity sound, and realistic three-dimensional animations as easily as today's computers juggle numbers and words; (2) it will work on all major brands of personal computers, including Commodore, IBM, and Apple; and (3) it'll be cheap.



The computer of the 1990s may combine a computer, TV, VCR, laser disc player, encyclopedia, and stereo. Add a fax machine, photocopier, and telephone; and you can see why competition to build the first multimedia computer is heating up.

The first player in this field is Commodore. Its CDTV features a computer, CD player, and electronic book that you read on the screen. The CDTV is also rumored to be a fantastic game machine with graphics superior to those of many arcade games.

The hearts of these new multimedia computers of the 1990s are the laser storage devices (videodiscs,

compact discs, CD-ROM) and complex new multimedia chips. These chips, like the one from AT & T, are known as digital signal processors (DSPs). DSPs promise to create a wonderland of intelligent multimedia devices that will be cheap enough to pop up in everyone's living room, classroom, car, or bedroom.

This is just the beginning. It will not be long before entire computers can be built on a device that can perch on the head of a pin.

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Artificial-intelligence scientists can't wait for these new computer chips. They plan to build entire cities of silicon on chips smaller than a ladybug. The cities will be just like real cities with garment, financial, jewelry, and shopping districts. One neighborhood will be made up of electronic musicians who generate synthesized music, speech, and sound effects.

Another neighborhood will house the artists who create dazzling 3-D graphics and animations. Down the street will be the accountants and clerks who are whizzes at filing and printing huge gobs of information. Writers and authors will have their own neighborhood. The "brains" who run the whole chip will probably live in a downtown neighborhood.

Computer cities of the future may be as rich, as complex, and as fascinating as real cities for human beings. But what happens if computer cities become too much like real cities with gangs, the Mafia, drug dealers, and homeless people moving in? Is the same future in store for miniature cities made of silicon? □

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BEGINNER BASIC

L A R R Y C O T T O N

I have received quite a few letters over the four years this column has run, in which readers include listings of their programs that for one reason or other don't work.

This month I'll hit the high spots in my collection of programming errors. Some may be obvious to experienced programmers, but they can be extremely perplexing to the novice.

For instance, if you type a command such as RUN or LIST with no program in the computer's memory where BASIC programs are normally stored, nothing happens. Obvious, perhaps, but make sure a program is in memory before trying to run or list it.

Two other areas where trouble pops up are with the simple PRINT and GOTO statements. PRINT must have something following it in quotation marks, a variable that the computer recognizes and allows, or nothing at all, in which case the computer prints a blank line. You can't use a numeric variable name which contains a preassigned keyword; TOTAL=5 won't work because it contains the keyword TO.

PRINT also can get fouled up with the arcane symbols which Commodore uses to represent cursor movements, screen clearing, colors, and so forth. Sometimes it's easier to use READ X in a data statement and then use PRINT CHR\$(X) to see the results.

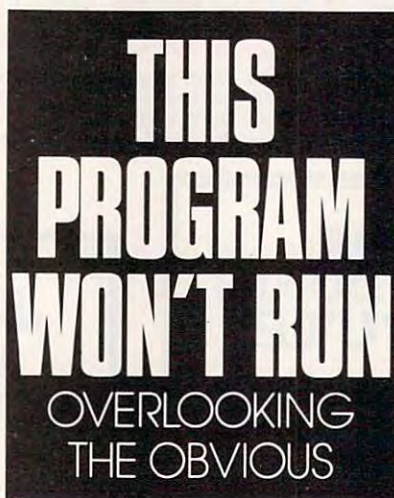
GOTO should be avoided as much as possible because of the often hopelessly tangled code that results. If you were to send me a program for analysis that contains several unconditional GOTOs, I'd probably get lost and not be of much help. Another sometimes overlooked fact: If a program line referred to in a GOTO or GOSUB isn't there, GOTO and GOSUB won't work.

Blank and/or Stuck Screens

When programming, beginners occasionally press the Clear/Home key by accident. The screen goes blank, and the programmer thinks he or she has

lost the program. However, it's very much alive and well in the computer's memory. Type LIST and press the Return key. Voilà!

Programs (usually unfinished ones) often get stuck in infinite loops or ignore keyboard presses. The best way to circumvent these problems is to save the program to disk just before running it. That way, if something goes amiss (and it usually does), you haven't lost a half-night's work.



Sometimes you can't even tell when a program's stuck in a loop because the monitor's screen or speaker doesn't reveal any clues. Try pressing the Run/Stop key. If that doesn't work, hold down Run/Stop and hit (don't just press) Restore. If that doesn't work, press your reset button.

On the 64, you'll have to make or buy your own reset button; the 128 has one. It resets the computer's memory to warm start, and with the aid of a BASIC utility, you may be able to resurrect what would've become a lost program if you had shut off the power completely.

Errors in Syntax

The computer is a perfectionist. When it encounters anything it doesn't recognize, it invariably brings the program to a screeching halt and prints

?SYNTAX ERROR (in whatever line the error occurred). Syntax errors run the gamut from typing a 0 when you meant to type the letter O to entering an extra parenthesis in a math program line.

Another common source of error in BASIC programs is caused by overzealous crunching of too many statements into one IF-THEN line. Here's an example:

```
100 IF T=5 THEN PRINT
    "COWABUNGA!": GOSUB 300
```

Do you ever want to GOSUB 300 if T is not 5? If you do, GOSUB 300 needs to go on another line:

```
100 IF T=5 THEN PRINT
    "COWABUNGA!"
110 GOSUB 300
```

READ and DATA are probably the most error-prone keywords in BASIC—and the hardest to diagnose. Again, don't overlook the obvious. When errors occur in reading data, the error message refers to the line that does the reading, even though the error is probably in the data itself. Here are several examples that contain various errors.

```
10 READ A,B,C,D,E,
20 DATA 5,6,4,3,8
```

```
10 FOR T=1 TO 5
20 READ Z
30 NEXT
40 DATA 4,5,6,7
```

```
10 READ A,B,C$
20 DATA 5,6,7
```

```
10 READ A$,B$,C
20 DATA XYLOPHONE, NOSE
    FLUTE, TUBA
```

```
10 READ NAMES
20 JIM
```

The first error is a period instead of a comma between the 3 and 8. The second example contains only four

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items of data, but line 10 is trying to read five. The third data item in the third example will be interpreted as a string; the 7 cannot be manipulated mathematically.

The opposite case appears in the fourth example; line 10 is expecting a number (C) as its third piece of data, but instead it gets a string (TUBA). Can you determine what's wrong with the last example?

The "Without" Errors

NEXT WITHOUT FOR and RETURN WITHOUT GOSUB errors occur when only one keyword is found from a pair of keywords that are normally used together. For every FOR there must be a NEXT; for every GOSUB there must be a RETURN.

In a FOR-NEXT loop, seven items are mandatory:

1. The word FOR
2. A counter (any valid numeric variable)
3. An equal sign
4. A starting value for the counter (any valid numeric expression)
5. The word TO
6. The ending value for the counter (any valid numeric expression)
7. The word NEXT

Here's a simple time-delay loop that uses all seven items:

```
100 FOR T=1 TO 2000: NEXT
```

By the way, even though IF and THEN are used together, there's no such error message as THEN WITHOUT IF; you'll just get a ?SYNTAX ERROR in whatever line the error occurred.

Numeric and String Variables

Can you find anything wrong in these three lines?

```
10 GET S$: IF S$=" " THEN
   GOSUB 200
20 GET S: IF S=" " THEN GOSUB
   200
200 RETURN
```

In line 20, GET S causes the computer to look at the keyboard to see if a number has been entered. No matter what it finds, the phrase IF S=" " will elicit the infamous TYPE MISMATCH ERROR. The problem is that S represents a numeric variable, and the double quotes indicate a null string. We must change " " to 0 in line 20. And this isn't foolproof, by any means.

A similar error happens with INPUT. INPUT A expects the user to enter a number. If the user types a letter and presses Return, the computer responds with the very user-unfriendly ?REDO FROM START error.

If you have a burning question of general interest involving BASIC programming, drop me a line in care of COMPUTE. I'll be glad to discuss it in a future column. □

READERSHIP SURVEY

Take a minute to tell us what you like most about Gazette. We also want to know what you don't like. What subjects would you like to see us cover? We want the magazine to be as useful and interesting as possible and to provide you with the coverage you want. Please take a minute to fill out and mail us the questionnaire that appears elsewhere in this section. We'll tabulate the results and use them to help us produce the magazine you want. If you don't want to tear out the questionnaire, a photocopy will be fine.



MACHINE LANGUAGE

J I M B U T T E R F I E L D

When a computer does several independent jobs at the same time, it often uses a *scheduler* program to allocate processor time. To demonstrate this, we will drop three Commodore 64 sprites from the top of the screen at varying rates. A more elaborate system might vary the *x* and *y* rates according to the forces acting on the objects, but the principles would be the same.

For each object, we will construct a two-byte table. The table starts at address \$035D and contains three two-byte entries, one for each object. The first byte keeps track of the time for the next movement to occur; this byte will be updated with each movement. The second byte will tell the rate at which the object should move. This value would not normally change.

When the time in the first byte matches the time in the lowest byte of the 64's jiffy clock, the scheduler will move the object. The jiffy clock is at addresses \$A0-\$A2 in the 64. The low byte is at \$A2. As each object's time arrives, that object will move, and its action time will be set ahead.

The second byte tells how many jiffies will elapse between movements of the object. Object 1 has a value of 5 in its second byte, so it will move every five jiffies (12 movements per second). The second object has a value of 6, so it will travel slightly slower.

When an object's action time arrives, as signaled in the first byte, it will be moved; then the time will be set ahead by adding in the value contained in the second byte.

The code won't let an object stop. The maximum value possible in the second byte is 127, or just over two seconds between movements.

Does jiffy time \$FF come before or after \$02? That's like asking whether ten o'clock comes before or after three o'clock. The answer is both; but in practical terms, \$FF comes before \$02, ten before three. The conventional computer test (which number is smaller?) doesn't work. We must use a modulo compare; this is achieved by

following the compare instruction with a BPL or BMI.

We will set up a loop to go through the table. In order to use the X register as the loop index, we must first initialize it to 0.

033C LDX #500

The table starts at \$035D, so we may check our action time against the low byte of the jiffy clock at \$A2. If we are past time, we'll hop ahead to \$034D and do the work. The X register advances in steps of two to keep pace with the two-byte table entries. If the table were more complex, the X register would increase by larger amounts.

SCHEDULING MULTIPLE TASKS

033E LDA \$035D,X

0341 CMP \$A2

0343 BMI \$034D

If the table entry doesn't call for action, we'll bump X by 2 and try again. If we pass the end of the table, reset X to the start.

0345 INX

0346 INX

0347 CPX #506

0349 BNE \$033E

034B BEQ \$033C

If an object's time has come, jump to the code at \$034D. Register X will contain 0, 2, or 4. The action time is still at address \$035D,X. First

increase its value by the contents of the second byte at \$035E,X.

034D CLC

034E LDA \$035D,X

0351 ADC \$035E,X

0354 STA \$035D,X

The *y* coordinates of sprites are spaced at two-byte intervals, starting at address \$D001. Since our X register moves in two-byte steps, we can bump the sprite's position directly.

0357 INC \$D001,X

If a sprite's *y* position rolls over to 0, the program ends. If not, we return to the scheduling table.

035A BNE \$033C

035C RTS

Here is the table schedule:

035D 00 05

035F 00 06

0361 00 0A

The BASIC program will poke the program in place and run it.

```
10 DATA 162, 0, 189, 93, 3, 197
20 DATA 162, 48, 8, 232, 232
30 DATA 224, 6, 208, 243, 240
40 DATA 239, 24, 189, 93, 3
50 DATA 125, 94, 3, 157, 93, 3
60 DATA 254, 1, 208, 208, 224
70 DATA 96, 0, 5, 0, 6, 0, 10
80 FOR J=828 TO 866
90 READ X
90 T=T+X
100 POKE J,X
110 NEXT J
120 IF T<>4282 THEN STOP
130 FOR J = 704 TO 766
140 POKE J,0
150 NEXT J
160 FOR J=704 TO 720 STEP 3
170 POKE J,255
180 NEXT J
190 FOR J=0 TO 2
200 POKE 53248+J*2,J*30+40
210 POKE 53249+J*2,50
220 POKE 53287+J,1
230 POKE 2040+J,11
240 NEXT J
250 POKE 53269,7
260 SYS 828
270 POKE 53269,0
```

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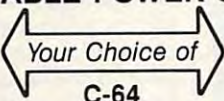
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PROGRAMMER'S PAGE

R A N D Y T H O M P S O N

My 64 is in its box right now, but not because I've abandoned it for an Amiga or some other computer (my Amiga is in its box, too). No, it's because I'm moving across the country.

Actually, I'm not quite sure exactly where my computer is, other than that it's in a box in a moving van somewhere between North Carolina and Washington state. Quite an unsettling thought.

It's difficult for me to be without a computer. I can't program, I can't play *Crossroads* (one of my all-time favorite computer games), and it makes writing this column extremely difficult. It's hard to remember the last time I actually had to compose something using a pen and paper, but I'll survive.

So what does all this have to do with programming? Nothing, except that I can't do any. Therefore, I won't be presenting any code this month. I'll be back on track next month, assuming my 64 arrives unharmed.

I've had a lot of time to think about what my next programming project will be, however. I've also had a lot of time to consider exactly what makes a good program. (Moving all the way across the country via automobile allows your mind plenty of time to dwell on such matters.) And as any programmer knows, coming up with a good original idea can be the most difficult step in developing software.

The best ideas are the products of necessity: You see a need for a program, and so you write one that fills that need. Take BASIC renumbering utilities, for example. Can you imagine writing a long BASIC program without one? I'll bet the first renumbering utility was written by a very frustrated hacker who simply ran out of line numbers late one night. Chances are, if you need the program, so does someone else.

Other good sources of programming ideas are different computer systems. If you can, play around with some other brands of computers and

see what your 64 or 128 lacks in comparison. This is one of the best ways to discover how you can enhance your computer. Just look at how much the Macintosh contributed to the development of GEOS. Program ideas don't have to be original to be good.

Of course, such cross-computer comparisons can go in both directions. There are several 64 programs that would be great on other platforms. I'd love to see an Amiga version of *Crossroads*, for example, and there's already a quite useful version of *SpeedScript* available for MS-DOS machines (even if I do say so myself, since I wrote it).

**IT'S MIDNIGHT
DO YOU KNOW
WHERE YOUR
COMPUTER IS?**

You must be careful when porting programs from one computer to another, however. If you're planning on distributing the software, you must take into account the program's copyright status. You can't legally sell a version of *Tetris* for Brand X computer without first obtaining permission from Spectrum Holobyte. The courts don't look too kindly on that type of behavior. Of course, that doesn't mean you can't get inspiration from such programs; just don't copy them outright unless you have written permission to do so or unless you're writing the program for your own personal use only.

Computer magazines have always helped me discover new ideas. I look at the lists of new software releases, and, in the case of a magazine such as *COMPUTE!'s Gazette* or *Run*, I look at what new programs are offered

as type-ins. Reading about other programs allows me to consider alternatives. A disk utility, for example, may allow you to sort your files alphabetically within the disk's directory but not to arrange the files in any other order. This might inspire me to write my own utility that not only sorts directories alphabetically, but by file type, by file size, or in an arbitrary order that the user chooses.

Sometimes the title of a program suggests the program does one thing when it really does something else entirely. Many times, this implied purpose is far superior to the program's actual function. If you were to take the implied idea and mold it, you might come up with a really good piece of software—and all because of a slight misunderstanding.

Although I can't claim personal success with programs conceived of while unconscious, I have known people who derive some of their best inspirations from dreams. For example, the entire concept for Rhett Anderson and David Hensley's highly entertaining game *Basketball Sam & Ed* (*COMPUTE!'s Gazette*, July 1987) came from a dream Rhett had one summer night. Crazy as it may seem, it might be a good idea to keep a notebook by your bed so you can jot down your dreams before they fade from your memory. I've even heard of people who keep tape recorders on their nightstands for just this purpose.

Now that I've traveled almost 3000 miles thinking about what I'm going to do once I get my computer back, I can't say that I'm suffering from a lack of programming ideas. The problem now is finding enough time to develop them all. Of course, I'd still like readers to send me their best programming tips. I'm still waiting for the moving company to deliver my computer and the rest of my belongings. The last I heard, the moving truck was experiencing mechanical difficulties somewhere in southern California. I guess there are worse places it could be.

I wonder where my computer is? ☐



PROGRAMS

G E O F F R E Y S P A R K S

Use *Ultragraph* to create and display a vast range of screen images. This integrated set of utilities is a powerful tool for computer artists and programmers.

Ultragraph comes in two parts. The first consists of a powerful and comprehensive character editor, block editor, and screen creator. Use these to give free reign to your imagination and creativity.

The character editor allows for the quick and easy creation of custom characters in multicolor mode. These can then be used in the block editor to create the basic building units of *Ultragraph*. The editor lets you define up to 251 custom characters to be used in 255 blocks. Each screen in turn is comprised of 40 blocks chosen from the 255-block set. This form of data compression is frequently used in commercial games, where multiple levels demand the most economical form of memory usage possible. Because the character and block editors are both onscreen simultaneously, it's a simple process to build up complex block patterns and pictures. Then you fit the blocks together to form full screens. You can use the blocks to create abstract or realistic designs.

The second part of *Ultragraph* is a short machine language module called *Runtime*. Use this module to display and screen with a single POKE to location 253 and a SYS call to 4175.

Because of the efficient way that *Ultragraph* stores its data, up to 186 screens can be held in memory at one time, while still leaving more than 36K free for BASIC programs. Since locations 49152-53247 are also free for machine language routines, this leaves a total of 40K of free RAM.

The adventurous game designer could create landscapes 12 screens wide X 15 screens deep, or perhaps 31 levels with 6 screens per level. To call up and move around in any of these screens, you need only a POKE and a SYS call.

Ultragraph is written entirely in machine language. Enter the program

with *MLX*, our machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000
Ending address: CFFF

When you've finished typing the data, be sure to save a copy to disk before exiting *MLX*.

To load *Ultragraph*, type Load "filename", 8, 1. Then type NEW, press Return, and type SYS 49152 to start. Press any key to exit the title screen.

ULTRAGRAPH

DESIGN AND EDIT
CHARACTERS,
BLOCKS, AND
SCREENS WITH THIS
GRAPHIC TOOL FOR
THE 64

The Editor

When you first enter *Ultragraph*, you're in the character- and block-edit mode. Use the f2, f4, f6, and f8 keys to select your choice of colors.

A joystick plugged into port 1 gives you control of the cursor, which will be in the upper left corner of the displayed character set. Move the cursor around and press the fire button. With each press of the button, the character under the cursor becomes the current character and appears below in the character-edit grid.

To exit the letter set and move to the character grid, press N. The cursor will appear in the edit grid. You can now change this letter as you desire. The fire button will change the color

pattern under the cursor to your chosen color. Colors can be selected from the palette to the right of the grid with the f1, f3, f5, and f7 keys.

To change the selection of colors in the palette, use the f2, f4, f6, and f8 keys. Hold down the key to cycle through the available colors. Note that the top color in the palette is the block color and can be different for each block. The other three colors are screen colors and must be common to all blocks on one screen. The same block may therefore have different colors on different screens. To set screen colors, use the color-changing keys until you have the desired palette; then switch to screen mode with the minus key and press Inst/Del.

Having created your character, you need to put it into a block. Press M to move the cursor into the block grid. Use the fire button again to place your custom character anywhere within the block. You can use this system to build your own custom characters and link them together within the block. This way you can build complex and detailed patterns and pictures.

Please note that characters numbered 252, 253, 254, and 255 are reserved for the palette and grid display. Changing them will result in a distorted display and is not advised. As a matter of convenience, character 0 and block 0 should be set to all spaces.

To help you create with *Ultragraph*, here's a description of the operative commands on the editor screen. Most of these command keys come in pairs for toggling forward and backward.

Q/W These keys cycle up and down through the character set. The currently selected character will be displayed in the grid with its number on the bottom line.

A/S These keys cycle through the blocks. Again the number will be displayed at the bottom to help you keep track of where you are.

Z/X These keys cycle through the screens. The screen number will be



PROGRAMS

increased or decreased, and the result displayed on the status line at the bottom. When you flip to screen mode, the currently selected screen will be displayed.

f1-f7 The unshifted function keys select the current drawing color from the chosen palette. Note that the colors are in the same order, top to bottom, as the function keys.

f2-f8 The shifted function keys will cycle through the available colors, changing the display as you go.

O/P The O key will memorize the current block. If you move to a new block number, the block design can then be recalled with the P key.

@/* The @ symbol stores the currently selected block palette, and the * key restores it. These are most useful when setting up a group of blocks that will be used on the same screen.

Return The Return key can be used in the block-edit grid to select the character under the cursor as the current character. This can be helpful if you need to make small editing changes and have trouble finding the right character in the upper letter set.

The Return key is also active in the screen-edit mode. When you position the large cursor over a selected block and press Return, that block will become the current block for painting purposes. This is convenient, as it reduces the amount of shifting between edit modes.

B The B key puts the cursor in the letter set for letter selection.

N The N key puts the cursor in the character grid for character editing.

M The M key puts the cursor in the block grid for block editing.

+/- These keys are used to shift between the character- and block-edit mode and the screen-edit mode. Pressing - puts you in screen mode, where the currently selected block can be inserted at the cursor position with the fire button. The + key takes you back to the character screen.

Note that when you switch to a new screen, if you wish to force your block colors to be the current screen colors, press Inst/Del. If you don't

press Inst/Del and the screen colors differ from the block colors, you'll find your block has changed appearance when you return to the character editor.

Shift-E A shifted E returns you to BASIC. Make sure you've saved your data before doing this, as it is not recoverable.

Shift- = Pressing Shift and the equal sign cycles through the border colors. If you use the Inst/Del key to preserve your choice, the selected border color will be stored along with other screen data.

Shift-D A shifted D saves data to disk. You're given the option of saving character, block, or screen data singly or all three sets of data. Data is saved with the same filename each time (using the @0:Save with Replace option), and this cannot be altered because the *Runtime* package will look for these filenames when it sets up.

Shift-L Use a shifted L to load data. Data can be loaded singly or as a group.

The Runtime Module

The second part of *Ultragraph*, *Runtime*, is a short machine language program that loads data and displays selected screens. The three sets of data you defined with the editor must be on the same disk as the *Runtime* program.

Runtime is written entirely in machine language. Enter it using *MLX* also. When *MLX* prompts you, respond with the values given below.

Starting address: 1000

Ending address: 128F

Load *Runtime* by typing Load "filename", 8, 1. Make sure the disk containing your graphics data is in the disk drive and then begin the program with SYS 4096. *Ultragraph* stores its custom character set from addresses 2048 to 4096, and the *Runtime* program starts at 4096, so the start of BASIC must be reset. The start of BASIC will be reset for you at 4864 (\$1300 hex) by putting the value 0 at 43 and 19 at 44. A NEW command is then performed to reset BASIC pointers, and the program falls through to the loading routine that force-loads your graphics data into its *Runtime*

locations.

If you wish to start BASIC at a different address, poke the low-byte/high-byte address into 43 and 44 and perform a NEW. Data alone can be entered with SYS 4166. This option can be used to skip the BASIC reset routine or load in even more disks of data as your program progresses.

Please note that *Ultragraph* data is force-loaded into different addresses from those where it was saved. The load addresses are given at the end of this article. When you have reset BASIC and loaded your data, *Ultragraph* is ready for use. Poke the screen number you desire into location 253 (\$FD hex), and call it by typing SYS 4175. Your chosen screen should instantly appear.

The following short program will give you a continuous slide show of your creations. Y is the highest screen number you wish to display.

```
10 REM ULTRAGRAPH SLIDE SHOW
20 X=0
30 POKE 253,X:SYS 4175
40 REM DELAY LOOP
50 FOR J=1 TO 2000:NEXT
60 X=X+1:IF X=Y THEN X=0
70 GOTO 30
```

Please note that the range of legal values to poke into 253 is 0-186. Negative numbers and numbers greater than 255 will crash your program. *Ultragraph* stores up to 186 custom-designed screens. Poking numbers higher than this into address 253 will simply return garbage screens and should be avoided. For a longer delay, increase the value of J in line 50.

Ultragraph stores its graphics data in the RAM under BASIC and Kernal ROM. When this data is accessed by the *Runtime* program, BASIC and the Kernal are switched out. They are switched back on when the screen is complete. Unfortunately, as a consequence any BASIC extensions or alterations that copy BASIC into RAM will be erased by the graphics data.

Character data is loaded in at 2048, block data under BASIC at 41472, and the screen data at 57344. *Ultragraph* was written entirely using COMPUTE's *Bassem* assembler. Machine language programmers should note that the *Runtime* program seems quite compatible with *Bassem* as long



PROGRAMS

as the symbol table is set to use memory away from \$A000-\$BFFF, as graphics data is stored there.

Ultragraph Command Summary

- Q/W** Cycles through character set.
- A/S** Cycles through blocks.
- Z/X** Cycles through screens.
- f1-f7** Selects drawing color.
- f2-f8** Cycles through colors.
- O/P** Memorizes and recalls the current block.
- @/*** Stores and restores selected block palette.
- Return** To select current character or current block.
- B** To select letter.
- N** Character editing.
- M** Block editing.
- +/-** Toggle between character- and block-edit mode and screen-edit mode.
- Shift-E** Return to BASIC.
- Shift- =** Border colors.
- Shift-D** Save data.
- Shift-L** Load data.

ULTRAGRAPH

```

C000:20 96 CF 78 A9 7F 8D 0D 2C
C008:DC A9 01 8D 1A D0 A9 C0 83
C010:8D 15 03 A9 AC 8D 14 03 5F
C018:A9 00 8D 12 D0 AD 11 D0 71
C020:09 80 8D 11 D0 AD 11 D0 39
C028:29 EF 8D 11 D0 AD 16 D0 37
C030:09 10 8D 16 D0 A9 93 20 C1
C038:D2 FF 78 A9 00 8D BB C9 44
C040:8D B9 C8 8D B8 CC 8D ED 6B
C048:C7 8D EE C7 8D 99 CA 8D 61
C050:7A CC 20 52 C1 20 CC C2 56
C058:20 81 C1 78 20 9D C2 20 27
C060:BF C3 20 6A C4 A9 00 8D B7
C068:2D D0 8D FE CF 8D D1 C5 ED
C070:8D D0 C5 AD 10 D0 29 FE 95
C078:8D 10 D0 A9 33 8D 53 C5 B5
C080:A9 38 8D 55 C5 A9 66 8D 1B
C088:54 C5 A9 30 8D 56 C5 A9 D8
C090:01 8D FF CF 58 A2 00 A0 E0
C098:00 E8 D0 FD C8 D0 FA AD 7B
C0A0:11 D0 09 10 8D 11 D0 4C 9F
C0A8:A7 C0 00 00 AD 19 D0 29 CA
C0B0:01 8D 19 D0 78 AD 11 D0 B3
C0B8:29 7F 8D 11 D0 A9 EA 8D 02
C0C0:12 D0 A9 2B 8D 14 03 A9 D3
C0C8:C7 8D 15 03 C0 20 C4 C1 20 C
C0D0:8F EA 20 BC C9 20 E2 C9 FE
C0D8:AD BB C9 F0 14 20 52 CA F8
C0E0:20 B9 CB AD 16 D0 09 10 4B
C0E8:8D 16 D0 20 28 CD 4C 4B 2F
C0F0:CF AD AA C0 8D 21 D0 AD 60
C0F8:16 D0 09 10 8D 16 D0 AD EF
C100:AB C0 D0 2D EE AB C0 20 3E
C108:87 EA 20 7A CD 20 D0 C1 08
C110:20 5C C2 20 57 C5 20 B6 D0
C118:C3 20 9C C9 20 0B CD 20 9E
C120:E5 C2 20 B2 C4 20 87 C7 F3
C128:20 C2 C7 20 6E C8 4C 4B E1

```

```

C130:C1 A9 00 8D AB C0 20 C3 3C
C138:C8 20 5B C9 20 B2 C4 20 A5
C140:D0 C1 20 01 C9 20 AA C9 9E
C148:20 27 C9 58 68 A8 68 AA C5
C150:68 40 20 0C CA A9 04 85 67
C158:FC A9 04 85 FB A9 00 AA CE
C160:A8 8A 91 FE E8 F0 19 C8 D2
C168:C0 20 D0 F5 48 18 A9 28 EB
C170:65 FB 85 FB A9 00 65 FC 2B
C178:85 FC A0 00 68 4C 61 C1 0B
C180:60 A9 D0 85 FC A9 00 85 25
C188:FB A9 08 85 FE A9 00 85 F1
C190:FD A0 00 78 A5 01 29 33 79
C198:85 01 B1 FB 91 FD E6 FB 63
C1A0:A5 FB C9 00 D0 E2 E6 FC 88
C1A8:E6 FD A5 FD C9 00 D0 02 A5
C1B0:E6 FE A5 FB C9 00 D0 E2 AE
C1B8:A5 FC C9 D8 D0 DC A5 01 5B
C1C0:09 04 85 01 AD 18 D0 29 23
C1C8:F0 09 02 8D 18 D0 58 60 35
C1D0:20 66 C2 AD 65 C2 F0 01 4A
C1D8:60 A9 14 8D 65 C2 A5 CB 9F
C1E0:C9 40 D0 01 60 A5 F5 C9 D2
C1E8:C2 F0 01 60 A5 CB C9 04 24
C1F0:F0 29 C9 05 F0 21 C9 06 66
C1F8:F0 19 C9 03 F0 11 C9 35 39
C200:F0 09 C9 0E F0 01 60 4C F2
C208:E2 FC 60 EE 20 D0 60 EE 2D
C210:21 D0 60 EE 22 D0 60 EE 59
C218:23 D0 60 EE 86 02 A9 D8 C6
C220:85 FC A9 00 85 FB A0 00 3A
C228:AD 86 02 29 0F 8D 86 02 B6
C230:C9 08 B0 09 18 AD 86 02 C9
C238:69 08 8D 86 02 AD 86 02 64
C240:91 FB E6 FB D0 F7 E6 FC 5B
C248:A5 FC C9 D0 D0 EF A2 00 62
C250:AD 86 02 9D D0 DB E8 E0 8A
C258:0A D0 F5 60 AD 65 C2 F0 55
C260:03 CE 65 C2 60 00 A5 CB 0E
C268:C9 03 F0 2A C9 04 F0 14 A8
C270:C9 05 F0 16 C9 06 F0 18 FB
C278:C9 01 F0 01 60 20 24 C6 E3
C280:20 98 C6 60 A9 FF 8D 9C 20
C288:C2 60 A9 FE 8D 9C C2 60 71
C290:A9 FD 8D 9C C2 60 A9 FC CD
C298:8D 9C C2 60 FF A9 0F 85 B4
C2A0:FC A9 E0 85 FB A0 00 A9 8F
C2A8:00 91 FB C8 C0 08 D0 F9 60
C2B0:A9 55 91 FB C8 C0 10 D0 8C
C2B8:F7 A9 AA 91 FB C8 C0 18 AF
C2C0:D0 F9 A9 FF 91 FB C8 C0 31
C2C8:20 D0 F9 60 A9 FF 8D F0 31
C2D0:05 8D F1 05 A9 FE 8D 40 6F
C2D8:06 8D 41 06 A9 FD 8D 90 3E
C2E0:06 8D 91 06 60 AD FF CF E8
C2E8:CD FE CF D0 01 60 AD FE FF
C2F0:CF 85 FC A9 08 85 FB 18 60
C2F8:A9 00 A2 08 6A 66 FB 90 9D
C300:03 18 65 FC CA 10 F5 85 93
C308:FC 18 A9 00 65 FB 8D FD 7D
C310:CF A9 08 65 FC 8D CF CF 29
C318:AD FE CF 8D FF CF A9 E3 7F
C320:8D FB CF A9 05 8D FA CF 26
C328:A0 00 A2 00 AD FD CF 85 DE
C330:FB AD FC CF 85 FC B1 FB 3D
C338:8D F8 CF 8C F9 CF A0 08 DF
C340:AD FB CF 85 FB AD FA CF 4C
C348:85 FC AD F8 CF 29 03 20 60
C350:9A C3 91 FB E8 88 91 FB 90
C358:E8 88 4E F8 CF 4E F8 CF 49
C360:C0 00 D0 DC E0 40 D0 01 DA
C368:60 AC F9 CF C8 C0 08 D0 B1
C370:01 60 AD FD CF 85 FB AD 60
C378:FC CF 85 FC B1 FB 8D F8 84
C380:CF 8C F9 CF 18 AD FB CF 8E
C388:69 28 8D FB CF AD FA CF 3B
C390:69 00 8D FA CF A0 08 4C 8B
C398:40 C3 C9 00 F0 0C C9 01 B6

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C3A0:F0 0B C9 02 F0 0A C9 03 03
C3A8:F0 09 A9 FC 60 A9 FD 60 F5
C3B0:A9 FE 60 A9 FF 60 A5 CB 0C
C3B8:F0 01 60 EE FE CF 60 A9 95
C3C0:00 AA 9D 00 10 E8 E0 C0 4D
C3C8:D0 F8 A2 00 BD FB C3 C9 7A
C3D0:CC F0 07 9D 40 03 E8 4C E1
C3D8:CC C3 A2 00 BD 12 C4 C9 95
C3E0:CC F0 07 9D 80 03 E8 4C F3
C3E8:DC C3 A2 00 BD 2A C4 C9 0E
C3F0:CC F0 07 9D C0 03 E8 4C 06
C3F8:EC C3 60 FF 00 00 81 00 F6
C400:00 81 00 00 81 00 00 81 77
C408:00 00 81 00 00 81 00 00 C7
C410:FF CC FF FF 00 80 01 00 D0
C418:80 01 00 80 01 00 80 01 34
C420:00 80 01 00 80 01 00 FF F1
C428:FF CC FF FF F0 80 00 10 7E
C430:80 00 10 80 00 10 80 00 45
C438:10 80 00 10 80 00 10 80 8F
C440:00 10 80 00 10 80 00 10 7D
C448:80 00 10 80 00 10 80 00 50
C450:10 80 00 10 80 00 10 80 A7
C458:00 10 80 00 10 80 00 10 88
C460:80 00 10 80 00 10 FF FF 74
C468:F0 CC A9 07 8D 15 D0 A9 4F
C470:0D 8D F8 07 A9 0E 8D F9 0E
C478:07 A9 0F 8D FA 23 A9 98 FA
C480:8D 02 D0 A9 C2 8D 03 D0 29
C488:A9 18 8D 04 D0 A9 32 8D FD
C490:05 D0 8D 00 8D 01 D0 A9 E4
C498:38 8D 00 D0 A9 04 8D 17 3E
C4A0:D0 8D 1D D0 A9 01 8D 27 3A
C4A8:D0 8D 28 D0 8D 29 D0 60 23
C4B0:EA 04 CE B1 C4 F0 01 60 F1
C4B8:A9 04 8D B1 C4 AD 00 DC 9E
C4C0:8D B0 C4 4E B0 C4 B0 03 B7
C4C8:20 EC C4 4E B0 C4 B0 03 18
C4D0:20 FB C4 4E B0 C4 B0 03 E3
C4D8:20 FA C5 4E B0 C4 B0 03 8F
C4E0:20 2F C5 4E B0 C4 B0 03 E0
C4E8:20 4F C5 60 AD 01 D0 CD F5
C4F0:53 C5 90 06 38 E9 08 8D 0F
C4F8:01 D0 60 AD 01 D0 CD 54 59
C500:C5 B0 06 18 69 08 8D 01 64
C508:D0 60 AD 00 D0 CD 55 C5 F7
C510:F0 17 38 E9 08 8D 00 D0 C6
C518:20 16 C6 AD D0 C5 F0 09 75
C520:AD 00 D0 38 E9 08 8D 00 AA
C528:D0 2C 10 D0 D0 E4 60 AD BE
C530:00 D0 CD 56 C5 F0 17 18 47
C538:69 08 8D 00 D0 20 08 C6 0A
C540:AD D0 C5 F0 09 AD 00 D0 6E
C548:18 69 08 8D 00 D0 60 20 38
C550:8B C6 00 33 66 38 C5 A5 AC
C558:CB C9 1C F0 09 C9 27 F0 7D
C560:39 C9 24 F0 6D 60 A9 32 01
C568:8D 01 D0 A9 33 8D 53 C5 EB
C570:A9 38 8D 00 D0 A9 38 8D BB
C578:55 C5 A9 66 8D 54 C5 A9 AE
C580:30 8D 56 C5 A9 00 8D F8 44
C588:07 A9 00 8D D0 C5 8D D1 65
C590:C5 AD 10 D0 29 FE 8D 10 E9
C598:D0 60 A9 01 8D D0 C5 A9 CE
C5A0:00 8D D1 C5 AD 10 D0 29 9E
C5A8:FE 8D 10 D0 A9 92 8D 01 D9
C5B0:D0 A9 93 8D 53 C5 A9 38 97
C5B8:8D 00 D0 A9 38 8D 55 C5 28
C5C0:A9 C8 8D 54 C5 A9 68 8D 7D
C5C8:56 C5 A9 0E 8D F8 07 60 C5
C5D0:00 8D A9 01 8D D1 C5 A9 8A
C5D8:00 8D C5 AD 10 D0 29 B6
C5E0:FE 8D 10 D0 A9 9A 8D 01 32
C5E8:D0 A9 9B 8D 53 C5 A9 F0 89
C5F0:8D 00 D0 A9 F0 8D 55 C5 26
C5F8:A9 B6 8D 54 C5 A9 10 8D 80
C600:56 C5 A9 0D 8D F8 07 60 EE
C608:AD 00 D0 D0 08 AD 10 D0 7B

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PROGRAMMS

G A Z E T T E COMMODORE 64/128

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| C610:09 01 8D 10 D0 60 2C 00 75 | C880:FE CF 60 C9 09 D0 04 CE 90 | CAF0:E0 05 F0 23 18 A5 FD 69 45 |
| C618:D0 10 FA AD 10 D0 29 FE 61 | C888:FE CF 60 C9 0A D0 04 EE C0 | CAF8:05 85 FD A9 00 65 FE 85 E5 |
| C620:8D 10 D0 60 AD 01 D0 38 E3 | C890:ED C7 60 C9 0D D0 04 CE 36 | CB00:FE 18 A5 FB 69 28 85 FB 84 |
| C628:E9 32 85 FC A9 05 85 FD 22 | C898:ED C7 60 C9 0C D0 10 EE 6E | CB08:A9 00 65 FC 85 FC 4C E0 8A |
| C630:18 A9 00 A2 08 6A 66 FC 12 | C8A0:EE C7 AD EE C7 C9 BA 90 AB | CB10:CA 00 00 00 00 00 58 65 |
| C638:90 03 18 65 FD CA 10 F5 59 | C8A8:05 A9 00 8D EE C7 60 C9 21 | CB18:60 20 B2 CA 20 C2 CA 20 AC |
| C640:85 FD A9 00 18 65 FC 85 1B | C8B0:17 D0 0F CE EE C7 AD EE B1 | CB20:8A CB 20 7F CB 20 DC CA 4F |
| C648:FC A9 04 65 FD 85 FD AD 45 | C8B8:C7 C9 FF D0 05 A9 BA 8D 7F | CB28:EE 16 CB AD 16 CB 4A B0 36 |
| C650:00 D0 85 FB AD 10 D0 29 FA | C8C0:EE C7 60 AD ED C7 85 FD 3A | CB30:27 4A B0 24 4A B0 21 AD 4B |
| C658:01 F0 07 18 A5 FB 69 18 0D | C8C8:A9 1A 85 FE 20 D2 C8 4C 80 | CB38:16 CB C9 28 F0 34 18 A5 B7 |
| C660:85 FB A5 FB 38 E9 18 85 43 | C8D0:E5 C8 18 A9 00 A2 08 6A 2A | CB40:FB 69 05 8D 12 CB A5 FC B1 |
| C668:FB 46 FB 46 FB 46 FB AD 08 | C8D8:66 FD 90 03 18 65 FE CA 7E | CB48:69 00 8D 13 CB EE 9A CA 91 |
| C670:10 D0 29 01 F0 07 A9 1D 83 | C8E0:10 F5 85 FE 60 A9 00 18 5A | CB50:D0 03 FE 9B CA 4C 19 CB 2E |
| C678:18 65 FB 85 FB 18 A5 FB CA | C8E8:65 FD 85 FD A9 28 65 FE F4 | CB58:38 A5 FB E9 9B 8D 12 CB 96 |
| C680:65 FC 85 FC A9 00 65 FD 96 | C8F0:85 FE A5 FD 8D FD C8 A5 35 | CB60:A5 FC E9 00 8D 13 CB EE 86 |
| C688:85 FD 60 20 24 C6 AD D1 CF | C8F8:FE 8D FE C8 60 00 00 00 DC | CB68:9A CA D0 03 EE 9B CA 4C 12 |
| C690:C5 D0 0D AD D0 C5 D0 10 01 | C900:00 A5 CB C9 26 F0 05 C9 DB | CB70:19 CB D0 B0 CB 60 AD 11 E2 |
| C698:A0 00 B1 FC 8D FE CF 60 E4 | C908:29 F0 0E 60 AD FD C8 8D B8 | CB78:D0 09 10 8D 11 D0 60 AD CF |
| C6A0:A0 00 AD FF CF 91 FC 60 53 | C910:FF C8 AD FE C8 8D 00 C9 C1 | CB80:12 CB 85 FB AD 13 CB 85 5B |
| C6A8:A0 00 AD 9C C2 91 FC C8 25 | C918:60 AD FF C8 85 FD AD 00 53 | CB88:FC 60 A0 19 B1 FD 8D 92 8F |
| C6B0:91 FC 20 B9 C6 60 20 D0 AE | C920:C9 85 FE 20 65 C9 60 AD 9C | CB90:CB 60 00 18 A5 FC 69 B8 54 |
| C6B8:C1 A9 E3 85 FB A9 05 85 7C | C928:FD C8 85 FD AD FE C8 85 FD | CB98:85 FC AD 92 CB 91 FB 38 E5 |
| C6C0:FC A0 00 A2 00 8C F9 CF 15 | C930:FE A2 00 A0 00 BD 23 06 39 | CBA0:A5 FC E9 B8 85 FC 60 AD A1 |
| C6C8:AD FE CF 8D F8 CF 0E F8 DB | C938:91 FD E8 C8 EE 5A C9 AD DF | CBA8:11 D0 29 EF 8D 11 D0 60 D3 |
| C6D0:CF 0E F8 CF B1 FB 20 13 B6 | C940:5A C9 C9 05 D0 EF A9 00 96 | CBB0:AD 11 D0 09 10 8D 11 D0 B7 |
| C6D8:C7 18 6D F8 CF 8D F8 CF 04 | C948:8D 5A C9 8A 18 69 23 AA 72 | CBB8:60 20 BE CB 60 01 CE BD 7F |
| C6E0:C8 85 C0 0A D0 E8 AD FD 41 | C950:C0 19 D0 E1 AD 86 02 91 DF | CBC0:CB F0 01 60 A9 05 8D BD DA |
| C6E8:CF 85 FD AD FC CF 85 FE 8B | C958:FD 60 00 AD FD C8 85 FD F9 | CBC8:CB AD 00 DC 8D B0 C4 4E 86 |
| C6F0:AC F9 CF AD F8 CF 91 FD 50 | C960:AD FE C8 85 FE A9 00 8D 28 | CBD0:B0 C4 B0 03 4C F8 CB 4E 64 |
| C6F8:C8 C0 08 F0 15 A5 FB 18 7A | C968:5A C9 AA AB 11 FD 9D 23 5F | CBD8:B0 C4 B0 03 4C 12 CC 4E D2 |
| C700:69 28 85 FB A5 FC 69 00 B2 | C970:06 E8 C8 EE 5A C9 AD 5A F8 | CBE0:B0 C4 B0 03 4C 2C CC 4E 43 |
| C708:85 FC 8C F9 CF A0 00 4C 18 | C978:C9 C9 05 D0 EF A9 00 8D C4 | CBE8:B0 C4 B0 03 4C 53 CC 4E E7 |
| C710:CE C6 60 C9 FC F0 08 C9 EC | C980:5A C9 8A 18 69 23 AA C0 74 | CBF0:B0 C4 B0 03 4C 7B CC 60 A2 |
| C718:FD F0 0A C9 FE F0 09 A9 38 | C988:19 D0 E1 B1 FD CD 86 02 6A | CBF8:A9 32 CD 05 D0 F0 12 AD 18 |
| C720:03 60 A9 00 60 A9 01 60 8A | C990:F0 06 8D 86 02 20 1E C2 C7 | CC00:B8 CC 38 E9 08 8D B8 CC 83 |
| C728:A9 02 60 78 AD 19 D0 29 3D | C998:60 00 00 00 A5 CB C9 2E 7A | CC08:AD 05 D0 38 E9 28 8D 05 67 |
| C730:01 8D 19 D0 A9 C0 8D 15 54 | C9A0:F0 01 60 AD 86 02 8D 9B C6 | CC10:D0 60 A9 D2 CD 05 D0 F0 A1 |
| C738:03 A9 AC 8D 14 03 A9 00 22 | C9A8:C9 60 A5 CB C9 31 F0 01 A0 | CC18:12 AD B8 CC 18 69 08 8D 0E |
| C740:8D 12 D0 AD BB C9 D0 30 E6 | C9B0:6E AD 9B C9 8D 86 02 20 9A | CC20:B8 CC AD 05 D0 18 69 28 31 |
| C748:AD 21 D0 8D AA C0 A0 90 95 | C9B8:1E C2 60 00 A5 CB C9 28 30 | CC28:8D 05 D0 60 A9 18 CD 04 37 |
| C750:8D 21 D0 AD 18 D0 29 F0 2B | C9C0:F0 05 C9 2B F0 16 60 A9 44 | CC30:D0 F0 1F 38 AD 7A CC E9 B0 |
| C758:09 04 8D 18 D0 AD 16 D0 DA | C9C8:00 8D BB C9 20 A7 CB AD B8 | CC38:05 8D 7A CC CE B9 CC AD 78 |
| C760:29 EF 8D 16 D0 A2 00 A9 4E | C9D0:F7 8F 8D ED C7 20 1E C2 A2 | CC40:04 D0 38 E9 28 8D 04 D0 06 |
| C768:01 9D C0 DB 48 A9 20 9D 7C | C9D8:20 B0 CB 60 A9 01 8D BB 50 | CC48:B0 08 AD 10 D0 29 FB 8D A3 |
| C770:98 07 68 E8 E0 28 D0 EF E2 | C9E0:C9 60 AD BB C9 F0 10 AD C2 | CC50:10 D0 60 A9 30 CD 04 D0 5E |
| C778:AD 11 D0 09 80 8D 11 D0 FA | C9E8:18 D0 29 0F 09 81 8D 18 54 | CC58:F0 1F 18 AD 7A CC 69 05 EE |
| C780:58 68 A8 68 AA 68 40 A2 0C | C9F0:D0 A9 04 8D 15 D0 60 A9 07 | CC60:8D 7A CC EE B9 CC AD 04 48 |
| C788:00 BD 95 C7 9D C0 07 E8 9D | C9F8:03 8D 15 D0 AD 18 D0 29 B9 | CC68:D0 18 69 28 8D 04 D0 90 CE |
| C790:E0 28 D0 F5 60 20 03 08 A5 | CA00:F7 09 10 8D 18 D0 A9 01 92 | CC70:08 AD 10 D0 09 04 8D 10 0C |
| C798:01 12 01 03 14 05 12 3A 90 | CA08:8D 99 CA 60 20 3A CA A9 53 | CC78:D0 60 00 AD ED C7 8D 9C B3 |
| C7A0:20 20 20 20 20 02 0C DF | CA10:04 85 FC A9 00 85 FB A9 FA | CC80:CA AD 05 D0 38 E9 32 85 EB |
| C7A8:0F 03 0B 3A 20 20 20 67 | CA18:17 85 FE A9 FF 85 FD A0 C7 | CC88:FD A9 05 85 FE 20 D2 C8 6B |
| C7B0:20 20 13 03 12 05 05 0E A7 | CA20:00 A9 FC A9 FC 91 FB E6 67 | CC90:A9 00 18 65 FD 85 FB A9 FF |
| C7B8:3A 20 20 20 20 20 20 55 | CA28:FD D0 02 E6 FC A5 FE C5 DA | CC98:20 65 FE 85 FC AD 7A CC 34 |
| C7C0:20 20 AD FF CF 8D 53 C8 42 | CA30:FB D0 F0 A5 FC C5 FE D0 3F | CCA0:18 65 FB 85 FB A9 00 65 63 |
| C7C8:20 EF C7 A2 0C 20 58 C8 E1 | CA38:EA 60 A9 20 85 FC A9 00 06 | CCA8:FC 85 FC 20 C2 CA 20 8A CF |
| C7D0:AD ED C7 8D 53 C8 20 EF 72 | CA40:85 FB A9 24 85 FE A9 00 8A | CCB0:CB 20 DC CA 20 BC CC 60 6E |
| C7D8:C7 A2 18 20 58 C8 AD EE 2A | CA48:85 FD A2 00 A0 00 20 23 DC | CCB8:00 00 C0 AD BA CC 85 C9 |
| C7E0:C7 8D 53 C8 20 EF C7 A2 A1 | CA50:CA 60 AD 99 CA C9 01 D0 03 | CCC0:FB AD BB CC 85 FC 18 AD 06 |
| C7E8:25 20 58 C8 60 00 00 A0 4E | CA58:3E AD ED C7 8D F7 CF AD CC | CCC8:B8 CC 6D B9 CC 18 65 FB C8 |
| C7F0:30 8C 54 C8 8C 55 C8 8C AA | CA60:FE 87 85 FD A9 2C 85 FE F7 | CCD0:85 FB A5 FC 69 00 85 FC 04 |
| C7F8:56 C8 C9 C8 90 11 A9 32 F9 | CA68:20 D2 C8 A9 00 18 65 FD 9F | CCD8:A0 00 A5 CB C9 01 D0 01 29 |
| C800:8D 54 C8 38 AD 53 C8 E9 40 | CA70:85 FD A9 50 65 FE 85 FE B3 | CCE0:60 AD ED C7 91 FB 60 AD 3B |
| C808:C8 8D 53 C8 4C 29 C8 C9 BA | CA78:A5 FD 8D 9A CA A5 FE 8D 34 | CCE8:BA CC 85 FB AD BB CC 85 FE |
| C810:64 90 16 A9 31 8D 54 C8 86 | CA80:9B CA 8D BB CC AD 9A CA 21 | CCF0:FC A0 28 B1 FB 8D 22 D0 7C |
| C818:38 AD 53 C8 E9 64 8D 53 77 | CA88:8D BA CC A9 00 8D 99 CA FB | CCF8:C8 B1 FB 8D 23 D0 C8 B1 5B |
| C820:C8 4C 29 C8 A9 30 8D 54 58 | CA90:20 07 CC A0 00 20 9D CA 5A | CD00:FB 8D 20 D0 C8 B1 FB 8D A0 |
| C828:C8 AD 53 C8 A2 00 38 E9 EF | CA98:60 01 00 00 00 A9 00 8D D2 | CD08:21 D0 60 AD 22 D0 8D 24 E2 |
| C830:0A 90 0F E8 48 38 AD 53 2D | CAA0:16 CB 20 A7 CB A9 00 8D 45 | CD10:CD AD 23 D0 8D 25 CD AD B9 |
| C838:C8 E9 0A 8D 53 C8 68 4C 9D | CAA8:12 CB 20 8D 13 CB 4C 0E | CD18:20 D0 8D 26 CD AD 21 D0 44 |
| C840:2E C8 8A 18 69 30 8D 55 6A | CAB0:19 CB AD 9A CA 85 FB AD 37 | CD20:8D 27 CD 60 00 00 00 00 0C |
| C848:C8 AD 53 C8 18 69 30 8D F4 | CAB8:9B CA 85 FC B1 FB 8D 9C 84 | CD28:A5 CB F0 05 C9 01 F0 1D 49 |
| C850:56 C8 60 00 30 30 60 4E | CAC0:CA 60 AD 9C CA 85 FE A9 67 | CD30:60 AD 24 CD 8D 22 D0 AD 0D |
| C858:AD 54 C8 9D C0 07 E8 AD 6A | CAC8:1A 85 FD 20 D2 C8 A9 00 9B | CD38:25 CD 8D 23 D0 AD 26 CD 15 |
| C860:55 C8 9D C0 07 E8 AD 56 1C | CAD0:18 65 FD 85 FD A9 28 65 30 | CD40:8D 20 D0 AD 27 CD 8D 21 4C |
| C868:C8 9D C0 07 00 0A CE 6D 84 | CAD8:FE 85 FE 60 A0 00 A2 00 7F | CD48:D0 20 56 CD 60 20 BC CC 55 |
| C870:C8 F0 01 60 A9 0A 8D 6D C6 | CAE0:78 B1 FD 91 FB 20 93 CB 4B | CD50:B1 FB 8D ED C7 60 AD BA 2A |
| C878:C8 A5 CB C9 3E D0 04 EE 1A | CAE8:C8 C0 05 D0 F3 E8 A0 00 45 | CD58:CC 85 FB AD BB CC 85 FC 2F |

PROGRAMS

CD60:A0 28 AD 22 D0 91 FB C8 BB
 CD68:AD 23 D0 91 FB C8 AD 20 55
 CD70:D0 91 FB C8 AD 21 D0 91 0A
 CD78:FB 60 A5 F5 C9 C2 F0 01 7A
 CD80:60 A5 CB C9 12 F0 0D C9 04
 CD88:2A F0 01 60 A9 01 8D 82 8A
 CD90:CE 4C 99 CD A9 00 8D 82 A1
 CD98:CE 78 AD 15 D0 8D 6F CF 2C
 CDA0:A9 00 8D 15 D0 AD 18 D0 52
 CDA8:8D 81 CE A9 94 8D 18 D0 BB
 CDB0:AD 16 D0 8D 83 CE 29 EF 35
 CDB8:8D 16 D0 A9 24 8D 88 02 BF
 CDC0:A9 00 8D 1A D0 A2 FF E8 7E
 CDC8:BD 0B CE F0 06 20 CA F1 27
 CDD0:4C C7 CD 20 71 CF 20 87 D2
 CDD8:EA A5 CB C9 04 F0 13 C9 3D
 CDE0:05 F0 15 C9 06 F0 17 C9 66
 CDE8:03 F0 19 C9 3C D0 E7 C4 43
 CDF0:4D CF 20 27 CF 4C 4D CF B7
 CDF8:20 3C CF 4C 4D CF 20 39 92
 CE00:CF 4C 4D CF 20 42 CF 4C 35
 CE08:4D CF 00 93 53 41 56 45 0B
 CE10:2F 4C 4F 41 44 20 44 41 C2
 CE18:54 41 2E 0D 11 50 52 45 7A
 CE20:53 53 3A 0D 11 46 31 20 78
 CE28:46 4F 52 20 43 48 41 52 19
 CE30:41 43 54 45 52 53 2E 0D 67
 CE38:11 46 33 20 46 4F 52 20 8C
 CE40:42 4C 4F 43 4B 53 2E 0D 41
 CE48:11 46 35 20 46 4F 52 20 DC
 CE50:53 43 52 45 45 4E 53 2E 3F
 CE58:0D 11 46 37 20 46 4F 52 08
 CE60:20 41 4C 4C 20 44 41 54 95
 CE68:41 2E 0D 11 53 50 41 43 86
 CE70:45 42 41 52 20 54 4F 20 9F
 CE78:51 55 49 54 2E 0D 11 11 5B
 CE80:00 00 00 00 A9 01 A2 08 BC
 CE88:A0 01 20 BA FF AD 0A CE FF
 CE90:C9 01 F0 0B C9 02 F0 CE 68
 CE98:A2 1B A0 CF 4C AD CE A2 B8
 CEA0:03 A0 CF 4C AD CE A2 0F A3
 CEA8:A0 CF 4C AD CE A9 00 20 44
 CEB0:BD FF AD 82 CE F0 08 A9 FE
 CEB8:00 85 0A 20 D5 FF 60 AD 18
 CEC0:0A CE C9 01 D0 12 A2 00 74
 CEC8:A0 10 A9 08 85 FC A9 00 E3
 CED0:85 FB A9 FB 20 D8 FF 60 E9
 CED8:AD 0A CE C9 02 D0 12 A9 67
 CEE0:00 85 FB A9 28 85 FC A2 ED
 CEE8:00 A0 42 A9 FB 20 D8 FF A3
 CEF0:60 A9 00 85 FB A9 50 85 2E
 CEF8:FC A2 00 A0 70 A9 FB 20 0A
 CF00:D8 FF 60 40 30 3A 43 48 55
 CF08:41 52 2E 44 41 54 41 40 05
 CF10:30 3A 42 4C 4F 4B 2E 44 AB
 CF18:41 54 41 40 30 3A 53 43 ED
 CF20:52 45 2E 44 41 54 41 A9 CB
 CF28:01 8D 0A CE 20 84 CE 60 EA
 CF30:A9 02 8D 0A CE 20 84 CE 46
 CF38:60 A9 03 8D 0A CE 20 84 FB
 CF40:CE 60 20 27 CF 20 30 CF 05
 CF48:20 39 CF 60 60 AD 81 CE D1
 CF50:8D 18 D0 A9 04 8D 88 02 DA
 CF58:78 A9 01 8D 1A D0 AD 6F 76
 CF60:CF 8D 15 D0 AD 86 02 8D 14
 CF68:70 CF 20 76 CF 58 60 00 40
 CF70:00 A9 01 8D 70 CF AD 82 14
 CF78:CE D0 08 A2 04 A0 04 20 A9
 CF80:8B CF 60 A2 09 A0 04 20 03
 CF88:8B CF 60 AD 70 CF 9D FF C6
 CF90:D7 CA 88 D0 F9 60 A9 00 91
 CF98:8D 21 D0 8D 20 D0 A9 93 65
 CFA0:20 D2 FF A2 00 BD B8 CF 67
 CFA8:F0 07 20 D2 FF E8 4A A5 95
 CFB0:CF A5 CB C9 40 F0 FA 60 D3
 CFB8:1D 1D 1E 20 20 20 20 D5
 CFC0:20 20 20 20 20 DA 20 55 80
 CFC8:4C 54 52 41 47 52 41 50 58

CFD0:48 20 DA 0D 11 11 11 20 D7
 CFD8:20 20 20 43 4F 50 59 52 89
 CFE0:49 47 48 54 20 47 45 4F 3D
 CFE8:46 46 52 45 59 20 53 50 1E
 CFF0:41 52 4B 53 20 31 39 39 D5
 CFF8:30 2E 00 00 00 00 00 00 3C

RUNTIME

1000:A9 00 85 2B A9 13 85 2C 29
 1008:A9 00 8D 00 13 8D FF 12 8F
 1010:A9 93 20 D2 FF A2 00 A9 4F
 1018:0D 8D 77 02 8D 78 02 A9 2D
 1020:02 85 C6 A2 00 BD 34 10 15
 1028:C9 00 F0 07 20 D2 FF E8 F0
 1030:4C 25 10 60 11 11 4E 45 76
 1038:57 0D 11 11 53 59 53 20 41
 1040:34 31 36 36 13 00 20 FD C7
 1048:11 A9 93 20 D2 FF 60 78 9F
 1050:20 C2 11 AD 16 D0 09 10 44
 1058:8D 16 D0 AD 18 D0 29 F0 01
 1060:09 02 8D 18 D0 78 A5 01 6D
 1068:8D 72 10 A9 35 85 01 4C 96
 1070:86 10 00 18 A9 00 A2 08 F3
 1078:6A 66 FD 90 03 18 65 FE 72
 1080:CA 10 F5 85 FE 60 A9 2C 1A
 1088:85 FE 20 73 10 A9 00 18 A5
 1090:65 FD 85 FD A9 E0 65 FE 0E
 1098:85 FE A5 FD 8D B6 10 A5 DC
 10A0:FE 8D B7 10 8D B9 10 AD BC
 10A8:B6 10 8D BA 10 20 D9 11 4B
 10B0:A0 00 4C BB 10 60 00 00 68
 10B8:00 00 00 A9 00 8D 34 11 23
 10C0:20 C2 11 A9 00 8D 30 11 06
 10C8:A9 04 8D 31 11 4C 36 11 BA
 10D0:AD B6 10 85 FB AD B7 10 E5
 10D8:85 FC B1 FB 8D B8 10 60 C0
 10E0:AD B8 10 85 FE A9 1A 85 B8
 10E8:FD 20 73 10 A9 00 18 65 62
 10F0:FD 85 FD A9 A2 65 FE 85 F9
 10F8:FE 60 A0 00 A2 00 78 B1 7C
 1100:FD 91 FB 20 AE 11 C8 C0 13
 1108:05 D0 F3 E8 A0 00 E0 05 B9
 1110:FD 23 18 A5 FD 69 05 85 F5
 1118:F0 A9 00 65 FE 85 FE 18 1E
 1120:A5 FB 69 28 85 FE A9 00 33
 1128:65 FC 85 FC 4C FE 10 00 3B
 1130:00 00 00 00 00 60 20 D0 E4
 1138:10 20 E0 10 20 A5 11 20 61
 1140:9A 11 20 FA 10 EE 34 11 5D
 1148:AD 34 11 4A B0 27 4A B0 7C
 1150:24 4A B0 21 AD 34 11 C9 69
 1158:28 F0 34 18 A5 FB 69 05 C7
 1160:8D 30 11 A5 FC 69 00 8D EC
 1168:31 11 EE B6 10 D0 03 EE 69
 1170:B7 10 4C 36 11 38 A5 FB 10
 1178:E9 9B 8D 30 11 A5 FC E9 2E
 1180:00 8D 31 11 EE B6 10 D0 80
 1188:03 EE B7 10 4C 36 11 78 B5
 1190:AD 72 10 85 01 20 CB 11 B1
 1198:58 60 AD 30 11 85 FB AD FB
 11A0:31 11 85 FC 60 A0 19 B1 89
 11A8:FD 8D AD 11 60 00 18 A5 CC
 11B0:FC 69 D4 85 FC AD AD 11 A9
 11B8:91 FB 38 A5 FC E9 D4 85 C2
 11C0:FC 60 AD 11 D0 29 EF 8D D8
 11C8:11 D0 60 A2 00 CA D0 FD A8
 11D0:AD 11 D0 09 10 8D 11 D0 62
 11D8:60 AD BA 10 85 FB AD B9 20
 11E0:10 85 FC A0 28 B1 FB 8D A3
 11E8:22 D0 C8 B1 FB 8D 23 D0 B1
 11F0:C8 B1 FB 8D 20 D0 C8 B1 C3
 11F8:FB 8D 21 D0 60 A9 01 A2 FB
 1200:08 A0 00 20 BA FF A9 6B E6
 1208:8D 86 12 A9 12 8D 87 12 59
 1210:A9 E0 8D 88 12 A9 09 20 E4
 1218:55 12 A9 01 A2 08 A0 00 27
 1220:20 BA FF A9 74 8D 86 12 96

1228:A9 12 8D 87 12 A9 08 8D A4
 1230:88 12 A9 09 20 55 12 A9 07
 1238:01 A2 08 A0 00 20 BA FF 86
 1240:A9 7D 8D 86 12 A9 12 8D 9B
 1248:87 12 A9 A2 8D 88 12 A9 70
 1250:09 20 55 12 60 AE 86 12 A9
 1258:AC 87 12 20 BD FF A9 00 3A
 1260:85 0A A2 00 AC 88 12 20 E9
 1268:D5 FF 60 53 43 52 45 2E D4
 1270:44 41 54 41 43 48 41 52 B5
 1278:2E 44 41 54 41 42 4C 4F 2D
 1280:4B 2E 44 41 54 41 00 00 1A
 1288:00 00 00 00 00 00 00 00 AC

ONLY ON DISK

There's something new on the *Gazette Disk*. In addition to the type-in programs found in each issue of the magazine, we offer additional features and programs every month on the *Gazette Disk*.

Check out the original 64 and 128 artwork on display in "Gazette Gallery," and look for our bonus programs as well. These programs and their instructions appear only on disk. Here's a description of this month's bonus programs.

MEASUREMENT 128

William P. Wright

Everybody knows that there are 5280 feet in a mile, but how many feet are there in a nautical mile? There are two pints in a quart, and four quarts equal a gallon, but how many gills and minims are there in a pin? This measurement conversion program for the 128 has the answers.

Measurement 128 offers more than ten screens filled with more than 200 different units. There are length and distance, volume and capacity, and surface and area conversions. There are dry, liquid, shipping, and apothecary fluid measurement conversions; avoirdupois and metric weight and measure conversions; time, temperature, circular, and angular measurement conversions—all at your fingertips. You enter the known unit, and the program automatically converts it to all equivalent values.

CALENDAR

Richard A. Rardin

Calendar is a desk accessory for GEOS that lets you record important dates and times and then displays them quickly and easily. Because of a production problem with the March 1990 *Gazette Disk*, many people had trouble getting *Calendar* to run, so we're offering this outstanding program again on disk. Since *Calendar* is a desk accessory, it doesn't matter whether you're working on the deskTop, creating a work of art in *geoPaint*, or formatting a newsletter in *geoPublish*; it's always available.



PROGRAMS

J E S U S M E N D O Z A E S C A L O N A

The 8-bit Commodore world, comparatively safe and comfortable until now, is being attacked by a complaint common to other computers: a virus. What used to be a PC or Amiga problem now threatens the 64.

This pesky virus resides on your disk between tracks 18 and 25, eating the directory data stored there. Your mission is to destroy the invader before it destroys your directory and makes your disk unreadable.

Getting Started

Virus 64 is written entirely in machine language, so you must use *MLX* to type it in; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000
Ending address: CBC7

When you've finished typing, be sure to save the program before you exit *MLX*.

When you're ready to play, plug a joystick into port 2 and type *LOAD-"filename",8,1* and press Return. *Filename* should be the name that you used to save the program. After the program loads, type *SYS 49152* to run it.

To fight the attacking virus, you'll be reduced in size and deposited on track 25 of a spinning disk. Press your fire button to start, and keep it depressed as you fire at the attacking virus cells. This virus is growing, and its individual cells attack relentlessly. Keep firing, but maneuver out of the virus's way as the disk spins. If a cell touches you, you'll be dissolved.

Don't think you can rest after you've cleared one track. The virus is spreading to other tracks of your disk. As you destroy cells, they're added to your score.

Take care though—the virus on succeeding tracks is faster, but its cells are fewer in number. Good luck, and try to make it to track 18.

VIRUS 64

STOP A VIRUS FROM
DESTROYING YOUR
DISK DIRECTORY

VIRUS 64

| | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|
| C000:A9 | 37 | 85 | 01 | 78 | A9 | 7F | 8D | DB |
| C008:0D | DC | A9 | 01 | 8D | 1A | D0 | A9 | AC |
| C010:09 | 85 | 02 | AD | 62 | CB | 8D | 12 | 02 |
| C018:D0 | A9 | C5 | 8D | 15 | 03 | A9 | E8 | EE |
| C020:8D | 14 | 03 | A9 | 00 | 85 | 94 | A9 | 51 |
| C028:30 | 85 | 95 | A9 | 00 | 85 | 9E | A9 | 6D |
| C030:D0 | 85 | 9F | A9 | 00 | 85 | FB | A9 | C1 |
| C038:34 | 85 | FC | A5 | 01 | 29 | FB | 85 | 59 |
| C040:01 | A2 | 04 | A0 | 00 | A9 | 00 | 91 | AD |
| C048:FB | B1 | 9E | 91 | 94 | C8 | D0 | F5 | 80 |
| C050:E6 | 95 | E6 | 9F | E6 | FC | CA | D0 | 13 |
| C058:EC | A5 | 01 | 09 | 04 | 85 | 01 | A9 | 4C |
| C060:1D | 8D | 18 | D0 | 20 | F1 | C1 | 20 | 50 |
| C068:37 | C4 | A9 | A0 | 8D | E7 | 07 | A9 | B9 |
| C070:00 | 8D | E7 | DB | 8D | 21 | D0 | 8D | 30 |
| C078:20 | D0 | A2 | 07 | A0 | 00 | A9 | 00 | 5B |
| C080:99 | 08 | 31 | A9 | FF | 99 | 00 | 35 | 2D |
| C088:C8 | CA | 10 | F2 | 88 | 99 | 08 | 31 | 3E |
| C090:A2 | D0 | BD | DE | C8 | 9D | 00 | 34 | 3E |
| C098:CA | D0 | F7 | A0 | 00 | A2 | 1F | A9 | 2F |
| C0A0:00 | 85 | 94 | A9 | E0 | 85 | 95 | B1 | AA |
| C0A8:94 | 91 | 94 | C8 | D0 | F9 | E6 | 95 | C9 |
| C0B0:CA | 10 | F4 | A9 | 19 | 8D | F7 | E8 | AC |
| C0B8:A9 | 0C | 8D | 04 | E9 | A9 | F0 | 8D | 69 |
| C0C0:05 | E9 | A9 | CA | 8D | FE | E8 | A9 | 09 |
| C0C8:EF | 8D | 08 | E9 | A9 | D8 | 8D | 0D | 1E |
| C0D0:E9 | A9 | 17 | 8D | D3 | E9 | 8D | 00 | CE |
| C0D8:EA | A2 | 18 | A0 | 0C | B9 | 55 | CB | 43 |
| C0E0:9D | F0 | EC | CA | 88 | 10 | F6 | A9 | D3 |
| C0E8:87 | 85 | EC | A2 | 03 | A9 | EA | 9D | 89 |
| C0F0:D8 | E9 | CA | 10 | FA | A2 | 7F | BD | D2 |
| C0F8:6F | CA | 9D | 80 | 21 | 9D | 00 | 22 | 42 |
| C100:9D | 80 | 22 | 9D | 00 | 23 | 9D | 80 | D8 |
| C108:23 | 9D | 00 | 24 | CA | 10 | E8 | A2 | D1 |
| C110:3F | BD | 2F | CA | 9D | 00 | 21 | 9D | 02 |
| C118:A0 | 21 | CA | 10 | F4 | 58 | A9 | 37 | F1 |
| C120:85 | 01 | A2 | 7F | BD | AF | C9 | 9D | D0 |
| C128:80 | 20 | CA | 10 | F7 | 86 | 03 | 20 | 4E |
| C130:97 | E0 | A5 | 8D | F0 | F9 | 29 | 3F | 46 |
| C138:A6 | 03 | 9D | 80 | 24 | C6 | 03 | D0 | 9E |
| C140:EE | A2 | FF | 8E | 1C | D0 | 86 | B2 | B0 |
| C148:E8 | 8E | 26 | D0 | 8E | 17 | D0 | 8E | B6 |
| C150:1D | D0 | 86 | B3 | 86 | A9 | 86 | 0E | 98 |
| C158:86 | B6 | 86 | AB | E8 | 8E | 15 | D0 | D4 |
| C160:A9 | 07 | 8D | 25 | D0 | 85 | A4 | CA | 2F |
| C168:BD | BD | CB | 9D | F8 | 07 | 8A | 9D | 24 |
| C170:27 | D0 | A9 | 00 | 9D | 34 | 03 | 9D | 52 |
| C178:52 | 03 | A9 | 01 | 95 | 05 | E8 | E0 | 9E |
| C180:08 | D0 | E5 | A9 | 91 | 8D | 00 | D0 | 27 |

| | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|
| C188:A9 | D2 | 8D | 01 | D0 | A9 | 00 | 8D | 12 |
| C190:28 | D0 | A9 | 35 | 85 | 01 | 20 | DC | 32 |
| C198:C5 | A9 | 14 | 8D | 11 | D0 | 20 | F7 | C8 |
| C1A0:C4 | 20 | 37 | C4 | C6 | 05 | D0 | 0B | B8 |
| C1A8:C6 | 06 | D0 | 07 | A9 | 07 | 85 | 06 | 16 |
| C1B0:20 | 0B | C2 | C6 | 07 | D0 | 0B | C6 | 24 |
| C1B8:08 | D0 | 07 | A9 | 02 | 85 | 08 | 20 | 46 |
| C1C0:22 | C2 | C6 | 09 | D0 | 12 | A4 | A9 | 31 |
| C1C8:B9 | B5 | CB | 85 | 09 | C6 | 0A | D0 | B0 |
| C1D0:07 | A9 | 08 | 85 | 0A | 20 | 08 | C3 | 40 |
| C1D8:C6 | 0C | D0 | 07 | A9 | 3C | 85 | 0C | A2 |
| C1E0:20 | 43 | C2 | C6 | 0B | D0 | BD | A9 | CA |
| C1E8:64 | 85 | 0B | 20 | 8A | C2 | 4C | A4 | FF |
| C1F0:C1 | A9 | 85 | A0 | C6 | 85 | 94 | 84 | 74 |
| C1F8:95 | A0 | 00 | B1 | 94 | F0 | 0B | 20 | 29 |
| C200:D2 | FF | C8 | D0 | F6 | E6 | 95 | 4C | DF |
| C208:FB | C1 | 60 | 20 | EA | E8 | A2 | 18 | 62 |
| C210:A0 | 02 | A9 | 01 | 8D | 86 | 02 | AD | E3 |
| C218:12 | D0 | 99 | E0 | 05 | C8 | CA | 10 | 0D |
| C220:F6 | 60 | A2 | 01 | A0 | 00 | BD | 08 | 26 |
| C228:31 | 99 | 08 | 31 | E8 | C8 | C0 | 07 | B3 |
| C230:D0 | F4 | A9 | 00 | 99 | 08 | 31 | C6 | A6 |
| C238:A4 | 10 | 07 | 84 | A4 | A9 | FF | 99 | A2 |
| C240:08 | 31 | 60 | AD | D0 | DC | C9 | 7B | 7F |
| C248:F0 | 04 | C9 | 6B | D0 | 0C | A0 | 00 | 49 |
| C250:D0 | C9 | 5A | 90 | 17 | CE | 00 | D0 | C9 |
| C258:D0 | 12 | A9 | 77 | F0 | 04 | C9 | 67 | 0E |
| C260:D0 | 0A | AD | 00 | D0 | C9 | FC | B0 | DE |
| C268:03 | EE | 00 | D0 | A5 | 0D | D0 | 19 | 54 |
| C270:A5 | 0E | D0 | 15 | AD | 1E | D0 | 29 | 68 |
| C278:01 | F0 | 0E | AD | 15 | D0 | 29 | FD | 93 |
| C280:8D | 15 | D0 | A9 | FF | 85 | B3 | 85 | C9 |
| C288:0D | 60 | A5 | B3 | F0 | 01 | 60 | A5 | 8E |
| C290:D0 | 00 | 42 | AD | 15 | D0 | 29 | 02 | 34 |
| C298:D0 | 1A | AD | 00 | DC | 29 | 10 | D0 | 3F |
| C2A0:33 | AD | 15 | D0 | 09 | 02 | 8D | 15 | 5B |
| C2A8:D0 | AD | 00 | D0 | 8D | 02 | D0 | A9 | CE |
| C2B0:C9 | 8D | 03 | D0 | AD | 03 | D0 | C9 | D0 |
| C2B8:96 | 90 | C0 | 38 | E9 | 8C | 8D | 01 | 50 |
| C2C0:D4 | CE | 03 | D0 | 4C | B3 | C3 | AD | 38 |
| C2C8:15 | D0 | 29 | FD | 8D | 15 | D0 | A9 | 1E |
| C2D0:00 | 8D | 01 | D4 | 60 | CE | C2 | 04 | EE |
| C2D8:AD | C2 | 04 | C9 | 30 | D0 | 06 | 20 | F3 |
| C2E0:FC | C2 | 4C | AA | C4 | A2 | 00 | 86 | 01 |
| C2E8:0D | E8 | 8E | 15 | D0 | A0 | 7F | B9 | 14 |
| C2F0:AF | C9 | 99 | 80 | 20 | 88 | 10 | F7 | 37 |
| C2F8:E8 | 8E | 27 | D0 | A9 | 00 | 8D | 0F | FF |
| C300:D4 | 8D | 08 | D4 | AD | 1E | D0 | 60 | 8B |
| C308:A2 | 05 | 86 | A7 | AD | 15 | D0 | 85 | 56 |
| C310:A8 | 85 | A5 | 18 | 06 | A8 | B0 | 46 | FD |
| C318:A8 | 12 | D0 | BD | 80 | 24 | 6D | 12 | F2 |
| C320:D0 | 29 | 0B | A8 | B9 | 8D | CB | AA | 8C |
| C328:B9 | 99 | CB | A4 | A7 | 99 | 3E | 03 | D9 |
| C330:98 | 18 | 0A | 69 | 04 | A8 | 8A | 99 | 53 |
| C338:00 | D0 | C8 | A9 | 82 | 99 | 00 | D0 | F2 |
| C340:A4 | A7 | AD | 12 | D0 | AA | BD | 00 | 08 |
| C348:24 | 29 | 03 | F0 | F5 | 99 | 48 | 03 | 45 |
| C350:A5 | A5 | 19 | A7 | CB | 85 | A5 | A9 | 1B |
| C358:00 | 99 | 34 | 03 | F0 | 49 | A5 | A7 | 9C |
| C360:A8 | 18 | 0A | 69 | 04 | AA | B9 | 34 | 8C |
| C368:03 | 30 | 1F | 18 | BD | 00 | D0 | D9 | 4C |
| C370:3E | 03 | 90 | 10 | B9 | 3E | 03 | 90 | 55 |
| C378:00 | D0 | B9 | 34 | 03 | 09 | FF | 99 | 84 |
| C380:34 | 03 | 30 | 09 | FE | 00 | D0 | 4C | 5F |
| C388:8D | C3 | DE | 00 | D0 | E8 | BD | 00 | 49 |
| C390:D0 | 79 | 48 | 03 | C9 | FD | 90 | 0C | 8B |
| C398:A9 | FF | 59 | A7 | CB | 25 | A5 | 85 | 5E |
| C3A0:A5 | 4C | A7 | C3 | 9D | 00 | D0 | C6 | 94 |



PROGRAMS

R O B E R T B I X B Y

There may come a time when you want to unscratch a file, change a file from sequential to program, reconstruct a damaged disk, or find the load address of a particular file. That's when a disk sector editor such as *Periscope II* comes in handy.

Periscope originally was a simple sector reader and editor for the 1581 and 128, but I realized that it could be made to work with any of the current Commodore drives since they all have virtually the same operating system. The original version was published in May 1988, but it worked only with a 128. Now, here's an upgraded version called *Periscope II*.

I changed the interface somewhat and added the ability to enter a specified value in a sector. It still works with all Commodore disk drives, but I've also added a version for the 64.

Getting Started

Periscope II is written entirely in BASIC. To help prevent typing errors, use *The Automatic Proofreader* to type it in; see "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program.

How to Use the Program

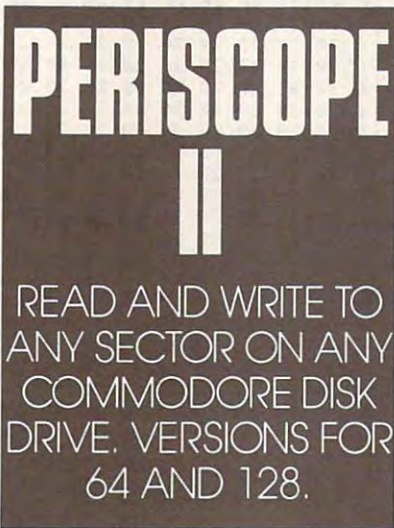
When you load and run *Periscope II*, you'll be prompted to enter the type of disk drive you're using. Press the cursor key until the drive type is highlighted.

Next you'll be asked to enter the drive number. The default is device number 8. If this is your drive number, simply press Return. Otherwise, just enter the device number of your drive at the prompt. You can easily change the default to another number by altering the number in line 70 of the 128 version or line 60 of the 64 version.

The menu then appears with a list of six options. Its selections consist of J for jump forward, E for edit, N for new, B for back, Q for quit, and V for value. Let's take a look at each of these selections.

Jump Forward

Most of the time you'll be using *Periscope II* to trace programs or text files that are linked by the first two bytes in the sector. Pressing C for continue will cause the program to read these bytes and call up the next sector in succession. When you reach the last sector, it will go no further. That's when N and B come in handy.



New

Pressing N will allow you to specify a new track and sector. Simply enter these numbers at the prompt. Entering 18,0 will take you to the first sector in the directory sequence of a disk in the 1541 or 1571 drive. Entering 40,0 will take you to the equivalent sector of a disk in a 1581.

Another use for new is to confirm that your edit was correctly written to disk. When you've finished editing a sector and you've pressed Return to save it to disk, press N and Return without entering new track and sector numbers. This will call up the sector again for inspection.

Back

If you're going through a sequence of sectors and you want to go backward, you may do so. *Periscope II* will save the addresses of up to 25 previous sec-

tors. It won't take you to the first sector, however; you must have progressed through at least two sectors before you can back up.

Edit

Edit is a powerful feature selected by choosing E from the starting menu. This puts you into the sector displayed in the first 256 bytes of screen memory. You can type a message, alter a directory, maintain a filing system (with up to 664 256-byte records on a 1541, 1328 records on a 1571, or 3160 records on a 1581), edit text files, correct a damaged sector, and so on.

Quit

It's very important to enter Q when you're ready to stop reading sectors.

When you want to save the sector to disk, press Ctrl-W. You'll be prompted with a message asking whether you really want to save this sector. If you respond with anything other than a lowercase y, the changes you've made to the sector won't be saved. If you've made a mistake or for any other reason don't want to save the sector to disk, press Return. By aborting the save, you'll move out of edit mode.

You may direct the sequence from within the editor. For instance, if you've looked through a disk directory and found a file you want to pursue, you may press N and enter the pointers to that file, if you're good at reading screen code. If you prefer, you can press E, place the cursor on the first byte of the pointer, and press Ctrl-J. You'll instantly go to the first sector of the file. Continue pressing Ctrl-J to proceed through the file. You'll remain in edit mode until you press Return.

If you need to go backward while in edit mode, press Ctrl-B. The same rules apply as with Ctrl-J.

I'd be remiss not to warn the novice that virtually every byte in an active file or directory is significant. If you begin putting in changes without understanding the disk operating system, you will be very likely to lose a



PROGRAMS

file or a whole disk. During *Periscope II*'s development, I lost a huge amount of important data, thinking I had thoroughly debugged the editor. I'd hate for that to happen to anyone else. Fortunately, once debugged, *Periscope* was instrumental in restoring the data. Before you start to work on any disk, make a copy of it first. Then use *Periscope II* with the copy.

Value

The original version of *Periscope* would allow you to enter a value only by typing in the sector area. Now you can enter a value either from within edit mode (by pressing Ctrl-V) or from outside edit mode by pressing V. You'll be prompted for a value, which will be placed in the current cursor location within the edit area.

Reading and writing to the disk are handled by a very fast machine language routine. Since the program is written in BASIC, however, you should have no trouble tracing it or altering it to suit your individual needs.

PERISCOPE 64

```
GD 10 REM COPYRIGHT 1991 - COM
PUTE PUBLICATIONS INTL L
TD - ALL RIGHTS RESERVED
XK 40 GOSUB720
XR 50 GOSUB870
RF 60 INPUT "DEVICE NUMBER
{2 RIGHT}8{3 LEFT}";DR:I
F DR<8 OR DR>11 THEN 60
BC 70 PRINT "{CLR}"
XX 80 OPEN15,DR,15:OPEN5,DR,5,
"#":OPEN4,DR,4,"#":GOSUB
220:GOTO270
QF 90 INPUT "{HOME}{8 DOWN}TRA
CK,SECTOR NUMBER
{10 SPACES}{10 LEFT}";TR
,SE
MP 100 PRINT "{HOME}{8 DOWN}
{39 SPACES}"
CX 110 IFTY$="A"AND(TR<10TR>8
0ORSE<0ORSE>39)THENRETU
RN
KD 120 IFTY$<"B"THEN170
EK 130 IF(TR<10TR>70ORSE<0ORS
E>20)THENRETURN
KA 140 IF((TR>17ANDTR<25)OR(TR
>52ANDTR<60))ANDSE>18TH
ENRETURN
MF 150 IF((TR>24ANDTR<31)OR(TR
>59ANDTR<66))ANDSE>17TH
ENRETURN
FP 160 IF((TR>30ANDTR<36)OR(TR
>65ANDTR<71))ANDSE>16TH
ENRETURN
ED 170 IFTY$<"C"THEN220
EK 180 IFTR<10TR>35ORSE<0ORSE
>20THENRETURN
CJ 190 IFTR>17ANDTR<25ANDSE>18
THENRETURN
GH 200 IFTR>24ANDTR<31ANDSE>17
THENRETURN
GP 210 IFTR>30ANDSE>16THENRETU
```

```
RN
BF 220 PRINT#15,"U1";5;0;TR;SE
SD 230 SYS49152
MQ 240 BK(PO)=TR:BK(PO+1)=SE:P
O=PO+2:IFPO>51THENPO=0
BE 250 IFPO>L1THENLI=PO
CG 260 RETURN
BC 270 GOSUB850:PRINT "{HOME}
{10 DOWN}"MES:PRINT"TRA
CK{6 SPACES}{6 LEFT}"TR
;
GS 280 PRINT "SECTOR{6 SPACES}
{6 LEFT}"SE"{8 SPACES}"
EH 290 GET CS:IFCS$=""THEN 290
MA 300 IFC$="J"THENGOSUB680
EK 310 IFC$="E"THENGOSUB370
SJ 320 IFC$="N"THENGOSUB90
KK 330 IFC$="B"THENGOSUB650
PS 340 IFC$="Q"THENG90
SB 350 IFC$="V"THENGOSUB990
AP 360 GOTO270
SS 370 CL=0
KP 380 GOSUB1020
JB 390 GOSUB590:GETINS:IFINS$=""
THEN390
MA 400 IN=ASC(IN$):IFIN=23THEN
630
BM 410 IFIN=22THENGOSUB990:INS
$=""GOTO390
AD 420 IFINCOS13THENRETURN
QE 430 IFIN=19THEN370
QF 440 IFIN=10THENTR=PEEK(C1):
SE=PEEK(C1+1):GOSUB110:
POKE197,0:GOTO370
JG 450 IFINCOS2THENGOSUB650:PO
KE208,0:GOTO370
GR 460 IFIN=17ANDCL<215THENCL=
CL+40:GOTO530
AH 470 IFIN=29ANDCL<255THEN520
MM 480 IFIN=145ANDCL<39THENCL=
CL-40:GOTO530
PE 490 IFIN=157ANDCL>0THENCL=C
L-1:GOTO530
DJ 500 IFIN=18ORIN=146THEN530
KH 510 IFIN<320R(IN)>127ANDIN<1
60)THEN390
PS 520 CL=CL+1:IFCL>256THEN370
DA 530 POKE781,(C1-1024)/40
FK 540 C2=(C1-1024)
JP 550 IFC2>39THENC2=C2-40:GOT
O550
AB 560 POKE782,C2
MX 570 POKE783,PEEK(783)AND254
:SYS65520
FA 580 PRINTINS$:GOTO390
JF 590 C1=1024+CL:C2=PEEK(C1):
POKE820,C2:SYS49198
DF 600 POKEC1,PEEK(820):C3=PEE
K(C1+1):C4=C2+C3*256
HJ 610 POKEC1,C2:POKE782,19:PO
KE781,7:POKE783,PEEK(78
3)AND254:SYS65520
QJ 620 PRINT "{6 SPACES}
{6 LEFT}"C2"{6 SPACES}
{6 LEFT}"C4:RETURN
FD 621 PRINT "{HOME}{RED}
{7 DOWN}";
HB 622 INPUT"WRITE THIS TO DIS
K <Y/N>{16 SPACES}
{12 LEFT}"
GM 623 IFWR$<"Y"THEN200
RC 630 PRINT "{HOME}{RED}
{7 DOWN}";
BJ 631 INPUT"WRITE SECTOR TO D
ISK <Y/N> N{12 SPACES}
{13 LEFT}";WR$
CM 632 PRINT "{HOME}{WHT}
{7 DOWN}{49 SPACES}"
```

```
AX 633 IFWR$<"Y"THEN220
SQ 635 SYS49171
XK 640 PRINT#15,"U2";4;0;TR;SE
:RETURN
PC 650 PO=PO-4:IFPO<0THENPO=LI
:PRINT "{HOME}{RED}
{7 DOWN}NO PREVIOUS SEC
TOR{WHT}":GOTO670
MJ 660 TR=BK(PO):SE=BK(PO+1)
JG 670 GOSUB1030:PRINT "{HOME}
{7 DOWN}{20 SPACES}":GO
TOL10
QS 680 TR=PEEK(1024):SE=PEEK(1
025):GOTO110
HJ 690 INPUT#15,A,B$,C,D:PRINT
A;B$;C;D
EA 700 CLOSE4:CLOSE5:CLOSE15:P
RINT "{CLR}"
HE 710 POKE808,237:END:REM ENA
BLE STOP KEY AND RUN/ST
OP-RESTORE
PH 720 PO=0:CL=1024:DIM BK(51)
:PRINTCHR$(14)CHR$(8):P
OKE248,192:TR=1:SE=1
FG 730 POKE53280,0:POKE53281,0
:PRINT "{CLR}{WHT}"TAB(1
4)"PERISCOPE 2.0":PRINT
QB 740 BX$="COPYRIGHT 1991 COM
PUTE PUB. INTL. LTD.":G
OSUB 9998
EJ 750 BX$="ALL RIGHTS RESERVE
D":GOSUB 9998
PF 760 RES=CHR$(13):MES$="{YEL}
J{7 SPACES}JUMP TO NEXT
LINK"+RES+"Q{7 SPACES}
QUIT"+RES$
AS 770 MES=MES+"E{7 SPACES}EDI
T"+RES+"N{7 SPACES}NEW
{SPACE}SECTOR"+RES$
JX 780 MES=MES+"B{7 SPACES}BAC
K UP{5 SPACES}"+RES$
MH 785 MES=MES+"V{7 SPACES}VAL
UE{9 SPACES}"+RES+"PRES
S KEY{WHT}"
FP 790 EE$="{YEL}CTRL-J
{2 SPACES}JUMP TO NEXT
{SPACE}LINK"+RES$+RETUR
N{2 SPACES}EXIT
{11 SPACES}"+RES$
FM 800 EE$=EE$+"CTRL-B
{2 SPACES}BACK UP
{3 SPACES}"+RES$+"CTRL-V
{2 SPACES}VALUE
{9 SPACES}"
HD 805 EE$=EE$+RES$+"CTRL-W
{2 SPACES}WRITE SECTOR"
FD 810 EE$=EE$+"{12 SPACES}"+R
E$+"{13 SPACES}"+RES$+"P
RESS KEY{10 SPACES}
{WHT}"
CS 820 CL$="{40 SPACES}"
AD 830 RESTORE:FORI=0TO54:READ
A:POKE49152+I,A:B=B+A
BA 840 NEXT:IFB<>7120THENPRINT
"{CLR}{RED}ERROR
{2 SPACES}IN DATA STATE
MENTS":END
KG 850 :
RS 860 POKE808,234:RETURN:REM
{SPACE}DISABLE STOP AND
RUN/STOP-RESTORE
GD 870 S1=0:S$="158115711541":
TYS$="ABC"
QX 880 GOTO940
JM 890 GETAS:IFAS$=""THEN 890
DQ 900 IFAS$="{UP}"ORA$="{DOWN}
"ORA$=CHR$(13)THEN920
BA 910 GOTO870
```



PROGRAMS

```

MA 920 IFA$=CHR$(13)THENTYS=MI
DS(TYS,S1+1,1):RETURN
FA 930 S1=S1+(A$="{UP}")-(A$="{
DOWN}"):IF(S1<0ORS1>2)
THENS1=-2*(S1<0):IFS1>2
THENS1=0
XS 940 PRINT"{HOME}{9 DOWN}CUR
SOR TO":PRINT"HIGHLIGHT
":PRINT"DRIVE TYPE":PRI
NT
QG 950 FORI=0TO2:GOSUB970:NEXT
XE 960 GOTO890
ED 970 IFS1=ITHEMPRINT"{RVS}";
AK 980 FORJ=0TO3:PRINTMIDS(SS,
I*4+J+1,1);:NEXT:PRINT:
RETURN
PS 990 INPUT"{HOME}{RED}
{8 DOWN}ENTER VALUE TO
{SPACE}INSERT{WHT}";AS
DX 1000 A=INT(VAL(AS)):IFA>-1A
NDA<256THENPOKECL,A
MQ 1005 PRINT"{HOME}{8 DOWN}
{26 SPACES}":RETURN
GD 1010 GOTO990
QD 1020 PRINT"{HOME}{10 DOWN}"
EES:PRINT"TRACK"TR"
{LEFT}{2 SPACES}SECTOR
"SE"{LEFT}{2 SPACES}":
RETURN
PJ 1030 FORI=0TO1000:NEXT:RETU
RN
EP 1040 DATA162,005,032,198,25
5
BK 1050 DATA160,000,032,207,25
5
XG 1060 DATA153,000,004,200,20
8
GP 1070 DATA247,076,204,255,16
2
GJ 1080 DATA004,032,201,255,16
0
KG 1090 DATA000,185,001,004,03
2
FQ 1100 DATA210,255,200,192,25
5
GR 1110 DATA144,245,173,000,00
4
XD 1120 DATA032,210,255,076,20
4
JC 1130 DATA255,173,052,003,07
3
ES 1140 DATA128,141,052,003,09
6
MA 9998 FOR TX=1 TO 20-LEN(BXS
)/2:PRINTCHR$(32);:NEX
T:PRINTBXS:RETURN

```

PERISCOPE 128

```

GD 10 REM COPYRIGHT 1991 - COM
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TD - ALL RIGHTS RESERVED
FE 40 GRAPHICCLR
GJ 50 GOSUB700
DK 60 GOSUB800
AA 70 INPUT "DEVICE NUMBER
{2 RIGHT}8{3 LEFT}";DR:I
F DR<8 OR DR>11 THEN 70
JG 80 OPEN15,DR,15:OPENS,DR,5,
"#":OPEN4,DR,4,"#":GOSUB
210:GOTO260
HD 90 INPUT "{HOME}{8 DOWN}TRA
CK,SECTOR NUMBER";TR,SE
SX 100 IFTYS="A"AND(TR<10TR>8
ORSE<0ORSE>39)THENRETU
RN
RR 110 IFTYS<>"B"THEN160
AJ 120 IF(TR<10TR>7ORSE<0ORS

```

```

E>20)THENRETURN
RB 130 IF((TR>17ANDTR<25)OR(TR
>52ANDTR<60))ANDSE>18TH
ENRETURN
SG 140 IF((TR>24ANDTR<31)OR(TR
>59ANDTR<66))ANDSE>17TH
ENRETURN
KP 150 IF((TR>30ANDTR<36)OR(TR
>65ANDTR<71))ANDSE>16TH
ENRETURN
GR 160 IFTYS<>"C"THEN210
AS 170 IFTR<10TR>35ORSE<0ORSE
>20THENRETURN
GK 180 IFTR>17ANDTR<25ANDSE>18
THENRETURN
KG 190 IFTR>24ANDTR<31ANDSE>17
THENRETURN
MQ 200 IFTR>30ANDSE>16THENRETU
RN
SM 210 PRINT#15,"U1";5;0;TR;SE
KB 220 SYS4864
SR 230 BK(PO)=TR:BK(PO+1)=SE:P
O=PO+2:IFPO>51THENPO=0
RF 240 IFPO>LITHEMLI=PO
SG 250 RETURN
AS 260 GOSUB780:PRINTMES:PRINT
"TRACK"TR;"SECTOR"SE
BP 270 GET C$:IFC$=""THEN 270
PF 280 IFC$="J"THENGOSUB660
HS 290 IFC$="E"THENGOSUB350
GX 300 IFC$="N"THENGOSUB90
HX 310 IFC$="B"THENGOSUB640
BM 320 IFC$="Q"THEN670
DS 330 IFC$="V"THENGOSUB920
DK 340 GOTO260
DX 350 GOSUB950:WINDOW 0,0,39,
7:CL=0
SH 360 GOSUB570:GETIN$:IFIN$=""
THEN360
GH 370 IN=ASC(IN$):IFIN=13THEN
RETURN
MS 380 IFIN=23THEN600
GM 390 IFIN=22THENGOSUB920:IN$
="":GOTO360
BF 400 IFIN=6THENRETURN
EB 410 IFIN=19THEN350
XE 420 IFIN=22THENTR=PEEK(CL):
SE=PEEK(CL+1):GOSUB100:
POKE208,0:GOTO350
BX 430 IFIN=2THENGOSUB640:POKE
208,0:GOTO350
PG 440 IFIN=17ANDCL<215THENCL=
CL+40:GOTO510
KJ 450 IFIN=29ANDCL<255THEN500
SQ 460 IFIN=145ANDCL>39THENCL=
CL-40:GOTO510
PC 470 IFIN=157ANDCL>0THENCL=C
L-1:GOTO510
SQ 480 IFIN=180IN=146THEN510
XQ 490 IFIN<320R(IN>127ANDIN<1
60)THEN360
FC 500 CL=CL+1:IFCL>256THEN350
AG 510 POKE7,(CL-1024)/40
RG 520 C2=(CL-1024)
MA 530 IFC2>39THENC2=C2-40:GOT
O530
JR 540 POKE8,C2
JM 550 POKE5,PEEK(5)AND254:SYS
65520
PR 560 PRINTIN$:GOTO360
SB 570 CL=1024+CL:C2=PEEK(CL):
POKECL,XOR(C2,128):C3=P
EEK(CL+1):C4=C2+C3*256
SA 580 POKECL,C2:POKE8,19:POKE
7,7:POKE5,PEEK(5)AND254
:SYS65520
DJ 590 PRINT"{2 LEFT}"C2"
{LEFT}"($)RIGHT$(HEX$(C2

```

```

),2)"}"C4"{LEFT}"$HEX$(
C4)"}{5 SPACES}":RETUR
N
QM 600 PRINT"{HOME}{RED}
{7 DOWN}";:INPUT"WRITE
{SPACE}THIS TO DISK <Y/
N>{16 SPACES}{15 LEFT}"
;WR$:PRINT"{HOME}
{7 DOWN}{39 SPACES}"
KP 610 IFWR$<>"Y"THEN210
QP 620 SYS4883
MG 630 PRINT#15,"U2";4;0;TR;SE
:RETURN
HA 640 PO=PO-4:IFPO<0THENPO=LI
:PRINT"{RED}{HOME}
{7 DOWN}THERE IS NO PRE
VIOUS SECTOR{12 SPACES}
":SLEEP1:PRINT"{HOME}
{WHT}{7 DOWN}
{29 SPACES}"
JP 650 TR=BK(PO):SE=BK(PO+1):S
LEEP1:GOTO100
BK 660 TR=PEEK(1024):SE=PEEK(1
025):GOTO100
JG 670 INPUT#15,A,B$,C,D:PRINT
A;B$;C;D
KG 680 CLOSE4:CLOSE5:CLOSE15:P
RINT"{2 HOME}{CLR}":POK
E248,0
EP 690 SYS4944:END:REM ENABLE
{SPACE}STOP KEY AND RUN
/STOP-RESTORE
DC 700 PO=0:C1=1024:DIM BK(51)
:PRINTCHR$(14)CHR$(8):P
OKE248,192:TR=1:SE=1:TR
AP680
DH 710 POKE53280,0:POKE53281,0
:PRINT"{CLR}{WHT}"TAB(1
4)"PERISCOPE 2.0"
QD 711 BX$="COPYRIGHT 1991 COM
PUTE PUB. INTL. LTD.":G
OSUB 9998
AS 720 BX$="ALL RIGHTS RESERVE
D":GOSUB 9998
FK 730 RES$=CHR$(13):MES$="{YEL}
J JUMP TO NEXT LINK"+RE
S$+"Q QUIT"+RES$+"E EDIT"
+RES$+"N NEW SECTOR"+RES$
+"B BACK UP"+RES$+"V ENT
ER VALUE"+RES$+"PRESS KE
Y{WHT}"
XR 740 EES$="{YEL}CTRL-J
{2 SPACES}JUMP TO NEXT
{SPACE}LINK"+RES$+"RETUR
N{2 SPACES}QUIT"+RES$+"C
TRL-B{2 SPACES}BACK UP"
+RES$+"CTRL-V{2 SPACES}E
NTER VALUE"
DD 750 EES$=EES$+RES$+"CTRL-W
{2 SPACES}SAVE SECTOR"+
RES$+"PRESS KEY{WHT}"
DQ 760 RESTORE:FORI=0TO114:REA
DA:POKE4864+I,A:B=B+A
PH 770 NEXT:IFB<>12696THENPRIN
T"{2 HOME}{CLR}{RED}ERR
OR{2 SPACES}IN DATA
TEMENTS{WHT}":END
EX 780 WINDOW 0,16,39,24,1
RX 790 SYS4919:RETURN:REM DISA
BLE STOP AND RUN/STOP-R
ESTORE
CS 800 S1=0:SS$="158115711541":
TYS$="ABC"
PP 810 GOTO870
RC 820 GETKEY AS
HD 830 IFA$="{UP}"ORAS$="{DOWN}
"ORAS$=CHR$(13)THEN850
AJ 840 GOTO800

```




PROGRAMS

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|----------|----|----|----|----|----|----|----|----|----------|---------|----|----|----|----|----|----|----|----|
| 08B1:03 | 4C | 13 | 01 | E8 | 20 | 34 | 03 | FB | 08B21:FB | B9 | 9B | 0A | 85 | FC | 30 | B1 | E9 | 08D91:91 | 22 | B2 | 15 | 0B | 60 | 3A | 04 | F6 | |
| 08B9:D0 | 1C | A0 | 03 | 84 | A8 | E8 | 20 | 36 | 08B29:FB | 08 | 09 | 20 | 9E | 0A | 91 | FB | 9E | 0D99:CD | D6 | DA | 43 | C8 | CB | CC | D5 | C4 | |
| 08C1:34 | 03 | F0 | 08 | A2 | 08 | 20 | 34 | F4 | 08B31:BA | A5 | F1 | 39 | 19 | 28 | 20 | 18 | 9E | 0DA1:D9 | DD | DE | DF | E0 | E1 | 19 | 05 | BF | |
| 08C9:03 | 4C | 5C | 01 | A2 | 0C | 20 | 34 | C3 | 08B39:32 | 32 | 32 | 18 | 2A | 90 | 02 | 09 | 5D | 0DA9:19 | 14 | C2 | E9 | 05 | 06 | 45 | 86 | 9D | |
| 08D1:03 | E6 | A7 | 4C | 5C | 01 | E8 | 20 | AF | 08B41:01 | C1 | 72 | F4 | 23 | EC | 12 | 0B | E1 | 0DB1:F9 | 60 | B4 | 0E | 86 | 60 | 4F | 7F | 2C | |
| 08D9:34 | 03 | D0 | 0A | E8 | 20 | 34 | 03 | B2 | 08B49:8D | 25 | BE | 8E | 26 | 1C | 02 | 0C | E1 | 0DB9:A9 | 5B | 25 | 38 | 18 | A7 | 43 | 07 | 94 | |
| 08E1:18 | 69 | 04 | A8 | D0 | D6 | E8 | 20 | 37 | 08B51:8D | 27 | 6B | 14 | 8D | 1C | CA | FE | 18 | 0DC1:5D | D0 | 3C | 1C | A2 | 02 | 0C | DA | 18 | |
| 08E9:34 | 03 | D0 | 0A | A2 | 02 | 20 | 34 | 21 | 08B59:8D | 81 | CE | 12 | 8D | E7 | 2C | 7D | 73 | 0DC9:FF | C3 | C8 | 16 | 00 | 99 | 16 | 02 | E3 | |
| 08F1:03 | 18 | 69 | 06 | D0 | ED | A2 | 08 | A2 | 08B61:19 | 01 | 20 | B4 | 81 | B0 | 09 | FE | 73 | 0DD1:E4 | 24 | 71 | 3F | B9 | 90 | 0E | 1C | D1 | |
| 08F9:20 | 34 | 03 | D0 | E6 | A9 | 00 | 85 | F7 | 08B69:C6 | FF | 41 | E4 | 08 | 03 | 00 | 2C | D1 | 0DD9:4E | 01 | 60 | 4C | D7 | 02 | 8E | 8A | 9A | |
| 0901:A7 | A4 | FB | F0 | 0C | 06 | FA | 2A | 37 | 08B71:00 | 08 | 0D | 12 | 17 | 87 | EB | 14 | 0F | 0DE1:31 | 0C | 18 | D1 | 8D | C6 | 10 | 80 | DF | |
| 0909:26 | A7 | C6 | FB | CA | D0 | F2 | A8 | D8 | 08B79:C6 | C4 | 0A | 8E | 4E | D1 | 01 | 52 | 5C | 0DE9:24 | 3C | 39 | 34 | 02 | D9 | 3B | 64 | E1 | |
| 0911:60 | 48 | B1 | FE | 85 | FA | A9 | 08 | FE | 08B81:16 | 1E | 69 | 45 | E1 | 0C | 43 | 45 | B6 | 0DF1:32 | 24 | 92 | 80 | F0 | 43 | 91 | 02 | 42 | |
| 0919:85 | FB | 68 | 4A | FE | D0 | 02 | C6 | 4A | 08B89:18 | 01 | 14 | 72 | 22 | 04 | 04 | 54 | 13 | 0DF9:C9 | 02 | D0 | 05 | A0 | FD | FF | 0D | ED | |
| 0921:FF | C6 | FE | C0 | E7 | D0 | DE | A4 | B5 | 08B91:10 | 10 | 00 | 1D | D5 | D5 | 50 | DD | 0A | 0E01:44 | CD | 4A | F4 | 17 | 34 | 34 | D0 | 0E | |
| 0929:FF | C0 | 07 | D0 | D8 | A9 | 37 | 85 | BA | 08B99:DD | CB | 00 | CD | CD | 00 | 07 | DA | C5 | 0E09:0E | 73 | CD | 1B | ED | 30 | 09 | DE | 95 | |
| 0931:01 | 58 | 4C | 13 | 08 | A4 | A8 | F0 | A9 | 08BA1:DA | 50 | 40 | 10 | 14 | 10 | 10 | 14 | 57 | 0E11:D4 | 60 | 24 | 14 | 21 | 0A | 0D | 85 | 46 | |
| 0939:22 | A5 | F7 | 38 | E5 | A8 | B0 | 03 | 7E | 08BA9:BE | 3E | 04 | 90 | 51 | 24 | D9 | 0D | 14 | 0E19:C7 | B6 | 44 | 80 | 20 | FE | 13 | 86 | 01 | |
| 0941:C6 | F8 | 38 | 85 | F7 | A5 | FC | E5 | 8A | 08BB1:0B | D0 | 3C | 4A | 75 | B9 | E8 | 1C | 14 | 0E21:DD | 09 | 09 | F0 | 25 | C9 | 66 | 21 | DC | |
| 0949:A8 | B0 | 02 | C6 | FD | 85 | FC | B1 | 3A | 08BB9:D9 | 1D | 0B | F0 | 0B | BE | 30 | E8 | 11 | 0E29:C9 | 0B | D0 | 0C | AD | 16 | 0F | 29 | D4 | |
| 0951:F7 | 88 | 91 | FC | 98 | D0 | F8 | C4 | 42 | 08BC1:8A | 01 | 21 | 4C | 85 | 0B | B9 | 94 | A6 | 0E31:27 | F1 | 51 | 01 | 99 | 1F | E2 | 01 | A7 | |
| 0959:A9 | F0 | 0A | B1 | F7 | C6 | FD | C6 | 76 | 08BC9:AC | A1 | 51 | 8C | 90 | 0E | D4 | 7E | 76 | 0E39:58 | 32 | 08 | A0 | 61 | 0E | 8D | 00 | 77 | |
| 0961:F8 | C6 | A9 | 10 | EC | 60 | 78 | E6 | 98 | 08BD1:C0 | 12 | 03 | 19 | 70 | FC | 17 | 06 | 6A | 0E41:9A | AA | 0B | 5C | 46 | E3 | 13 | AD | 99 | |
| 0969:01 | 4C | 16 | 08 | 60 | 00 | 11 | 08 | 7F | 08BD9:8E | A9 | 03 | 50 | BA | C8 | 4C | 37 | CF | 0E49:EF | 00 | 40 | 0D | 08 | 67 | 53 | 88 | 43 | |
| 0971:C5 | 07 | 9E | 20 | 28 | 32 | 30 | 36 | 9E | 08BE1:C2 | E5 | DC | 8D | 54 | 0B | 85 | 97 | B8 | 0E51:89 | 0D | 1D | 68 | 62 | DB | 89 | 78 | A1 | |
| 0979:37 | 29 | E6 | A3 | 43 | 22 | 02 | 20 | 4F | 08BE9:61 | 2C | BE | C8 | C2 | 08 | 0E | DC | 4F | 0E59:18 | A9 | 02 | 4A | 4F | A0 | 07 | 4C | 28 | |
| 0981:82 | D4 | D5 | 95 | BC | 3C | 86 | 07 | 09 | 08BF1:11 | 0B | E1 | E2 | B1 | 0B | 41 | B4 | AE | 0E61:AB | C8 | 6C | 10 | 80 | C9 | 80 | F0 | 31 | |
| 0989:E1 | 5F | 1A | A2 | 00 | 63 | 46 | 96 | 82 | 08BF9:AB | 03 | 20 | 2A | 0C | 60 | 7F | 0D | 3B | 0E69:1B | B9 | AF | 43 | 8D | 5C | 88 | 62 | FC | |
| 0991:D0 | 02 | A2 | 0B | 8E | 20 | D0 | 06 | 2E | 08C01:52 | B8 | 09 | 86 | 48 | 1C | 91 | 20 | EF | 0E71:38 | E9 | 00 | C9 | 32 | B0 | 1B | 0E | 59 | |
| 0999:07 | 79 | D8 | 20 | 59 | 16 | 3A | B9 | FB | 08C09:B2 | 41 | C9 | 19 | 5A | 89 | 19 | 36 | F6 | 0E79:5E | 91 | 32 | 4C | 7C | 0F | 69 | 2B | 52 | |
| 09A1:DE | C2 | 23 | 45 | 03 | F0 | 38 | F0 | C9 | 08C11:22 | AD | 39 | 09 | 20 | 91 | 03 | B0 | 5B | 0E81:18 | 0F | 40 | 27 | C9 | 96 | 90 | 05 | B6 | |
| 09A9:AA | 5E | 72 | 9E | 0B | 31 | 89 | 89 | 9A | 08C19:04 | 57 | 50 | 90 | 8D | F6 | 0B | 74 | EE | 0E89:20 | 80 | 0F | A9 | 96 | 58 | DC | 26 | 48 | |
| 09B1:0B | 20 | AC | 1A | 20 | 68 | 0C | 20 | 63 | 08C21:55 | 1B | 24 | E1 | 72 | 9C | E1 | 8D | A4 | 0E91:E3 | B4 | 49 | 80 | 0A | 60 | B9 | AC | EF | |
| 09B9:0B | 30 | 8E | DF | 0E | 4C | 36 | 20 | 5B | 08C29:94 | 71 | 00 | 13 | 29 | 36 | 47 | 3E | 08 | 0E99:14 | 60 | A2 | D9 | 31 | F0 | 04 | A3 | C2 | |
| 09C1:9A | 12 | 72 | 30 | 4A | 4C | 15 | F1 | 96 | 08C31:63 | 04 | CA | 70 | 64 | 30 | 0A | 17 | 6B | 0EAL:82 | 60 | C6 | 6C | 23 | B0 | 28 | 1A | 7C | |
| 09C9:2A | 13 | 8C | 1A | AD | 35 | AF | 21 | AB | 08C39:3C | 8C | 42 | 47 | 4F | 61 | 4F | 04 | F1 | 0EA9:3F | 9C | 0F | 24 | 2E | 00 | 08 | 3A | FO | |
| 09D1:24 | B9 | 4C | 63 | 18 | A6 | 17 | 9C | 4A | 08C41:55 | 13 | 13 | 86 | 91 | 76 | 84 | AD | B0 | 0EB1:5E | 1B | 28 | 2E | 60 | AA | 2E | 23 | D8 | |
| 09D9:B0 | 80 | 01 | 58 | 3B | B7 | A0 | 08 | 0C | 08C49:8B | D4 | 69 | 1E | 8D | 02 | 0D | AD | 2F | 0EB9:BA | E0 | FF | 43 | 0B | 06 | 4C | BA | 6B | |
| 09E1:07 | D0 | 70 | 64 | 3B | 1D | CB | 8E | 74 | 08C51:01 | 15 | 5C | 03 | 55 | 2C | CC | 8D | 6D | 0EC1:BC | 2A | 60 | 8D | 72 | AA | BD | EA | 50 | |
| 09E9:21 | CF | 18 | ED | 4C | 16 | 08 | 03 | 30 | 08C59:F9 | 07 | 50 | 3D | D6 | 0A | A9 | 0A | 4A | 0EC9:11 | CD | 33 | 09 | 90 | 03 | 20 | 4E | F7 | |
| 09F1:0C | 1C | 4D | C3 | B5 | 1C | 4F | 50 | 04 | 08C61:8D | EE | 0A | 08 | 0E | 59 | FD | 38 | C7 | 0ED1:9E | 45 | 38 | 5D | B7 | 0F | A0 | 02 | A8 | |
| 09F9:4C | 45 | CF | 3D | 3D | 3A | F3 | F5 | 02 | 08C69:C5 | 87 | 02 | 13 | 06 | 84 | 2C | 24 | 76 | 0ED9:8E | BA | BD | 46 | 45 | 05 | D5 | 52 | 44 | |
| 0A01:C4 | CE | 8E | 47 | D0 | DB | 51 | B1 | BB | 08C71:80 | 6E | C9 | 8D | E6 | 0A | F7 | 0D | D3 | 0EE1:82 | 20 | 05 | 40 | BD | BE | 43 | 05 | 60 | |
| 0A09:47 | 2D | 41 | 2D | 4D | 6B | 00 | 09 | 28 | 08C79:8C | 38 | 6D | 8D | 92 | 03 | 48 | 1F | BC | 0EE9:ED | 52 | FA | 10 | 40 | 41 | BD | 36 | AA | |
| 0A11:4F | 2D | 56 | 2D | 45 | 2D | 52 | 0D | 46 | 08C81:11 | 3C | 10 | 90 | 09 | 55 | 32 | D8 | 97 | 0EF1:43 | 29 | C0 | 9D | 00 | 30 | 30 | BD | CA | |
| 0A19:C2 | F9 | 32 | 9B | 7C | 0E | EA | 18 | 17 | 08C89:4C | AF | 0C | 20 | B2 | 5B | 95 | C9 | 2F | 0EF9:72 | 11 | C3 | CD | 0C | B1 | 50 | E4 | 95 | |
| 0A21:C8 | 08 | 2D | 2D | 00 | 30 | C0 | 8D | E3 | 08C91:78 | 90 | 27 | 33 | 01 | 60 | 97 | 51 | 2C | 0F01:03 | 6A | 73 | 00 | 65 | BD | AE | 11 | 3A | |
| 0A29:C7 | 18 | 01 | 32 | 80 | 0F | AA | 16 | 16 | 08C99:18 | 6D | BD | 0C | 69 | 94 | 0A | 13 | 56 | 0F09:29 | 0F | AA | 42 | C3 | 08 | B9 | DD | 88 | |
| 0A31:6C | 00 | 74 | F0 | 4A | 8D | 04 | F1 | 9B | 08CA1:08 | 8C | E3 | 0C | 8D | 98 | 37 | 10 | 6B | 0F11:25 | 23 | 18 | C2 | B9 | FD | 0A | 29 | BC | |
| 0A39:20 | 92 | A6 | 02 | 04 | 06 | 08 | 23 | 62 | 08CA9:56 | 50 | 00 | 24 | 10 | D2 | 20 | 07 | 56 | 0F19:40 | C1 | CE | 24 | 06 | 20 | 56 | 0E | 4F | |
| 0A41:C1 | 9B | 00 | 28 | 50 | 78 | A0 | C8 | 0E | 08CB1:1A | 30 | 05 | 34 | D8 | 44 | BC | A0 | B8 | 0F21:4C | 3A | 10 | C1 | 59 | 8F | AE | 44 | BC | |
| 0A49:F0 | 18 | 40 | 68 | 90 | B8 | E0 | 08 | 9B | 08CB9:06 | 60 | 20 | F9 | 0C | B0 | 0C | 0B | D6 | 0F29:10 | E8 | 5C | 09 | 9B | 60 | 0B | 3C | 56 | |
| 0A51:30 | E8 | 75 | 06 | 04 | 8F | 83 | D1 | FD | 08CC1:67 | 28 | 0D | E2 | 0C | AF | 94 | C2 | 72 | 0F31:CE | 95 | 63 | 6B | E1 | 88 | 0B | F1 | 78 | |
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INFO SELECT

Just when chaos had built up a sizable lead, *Info Select* came along and helped me find my desk again.

Info Select is a personal information manager that specializes in random information—the kind I put on the backs of envelopes, in the margins of magazine articles, on the kids' school papers, and worst of all, in my head.

When memory resident, *Info Select* is just a hot key away should the phone ring or the boss drop by with a new assignment.

An enhancement of the acclaimed *Tornado* from Micro Logic, *Info Select* is a master at controlling all of the bits and pieces of information that keep you afloat. Among other things, the program serves as a data manager, a tickler file, and a project-tracking and time-management system.

Info Select organizes data in groups of windows called *stacks*. Each window sizes itself to fit the information in it. Display as many windows as will fit on the screen at one time, with the current window highlighted. This system of showing multiple windows gives you access to as much pertinent information as possible. When Mr. Big calls to discuss the contract you're negotiating, you could have notes from a half-dozen of your previous conversations onscreen at once.

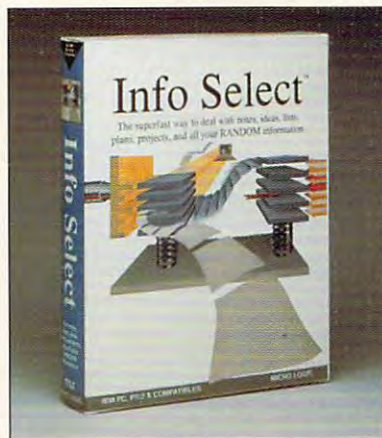
Searching *Info Select* information is as close to instantaneous as imaginable. To find all windows containing a reference to Mr. Smith, press G (for Get). This activates the search screen, which includes several rows of boxes representing your windows. Letter by letter, as you type the word *Smith*, boxes disappear as *Info Select* eliminates them from the search.

When *Info Select* has narrowed

the possibilities to a handful, the pertinent windows are flashed onscreen. The whole process ends as quickly as you can type *G-S-M-I-T-H*.

This program is loaded with features and options, permitting and encouraging customization. You can change the window sizes, borders, and colors. You can automatically time- and date-stamp any new window. You can import information from databases and ASCII files, and you can pull a screen from an underlying application into a window.

The manual bulges with specific ideas on how the program might be useful. An online tutorial introduces you to *Info Select* commands and shows how you might set up a hypertext system using *Info Select*.



Organize your random notes quickly and easily with Micro Logic's *Info Select*.

In the manual you'll also find four pages of compatibility information with tips to make *Info Select* work with your other applications. These tips help resolve hot-key conflicts, or, as with *Microsoft Windows*, suggest running *Info Select* in a non-memory-resident mode.

Info Select is a keyboard-

controlled DOS program without mouse support. Although it displays information in what it calls *windows*, these shouldn't be confused with the windows of Microsoft. There are no buttons to click on or scroll bars to move.

Running *Info Select* memory resident is fast, but doing so consumes upward of 120K of memory. Fortunately, the program includes a utility that swaps *Info Select* off and on disk as you enter and exit. In this mode, *Info Select* takes only 7K when it's inactive. If you can install a ramdisk as the swap device, you'll never notice the swap occurring.

Innumerable other features make *Info Select* a terrific tool. It includes a phone dialer, allows special information windows to be assigned to function keys, and includes a handful of tools for extracting specific information from your stacks. It lets you set up fill-in-the-blank templates for order taking, shipping labels, or purchase requisitions. Printing options give you hard copies of these forms or any of your windows. The program also supports some of the editing commands of *WordStar*, *WordPerfect*, and *Microsoft Word*. *Info Select* is an outstanding organizational tool, a workhorse that remembers everything. I've never had so much fun cleaning up my desk.

TONY ROBERTS

Ease of Use ★★★★★
Documentation ★★★★★
Features ★★★★★
Innovation ★★★★★

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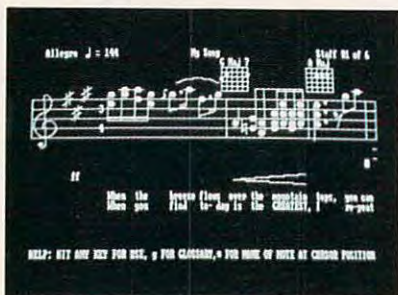
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BASIC COMPOSER 4.3

At last I've found a simple and effective music composition program for people without MIDI experience. It's *Basic Composer*, from Education Software Consultants, and unlike the expensive and elaborate MIDI-based composition programs I've seen, this one should suit my music students quite well.

Since *Basic Composer* is menu driven and features onscreen help prompts, it provides a very user-friendly way to compose and notate music.

Basic Composer's Main Menu gives you a real sense of the program's capabilities. You can start editing, retrieve, print, and save a song; you can also choose to reformat or extract parts of songs or work on a single staff or a grand staff. When you start editing a song, the Compose Menu lets you set the clef, key signature, tempo, dynamic level, and other options. Once you've made these selections, you're ready to begin composing on the workscreen, which pictures the musical staff you have selected.



Basic Composer lets you include guitar chords with a melody line and lyrics.

You place notes and other musical symbols on the screen using various keystrokes, which appear in tables at the end of the manual. If you prefer, you can have onscreen listings of any or all of the keystroke codes you need help with. To hear your composition played back at any time, press R for the last note, P for the current staff, or C for the entire composition.

One hardware limitation PC compatibles have, unfortunately, is

that they can play only one note at a time, so you can't hear chords and harmony. You can, however, play the different notes of chords back separately to check for accuracy.

Once you've finished your musical masterpiece, use one of the many supported printers to generate a detailed hardcopy of your composition. The printouts from my Epson LQ 24-pin printer looked impressive, and I particularly appreciated the program's ability to let me print guitar chords along with a melody line and lyrics. I also found that with *Basic Composer* I could quickly and automatically transpose a piece of music and print it out in a different key.

Basic Composer comes with an exceptional 61-page user's manual, complete with a thorough index and instructions on getting free technical support by calling, writing, or sending a letter on CompuServe using a modem.

I highly recommend *Basic Composer* to music teachers, students, and hobbyists as a powerful and user-friendly alternative to costly and confusing MIDI-based music processors.

JOEY LATIMER

| | |
|-------------------|-------|
| Educational Value | ★★★★★ |
| Documentation | ★★★★★ |
| Originality | ★★★ |
| Graphics | ★★★★ |

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The program provides easy management of a number of separate but related databases. The central feature is the contact menu, through which you process information about prospects and contacts. When you add a record to this database, *Total Manager* leads you through the process of entering the phone number, name, address, and title of the individual, as well as the letter salutation. Other noteworthy items are Source (how you encountered this person), Origin Date (when you started working with this person), and Progress (where you are in the sales cycle). When you bring up a client's record, the program automatically presents the local time at the client's office.

Once you've entered the client record, use the Track option to help you record your last contact with the client. You can indicate the type (call, letter, meeting), date, objective, and result of the contact. You can also enter your next planned contact by date and time, objective, and priority, as well as tasks to be performed in preparation for the contact. After you've made your plans, you can call up your agenda, which shows your planned activities by day or week.

Conveniently, you can at any time bring up a calendar, point to the date desired, and enter it into the record. You may also specify a minimum time between activities, which will automatically keep you from making too tight a schedule. A pop-up calculator lets you enter the results of a calculation into the field of a record.

Many other options in the contact menu show just how flexible and handy this program can be. You can set up filters to screen your database by state or ZIP code or any field you wish. Write a letter, check the spelling, and send it to the printer or print queue. Choose to make a form letter, and vary the paragraphs in it. View the entire history of dealings with a client. Keep records of orders from a client.

In menus other than the contact menu, you can create a multistep marketing plan for a product. You can also create a database of expenses, orders, or goals.

Total Manager is a very powerful program. It's entirely menu driven (though it lacks mouse support), and you can become quite at ease with it >



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after spending a few hours with the tutorial and getting a little practice. The program is a bit pricey, but with all *Total Manager* can do to keep you afloat in your business's ocean of information, it could be well worth its cost.

CHARLES IDOL

Ease of Use ★★★
Documentation ★★★★★
Features ★★★★★
Innovation ★★★★★

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Amiga

WINGS

Part simulator, part role-playing game, and part arcade game, *Wings* is a truly impressive program. It takes you back in time to the latter half of the Great War, World War I. You join the 56th Squadron in the Allied forces as a fresh combat pilot. Earn your wings by successfully completing one of three training missions. They're easy to beat, so you should be in the air quickly. After passing this skill test and entering a word from the manual, you're ready to begin the game proper. What impressed me most about *Wings* is that all of the events in the game fit into a story line that ties in with what was actually going on at that point in the war. You'll eventually fly over 200 missions that take place between March 1916 and November 1918.

As you progress through the story, the missions become more difficult. The planes and equipment that you encounter accurately reflect the weaponry in use in each stage of the war. For example, you'll only encounter monoplanes, not biplanes, until around September 1916. This ap-



The 3-D aerial combat sequence puts you in the pilot's seat against German fighters.

proach draws you into the game and compels you to keep playing. At the beginning of each mission day, you read an entry in the squadron's journal that outlines what will happen that day. You then go to a briefing screen, perform one of the three mission types, and are shown a postflight log that details the success or failure of the mission.

Wings can be played with the joystick, keyboard, or mouse. Most commands are entered by selecting choices from menu screens. The first screen allows you to add and delete pilots, view their statistics, earn your wings, and join the squadron. On every game day, you're notified of any deaths or departures of members and any new pilots that have joined your group. The command screen lets you review pilots' characteristics, start a new game, send a pilot to flight school, and save your game.

Four characteristics affect the performance of each pilot: flying ability, shooting ability, mechanical aptitude, and stamina. As you play the game, these statistics and others, like number of confirmed kills, number of missions, and number of bomb hits, are tallied on the pilot data screen.

There are three sequences in *Wings*: aerial combat (3-D view from behind the pilot), bombing (2-D view from above your plane), and strafing (in three-quarters perspective, like the old *Zaxxon* arcade game). All three are easy to learn, but *Wings* throws a lot of variety into each mission. The animation in the 3-D fighting sequences is flawless. A great feature of the 3-D combat is the ability to switch views by pressing one of the four compass directions on the keypad. You can use this ability to take a quick

look around when you don't know where the enemy planes are hiding. You have to hit the enemy planes a number of times to destroy them, and it takes more than a bullet or two to down your biplane. Bullet holes and other structural damage in the cockpit appear as your plane takes hits.

The graphics in *Wings* are superb. All of the images are colorful and detailed in the Cinemaware tradition. I was extremely impressed with the animated graphics in the combat sequences. From the pages of the journal, which turn as if the book were right in front of you, to the funeral scene, in which a tombstone pops up with your name on it after you've been killed in action, the images are the best that they can possibly be without being digitized. As you get farther along in the game, the action gets faster, and the graphics don't slow down things at all.

The music in *Wings* is inspiring and lively. Familiar military marches play during the mission summaries, journal entries, and other interim sequences. The sound effects are excellent, as you would expect in a game of *Wings*' caliber. Overall, *Wings* gets my vote of confidence. It takes a theme that has been beaten to death and creates something entirely new with it. The included Aviator's Briefing Manual gives a very well-written summary of aerial combat in World War I, as well as combat techniques, famous pilot biographies, plane data, and interesting stories. It's well worth the time it takes to read this booklet. I didn't think that Cinemaware could surpass *It Came from the Desert* until I played *Wings*. It's certainly the most unique combat simulator involving aerial combat—and a must-have for all aviation buffs. >

RUSS CECCOLA

Playability ★★★★★
Documentation ★★★★★
Originality ★★★★★
Graphics ★★★★★
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LOOM

On the barren island of Loom, the exiled Guild of Weavers plies its trade and works its magic, spinning threads that alter the present and the future. No children had been born to the Weavers for many years, until you, Bobbin Threadbare, arrived 17 years ago. Instead of being a welcome member of the Guild, you're an outcast, for your birth was an evil omen. Shadow will soon fall across the world, and the age of the Great Guilds will be over. Unless, of course, you, the untrained and youthful Bobbin, can stop the cataclysm. Thus begins *Loom*, an unusually well-conceived and -implemented graphic adventure game from Lucasfilm.

Before actually playing *Loom*, you're advised to read the *Book of Patterns*, which contains spell descriptions and blanks to fill with the musical sequences that you discover throughout the game. Since much of the game concerns magic, knowing what could become available to you is an advantage. The spells, or *drafts*, as they're referred to by the Weavers, are found in objects around you and are noticeable to you when you carry your distaff. Drafts are easy to record and use; you simply play them back on your distaff. Magic seems to work on most objects in *Loom*, and weaving drafts just to see what might happen is quite entertaining.

Unlike most other adventure games, *Loom* does not kill you every time you make a mistake. There's often more than one way to solve a problem, and the problems are not so convoluted as to be unsolvable, as in some other games. This simple combination alone makes *Loom* far less intimidating than virtually any other adventure game I've played. Because thought is rewarded with success, not death, thinking is encouraged, and the game feels more like a challenge than an insult. While this approach to game design makes *Loom* an excellent game for beginners, it's no less a game for the seasoned player.

The story that you participate in is told with devastating humor, and the supporting cast is quite lovable. Your role in the fiction allows you to become an offbeat fantasy hero, and the ease with which you become at-

tached to Bobbin is surprising.

Graphics in *Loom* are limited in palette and low in resolution, ported directly from IBM EGA, but they're rendered fairly well in a cartoonish sort of 3-D. You move Bobbin by pointing with the mouse and clicking on the destination; the game moves the character for you. Animation is everywhere, but again, it's limited. Most figures move in a laborious, choppy manner, and when one or more are onscreen with Bobbin, there's an appreciable delay in all movement. Yet most of the animation is charming, and some of it's rather complicated. Despite being so graphically dependent, floppy disk access is moderate and holds up gameplay very little. The music in *Loom* is neither brilliant nor annoying, but it supports the actions of the characters well enough and can always be counted on to accompany plot developments.



Loom's Bobbin stands ready with his distaff; what mysteries lie below?

Occasionally Bobbin is removed from your control; the game loads a lengthy animated sequence to which you're merely the audience. Much inside information is related this way, like Bobbin's own history and what can be done about the oncoming apocalypse, but these sequences are sometimes disturbing. At one point Bobbin's distaff is taken away, and he's imprisoned. Without the distaff Bobbin is powerless, yet I was unable to prevent its theft. While necessary to the plot, the sequence was extremely obtrusive, and the animation that depicted Bobbin's escape also proceeded without my intervention. For several minutes, I could only watch and wonder what would happen.

Despite my annoyance with some of the animation, I was delighted with *Loom* as a whole. I'm pleased to an-

nounce that it's the first adventure game that I've been able to solve on the Amiga, and that's not because it's an easy game. It's because *Loom* is a sensible fantasy—engrossing, amusing, and a minor epic in its own right.

DAVID T. SEARS

| | |
|-------------------------|-------|
| Playability | ★★★★★ |
| Documentation | ★★★★ |
| Originality | ★★★ |
| Graphics | ★★★ |
| Sound | ★★★ |

Amiga—\$59.95

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REVIEWS

Mail List Manager is newer and works with as much if not greater ease than its partner. Filling in the nine predefined fields is child's play. Memory resident, it sorts quickly. A list on a 64 can handle approximately 300 records; a 128 can handle about 1000. Transfers between lists are handled via exporting and importing functions. Editing is done with standard techniques.

The two programs make excellent use of drop-down menus and direct one-letter commands. Both have drivers for several printers. (*Label Maker* will support two at once.) Management and mastery of the programs are accomplished with ease—but with one exception. The problem comes when trying to make the finished product turn out exactly the way you've envisioned.

Generally, the problems have to do more with the vagaries of individual printers and not the printer drivers or the programs themselves. Part of the problem is due to documentation that's comprehensible but not thorough enough. As with a new graphics or desktop publishing program, you have to play around with them to really understand what you'll get.

For instance, my first Rolodex list of relatives was great. My second list, magazines and their editors, came out in an unexpected format. The editors' names were printed where I thought the magazine titles would be, and the magazine titles were listed next, after a comma, where

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the program expected a first name to be. Nothing I couldn't remedy, but after this error it took a trial or two to discover how to fix it. Embedded printer commands presented another difficulty until I learned to leave enough room on a line for all the commands I wanted before I entered text.

Mail List Manager works only with labels created within the Design Your Own option of *Label Maker*, not with those made in any of the other options: Rotary Cards, Standard Mail Label, and so on. This is because *Label Maker* identifies each label file as it's saved by the option that created it. Labels will load back only into the same option. *Mail List Manager* recognizes only files coded for the Design Your Own option. On the positive side, you can load a *Mail List Manager* label file into *Label Maker's* Design Your Own option to modify it.

To boil it down, you can usually find a way to do what you want, but it takes a while and some experimentation. Like tackling a new desktop publishing project, with perseverance you can open new worlds of productivity.

It takes time to tame this dynamic duo. But old Leroy (he of Cheat-sheet fame) has a good thing going. Keystone knows it, too, because the final option on *Label Maker* is a print-out of an order form for all kinds of continuous labels.

Mail List Manager can be sufficient unto itself. It has a good selection of labels, and it's a terrific program for handling all kinds of mailing lists: relatives, clients, help services, club members, and so on. *Label Maker* invites you to customize labels to your heart's content, and it will work with several databases and word processors. Each program will work within the other. Together they can solve almost all your label needs.

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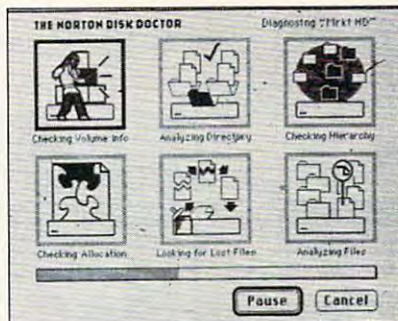
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If you sometimes see the sick Mac face when you boot up or if you've lost work to a damaged or crashed disk, you need *Norton Disk Doctor*. This suite of diagnostic and recovery programs can fix 45 kinds of problems that render disks unbootable and files unreadable. I tried it on a couple of corrupted MS-DOS files I had earlier ported to my Mac, and the program recovered everything but a few bytes.

Whiplash is a common malady on the Mac that's caused by slapping yourself in the forehead when you've trashed a file you really wanted to keep. The trashed files are actually still on your disk, but they can be overwritten at any time by another file. Norton's *FileSaver* cdev keeps track of hundreds of deleted files, while another program, *UnErase*, helps you save them before they're

gone forever. *UnErase* displays a list of files you can still recover and tells you if they're in good shape or if they're poor candidates for recovery. I tried to recover several trashed files and found that, in most cases, even files in poor condition can be Un-Erased with only minor patchups.

If you've forgotten yourself so much that you've accidentally formatted your hard disk, the *Format Recover* program can probably restore most of the lost material.

Speed Disk optimizes your disk by defragmenting files that have been splattered all over the disk by frequent write operations. Fragmented files make your drive do more seeks, which really slow things down. While *Speed Disk* isn't as fast as other defragmenters, such as Symantec's *HD Tuneup*, it gets the job done—and it reorganizes your directories, which speeds up your disk even more.

The documentation is easy to use and well organized. The instructions on how to recover from a disk crash or fix a damaged disk are right up front in the manual, where panicked users can find them quickly. Also included in the package is a red emergency floppy that you can use immediately to help get you out of a jam. Many of the other disk utility programs make you create your own emergency startup disk, which the typical lazy user may never get around to doing.

Rounding out the package are some useful utilities for managing files and folders from the Open and Save dialog boxes, customizing the look of the Finder, snooping around in hex and ASCII, and more. All in all, *The Norton Utilities for the Macintosh* is a package well worth having, even if you already own another disk utility.

STEVEN ANZOVIN

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| inc | dx | :00721 | | | |
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| db | 90 | :00723 | | | |
| push | ax | :00724 | | | |
| les | bx, DWORD PTR [bp+16h] | :00725 | | | |
| mov | ax, WORD PTR es:[bx] | :00728 | | | |
| dec | ax | :0072b | | | |
| les | bx, DWORD PTR [bp+12h] | :0072c | | | |
| mov | cx, ax | :0072f | | | |
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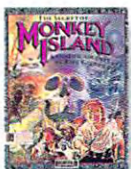
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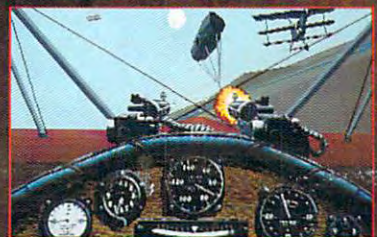
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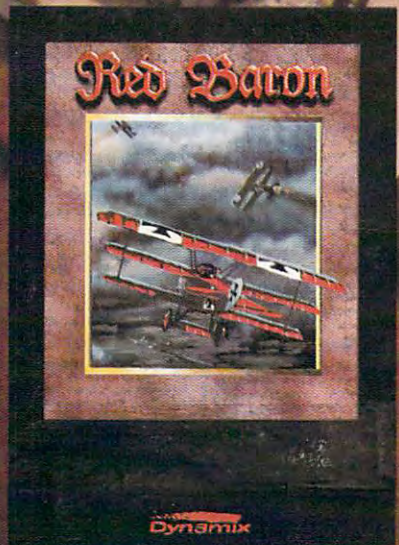
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