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# COMPUTE

FEBRUARY 1991

VOLUME 13 • NO. 2 • ISSUE 126

## GAZETTE SUBSCRIBER EDITION

Special Coverage Follows Page 88

### FEATURES

#### Climbing Your Family Tree **G-8**

AUDREY COX VOGELPOHL  
No telling whom you'll meet when you start climbing your family tree, but keeping track of all your relations can be quite a chore. You won't be left out on a limb, though, if you use your 64 or 128 with a good genealogy software package. This article investigates four genealogy programs that can help you organize the information you discover about your relatives.

### DEPARTMENTS

#### 64/128 View **G-1**

BRUCE BOWDEN  
COMPUTE programmer Bruce Bowden introduces the *Gazette Operating System*, an exciting new multifeatured menu program he's written for *Gazette Disk*. With the click of a fire button or the press of a key, you can use this graphical user interface to run programs, read files, copy disks and files, and more.

#### News & Notes **G-4**

EDITORS  
CMD announces a new product that will boost your computer's speed with a Hayes-compatible modem and a cartridge that's a compatibility interface for REUs. If action is your game, check out UBI Soft's *Skate Wars* or Konami's *Blades of Steel*. To satisfy your hunger for football during the spring and summer months, there's *MicroLeague Football*, the *Coach's Challenge* from *MicroLeague Sports*.

#### Feedback **G-15**

EDITORS and READERS  
A reader calls for faster chips for the 64, and another needs a new manual for his flight simulator. Will the real artist who drew *Natalie* in "Gazette Gallery" please stand up? Mail-order user groups, UPS deliveries, and relative files are also discussed.

### COLUMNS

#### D'Iversions **G-18**

FRED D'IGNAZIO  
An enlarged image of a computer chip looks like a silicon city to Fred D'Ignazio; he even wrote a book about it. What will computer cities of the future have to offer?

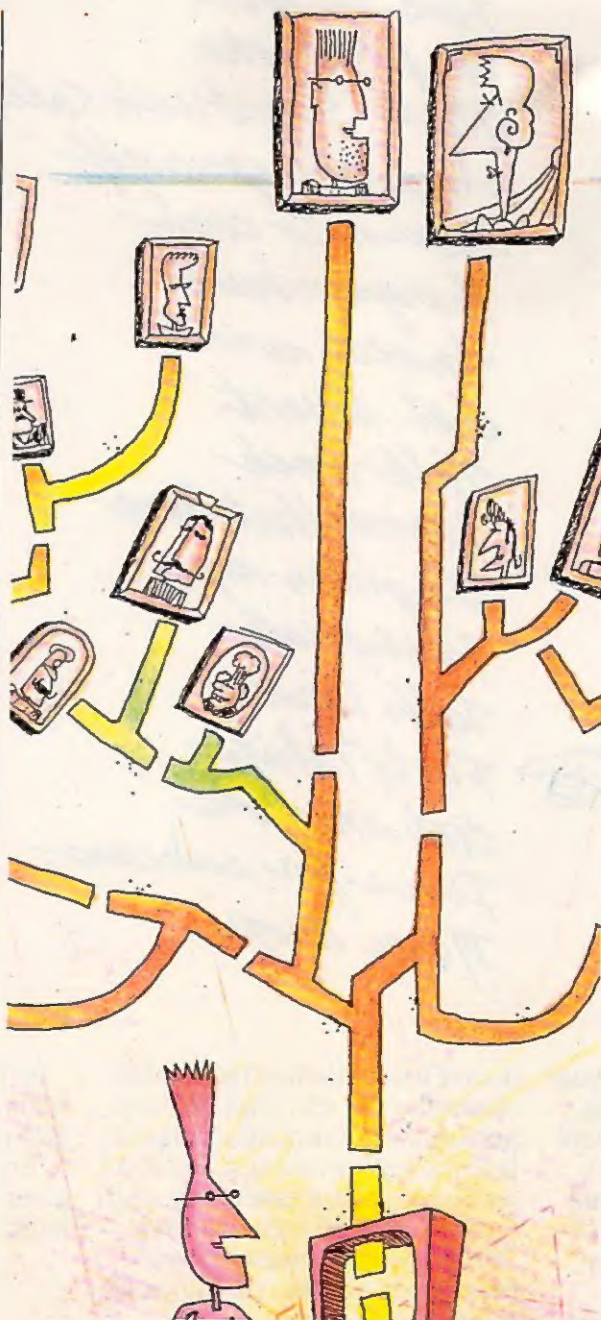


ILLUSTRATION BY DAVID POVILAITIS

#### Beginner BASIC **G-20**

LARRY COTTON  
Bugs can creep into the best of programs and make them crash. If you're a programmer, you'll want to watch for and avoid these obvious problems before they infest your programs and make them grind to a halt.

#### Machine Language **G-22**

JIM BUTTERFIELD  
A computer can do several independent jobs at the same time. Try this program that uses three sprites to demonstrate how a scheduler program allocates processor time.

#### Programmer's Page **G-24**

RANDY THOMPSON  
Programming can be tough when you're in one state and your computer is in another. Randy Thompson isn't too sure where his 64 is, but both are expected to find their ways from North Carolina to Washington.

### TYPE-IN PROGRAMS

#### Ultragraph **G-25**

GEOFFREY SPARKS  
Use *Ultragraph* to create and display a vast range of screen images. This integrated set of utilities, which includes a character editor and display module, is a powerful tool for computer artists and programmers.

#### Virus 64 **G-30**

JESUS MENDOZA ESCALONA  
Other computers have been plagued with one pesky virus or another, but until now the 64 has been virus free. Now it's up to you in this game for the 64 to stop this pest before it destroys your disk directory.

#### Periscope II **G-32**

ROBERT BIXBY  
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, a disk sector editor such as *Periscope II* comes in handy.

#### Bounce **G-35**

BEN CAMPBELL  
In this outstanding arcade-style game for the 64, you're traveling through space in a metallic ball that's constantly bouncing. Avoid collisions, and keep your cannons trained on the hostile aliens as you blast your way through five deadly zones.



# 64/128 VIEW

B R U C E B O W D E N

**C**OMPUTE programmer Bruce Bowden contributes a guest editorial this month to introduce an outstanding program he's written that will add an exciting new dimension to the Gazette Disk.

Say hello to COMPUTE's new Gazette Operating System—GOS for short. GOS is an all-machine-language GUI (Graphical User Interface) that makes its debut on this month's Gazette Disk, replacing the older BASIC disk menu program. With just the click of a fire button or the press of a key, you can use this powerful utility to run programs, read files, copy disks and files, and more.

Central to any GUI, including GOS, are a pointer, icons, and a set of windows with which the user interacts. The essential program, however, is centered around three different device services: monitor, disk drive, and printer. The monitor and printer options display information—directory, text, and so on—and the disk options handle drive selection, DOS commands, and the reading, writing, and duplicating of files.

The names of these devices appear on a menu bar at the top of the screen, while their icons—which are small pictorial representations of a monitor, disk drive, and printer—appear along the right side of the screen. Moving a pointer over any one of these causes the name and icon to light up. The pointer is controlled with a joystick plugged into port 2 or by the cursor keys. Pressing the fire button or Return key makes a window appear with appropriate menu options for that selection.

There are three types of windows. The

first is used for information. Because of window size constraints, you may need to scroll the window up and down to view all its contents. The second type provides selections as well as scrolling—the disk directory window is a good example of this. The last window type is used for menus that offer further selections.

Both scrollable windows have three special controls: the trigger, up scroll-arrow, and down scroll-arrow. The trigger is a box at the upper left corner and is used to exit a window. To use the trigger, highlight it by moving the pointer over it and then press the fire button or Return key. The scroll-arrows move text up and down within a window. Use them in the same manner as the trigger.

Several hot keys make the selection of options even faster. To get the pointer to a menu name or icon easily, press the key representing the first letter of the objective. These keys are

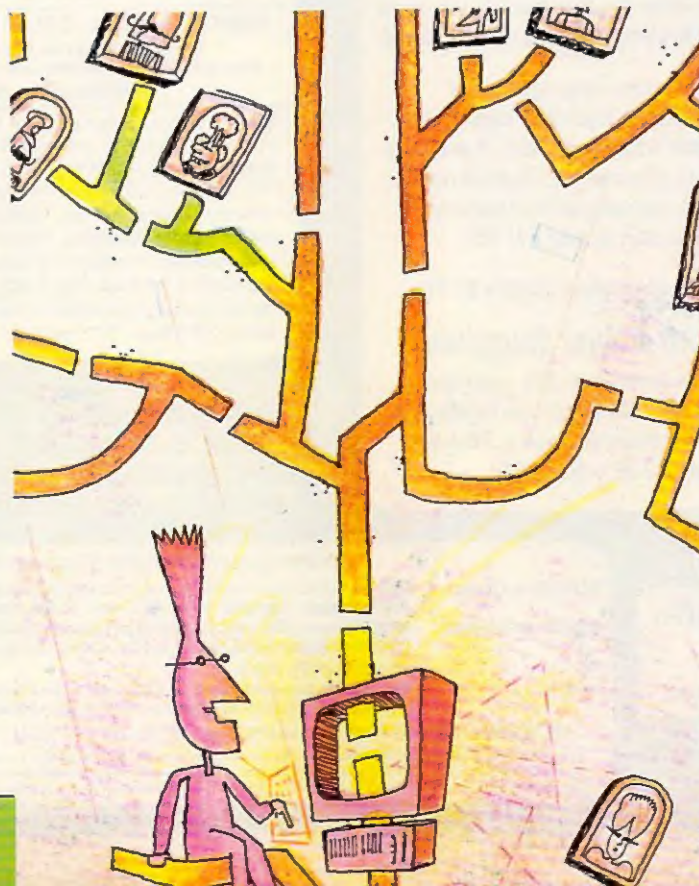
M for monitor, P for printer, D for disk, and S for system options. Pressing the fire button or Return key with the pointer on any icon or menu-strip item activates the associated menu window. An additional hot key, T, places the pointer on the trigger button of any currently active window.

The disk directory window is activated by selecting it from the monitor menu. The name of the disk in the currently active drive is displayed at the top of the window, and filenames are enclosed within. Moving the cursor within the directory highlights the filenames, and a special corresponding symbol appears in the lower left corner of the screen. GOS disk functions are not limited to the Gazette Disk, but certain file symbols will not be available on other disks. Directory symbols for all disks include P for a program file, S for a sequential file, and ? for other file types.

Three additional file symbols are reserved for the Gazette Disk. They include a tennis shoe, a book, and COMPUTE's house-shaped logo. The tennis shoe means that the program is executable, the book means that the file is in SpeedScript format and can be read, and the COMPUTE house symbolizes a special utility that can be run from within the GOS environment.

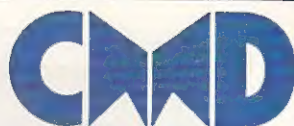
To run, read, or load any file from the directory, highlight the filename and then press the fire button or Return key to lock in your selection. Then move the pointer to select the appropriate option.

GOS makes its debut on this month's disk, and we'd like to know what you think of it. What other capabilities should it have? □





• Your Memory Location •



# HD Series™ Hard Drives

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- Supports all serial and JiffyDOS protocols, plus parallel interface for connection to RAMLink.
- Easy-to-use utilities allow backing up and copying files to and from 1541, 1571, or 1581 drives.
- Supports an unlimited number of true subdirectories which share all blocks within a partition.
- Built-in Q-Link software allows easy access to America's most popular 64/128 online service.
- External power supply avoids overheating and wear on computer power supply.
- Includes standard SCSI port and all utilities needed to expand the system (up to 4 Gigabytes).

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**SD Series SCSI Hard Drives** - Add-on drives for the CMD HD or any other SCSI interfaced computer such as the Amiga™, Macintosh™ or IBM™. SD series drives come mounted in our sturdy steel case and include an external power supply and connecting cable. SD drives also come equipped with a second SCSI port to allow chaining of additional SCSI devices.

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**JiffyMON** - A high performance Machine Language Monitor designed to work in conjunction with JiffyDOS. JiffyMON is loaded with useful features and can be used without exiting from BASIC. It also has a built-in drive monitor for easy access to drive memory. JiffyMON comes complete with a well documented user's manual and offers features just not found in other machine language monitors. \$19.95 + \$1 S/H

**Serial Cables** - 30' high quality serial cables. \$3.95 + \$1 S/H

## 1541-II/1581 Replacement Power Supplies

These switching power supplies are the same heavy duty, cool running units found on the HD series hard drive and are much more reliable than the supplies issued by Commodore as standard equipment. They are also repairable and reasonably priced. \$49.95 + \$6.00 S/H

- Supports CMD HD Series Hard Drives and RAMLink.
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  - 100% Compatibility Guarantee - Guaranteed to work with all Software and Hardware
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  - Can be completely switched out. Returns you to a 100% stock configuration
  - Built-in DOS Wedge. Plus 17 additional commands and convenience features.
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  - REU support. Fully supports Commodore REUs (RAM Expansion Units) under RAMDOS.
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**JiffyDOS & Lt. Konnector:** Add \$4.50 per order (UPS ground), \$8.50 (2nd-Day Air), plus \$4.00 for APO, FPO, AK, HI, and Canada, or \$14.50 for overseas orders. No additional shipping if ordered with any hard drive. COD's to US only - add'l \$4.00

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# RAMLink™

Power-backed REU interface and  
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## What is RAMLink?

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REUs). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- Supports Commodore 1700, 1764, 1750, Berkeley Software GEORAM and PPI's RAMDrive.
- Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.
- Pass-thru connector allows use of cartridge port peripherals such as utility cartridges.
- Reset, Disable, Direct Access mode and SWAP functions are all standard features.
- RAM port provides power back-up to REU's.
- Parallel port provides ultra-fast data transfer when connected to CMD HD series hard drives.
- Includes separate power supply - optional battery available to protect against power failure.

RAMLink (w/out internal RAM)	\$149.95	RAMCard w/ (1 Mb)	\$149.95
RAMLink w/ RAMCard (1 Mb)	\$259.95	RAMCard w/ (2 Mb)	\$239.95
RAMLink w/ RAMCard (2 Mb)	\$349.95	RAMCard w/ (3 Mb)	\$329.95
RAMLink w/ RAMCard (3 Mb)	\$439.95	RAMCard w/ (4 Mb)	\$419.95
RAMLink w/ RAMCard (4 Mb)	\$529.95	1 Mb SIMM (User Installed)	\$100.00
RAMLink Battery back-up unit	\$24.95	Parallel Cable for CMD HD	\$14.95

Shipping: US: \$10.00 (UPS), \$18.00 (2nd day), COD add \$4.00 Canada \$20.00

## BOTH RAMLINK AND RAMDRIVE INCLUDE RL-DOS

- Allows vast amounts of commercial software, including GEOS, to access all available RAM as a high-performance RAM Disk.
- RL DOS performs up to 20 times faster than Commodore RAMDOS, up to 400 times faster than a stock 1541 and provides full DOS command compatibility.
- Up to 32 1541/1571/1581 emulation or Native mode partitions, plus true subdirectories.
- Includes built-in JiffyDOS Kernel for high-speed access to JiffyDOS equipped disk drives.
- Software for copying files (FCOPY) and complete disks (MCPY) included.
- Many other features, including CMD's exclusive device number SWAP functions.

## WHICH ONE IS RIGHT FOR YOU?

Both RAMLink and RAMDrive give Commodore users powerful features never before available in a RAM expander. RAMDrive is intended mainly for those who do not require the high RAM capacity of RAMLink (up to 16 Mb), RAMLink's Pass-Thru port or the parallel port for communicating with the CMD HD Series of hard drives. RAMDrive is an excellent choice for those who desire portability since the internal battery pack can keep the contents of RAMDrive intact for several days. RAMLink is the perfect choice for geoRAM owners who want the ability to use that device with programs other than GEOS. RAMLink has a built-in RAM port for easy use with a geoRAM or Commodore REU. No matter which CMD RAM device you select, you'll benefit from fantastic capabilities of having a high speed RAMDisk equipped with RL-DOS and the outstanding value of CMD support.

## What is RAMDrive?

RAMDrive is a fresh new approach to RAM expansion for the Commodore 64 and 128. RAMDrive is a self contained battery backed cartridge with capacities of 512K, 1 Mb and 2 Mb. RAMDrive incorporates RL-DOS, an ultra-fast, easy-to-use operating system similar to the HD-DOS found in CMD HD series hard drives. This proprietary DOS allows various types of partitioning along with compatibility and speed unsurpassed by previous RAM Expansion systems.

- Compatible with vast amounts of commercial software as an ultra-fast RAM disk.
- RL-DOS operates up to 20 times faster than Commodore's RAMDOS.
- Power back-up eliminates the loss of files upon powering down the computer while the battery protects data during transportation or power outages.
- Available in 512K, 1 Mb and 2 Mb models at incredibly low prices.
- DOS includes JiffyDOS Kernel routines for high speed disk access with JiffyDOS equipped disk drives.
- Software for copying and GEOS compatibility included.
- Reset switch allows computer reset without losing data in RAMDrive.
- Disable switch allows RAMDrive to be disabled at any time.

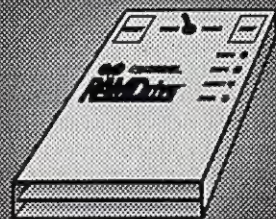
RAMDrive w/512K \$149.95    RAMDrive w/1 Mb \$199.95    RAMDrive w/2 Mb \$289.95

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# NEWS & NOTES

## Calling All Heroes

Konami (900 Deerfield Parkway, Buffalo Grove, Illinois 60089) has converted several of its most popular Nintendo titles for the 64/128. These games are especially designed to bring out the hero in all game players.

*Castlevania* (\$29.95) brings goblins and demons to the computer. If you've got what it takes to be a night stalker, this horror-adventure game takes you armed with a stake through cavernous dungeons in search of Count Dracula. Watch out for bats and wolves along the way.

*Double Dribble* (\$29.95) promises more fast breaks and slam dunks than you'll find this side of the NBA. Players can test their defenses, free throws, and full-court presses against a friend or go one-on-one with the computer.

Konami also invites players to take their pucks out of the freezer, put their sticks down, and put their dukes up. *Blades of Steel* (\$29.95) integrates all the speed, checking, and bone-jarring action of pro hockey. Lead your team to victory, but watch out when tempers flare. You'll find this hockey game packs a wallop.

## Draw Me

Let your 64 help you learn the fundamentals of composition and design. *Principles of Composition* (\$34.95) uses graphics and sound effects to teach students about color, balance, rhythm, pattern, contrast, unity, gradation, harmony, and more.

This program from Art Instruction Software (P.O. Box 1352, Patchogue, New York 11772) combines a design test, a drawing program, and a report card to help students with their lessons. After students complete a project with the included paint program, they mail it back to the company, where it will be evaluated at no additional charge.

## To the Swiftest

Tired of communicating with other computers at a poky 1,200 baud? Now there's SwiftLink-232 (\$39.95 plus \$4.50 shipping and handling). This cartridge from Dr. Evil Laboratories (distributed by CMD, 50 Industrial Drive, East Longview, Massachusetts 01028) can accelerate your 64 or 128 to interface with modems at 2,400; 4,800; 9,600; 19,200; or even 38,400 bps.

This cartridge, which plugs into the computer's expansion port, comes with several terminal programs and connects readily to any Hayes-compatible modem via an IBM AT-style DB-9 serial connector. It isn't designed to work with any modem that plugs directly into the 64's user port. Use SwiftLink with a null-modem cable to connect your computer directly with any IBM, Mac, or Amiga for superfast file transfers. A ten-foot shielded cable to connect the cartridge to a modem costs \$10.00.



## Knight

*Knight* by Brian Kissinger of Evansville, Indiana, is this disk's Picture of the Month.

Welcome to "Gazette Gallery." Each month the *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay \$50 for each piece of art we accept and an extra \$50 for the one selected as Picture of the Month. Send your original artwork to Gazette Gallery, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. >

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## Commodore<sup>®</sup> 64C<sup>®</sup>

Includes:  
GEOS Program  
Quantum Link Software  
1 Joystick



**FREE JOYSTICK**  
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- GEOS Program
- Quantum Link Software

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CARDCO G-WIZ Interface.....	\$49.95	XETEC Supergraphix Gold.....	\$74.95
CARDCO SUPER G.....	\$69.95	XETEC Lt. Kernal 20MB Hard Drives for:	
C-64/C-64C Power Supply.....	\$29.95	C-64C, C-128 & 128D.....	\$549
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COMMODORE 1351 Mouse.....	\$49.95	Micro C-128 Power Supply.....	\$59.95

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NX-2420R.....	\$339.95	<b>COMMODORE</b>	
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# NEWS & NOTES

continued from page G-4

## How About Four Megs of RAM?

Creative Micro Designs (P.O. Box 646, 50 Industrial Drive, East Longmeadow, Massachusetts 01028) has announced the release of RAMLink, a multiple-purpose cartridge that's mainly intended as a compatibility interface for current RAM expanders.

RAMLink incorporates a ROM-based RAM DOS (RL DOS) that allows Commodore 1700 series REUs or Berkeley Softworks GEORAM to be used as a ramdisk. This allows most commercial software to recognize RAMLink as if it were a disk drive. Since RL DOS does not use computer memory, a high level of compatibility with commercial software is realized.

RAMLink may also house one to four megabytes of additional memory by using an optional RAMCard. It contains its own power supply, which allows the contents of RAM to stay intact when the computer power is shut off. It can also be used with the CMD HD series of hard drives for faster disk access.

RAMLink's price is approximately \$100. The optional RAMCard with one megabyte of RAM is approximately \$180 with additional RAM about \$100 per megabyte.

## Rollin', Rollin', Rollin'

UBI Soft's new arcade-style game, *Skate Wars*, combines the skills of soccer with the excitement of rollerball and lands you in a futuristic ice stadium to do battle with either a friend or your Commodore 64/128.

To achieve victory, you must lead your team through obstacles and apply ruthless tactics to defeat your opponent. *Skate Wars* (\$29.95) features a series of dangerous hazards including crevasses, ramps, jumps, disintegrators, pits, stone pillars, spiked balls, and other disastrous obstacles. To conquer your opponent, you must adopt dirty strategy. Flying kicks, pushes, and body slams help you survive and win.

*Skate Wars* from UBI Soft is distributed by Electronic Arts (1810 Gateway Drive, San Mateo, California 94404).

## Blast Off With Buck Rogers

Buck Rogers makes his computer-game debut in Strategic Simulations' *Countdown to Doomsday* (\$39.95). SSI recently signed a contract with TSR to produce a line of Buck Rogers computer products.

*Countdown to Doomsday* uses a specially enhanced version of the game system used in such AD & D Gold Box fantasy role-playing games as *Pool of Radiance* and *Secret of the Silver Blades*.

In *Countdown to Doomsday*, the powerful Russo-American Mercantile holds the solar system of the twenty-fifth century in an iron grip. You and Buck must lead members of the New Earth Organization to free the solar system of this tyranny. To help you on this dangerous mission, you'll need to assemble an interplanetary team of Rocketjocks, Warriors, Engineers, Rogues, and Medics.

SSI products are distributed by Electronic Arts (1820 Gateway Drive, San Mateo, California 94404).

## The Prism of Whom?

Miles Computing has released an entertaining graphics quest called *Questmaster—The Prism of Heheutoto!* (\$34.95). As Terna, the last of the Tellasien race, you must complete a dangerous search for the fabled crystal prism.

This graphic adventure features more than 100 different screens and 30 animation sequences, a sophisticated parser, and timed events to make your quest more exciting and entertaining. Once you've acquired the prism, the quest is complete . . . for now.

Miles Computing products are distributed by Electronic Arts (1820 Gateway Drive, San Mateo, California 94404).

## Let's Play Some Football

MicroLeague Sports (2201 Drummond Plaza, Newark, Delaware 19711-5711) has released *MicroLeague Football, the Coach's Challenge* (\$29.95). This game features 20 professional football rosters with real NFL players and their statistics.

This is no arcade-style game. With *MicroLeague Football* you control offense and defense, winning or losing on your coaching abilities. Sports fans and stats buffs will appreciate the 3-D graphics, the midgame statistics, a Quick Play option that plays a game in approximately one minute, and an expert mode that allows you to call plays in numerical code, just like the pros. A General Manager/Owner disk and Season disks will also be available.

# Memory Expansion!

GEORAM

**\$124<sup>95</sup>**



Believe it or not, GEORAM's disk transfer rate is actually 35 times faster than the 1541, 1571, or 1581 disk drive! This means that screens redraw in a flash, and that your Commodore doesn't waste time spinning disks looking for data. GEORAM makes the GEOS family of programs faster and more powerful than ever. NOTE: GEORAM is designed for use ONLY in the GEOS environment—it cannot be used with non-GEOS software.

GEORAM (requires GEOS)

88604 \$124.95

## 1750 Clone

**\$199<sup>95</sup>**



The 1750 Clone offers 512K, and works with all software that is 1750 compatible (e.g., GEOS, Paperclip III, and Maverick). Furthermore, you can use it to create a RAM disk to store files or programs for lightning-fast access. (Unlike GEORAM, the 1750 Clone works with non-GEOS software. Some computers may require power supply.)

1750 Clone 89517 \$199.95

## Super Mouse Bargain!

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Includes GEOS 1.5 Plus Graphic & Utility Software!

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M3 Mouse 82704 \$38.95  
M4 Mouse for AMIGA 88171 \$34.95

**\$129<sup>95</sup>**



## Commodore 64C

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64C Computer 54574 \$129.95

## Commodore Hardware

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1541 II Disk Drive (Includes GEOS)	54586	\$CALL
1764 RAM Expansion C64	72513	\$114.95

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**\$79<sup>95</sup>**



Both the Minimodem-C and C24 are completely Hayes compatible (not just partially compatible like the 1670 and some Avatex models) and 1670 compatible. This means they'll work with ALL communications software for the 64, 64C, and 128. Key features include seven status indicators, Busy Detect, DTR signal support, High Speed Detect Line, and Auto Answer/Auto Dial. Includes Multiterm 64 and 128 software so you can start communicating right away, plus a free trial hour on CompuServe! Full-year warranty.

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**\$59<sup>95</sup>**

The Amiga versions of the Minimodems are equipped with a female connector to plug directly into the Amiga 500 or 2000. They need no external wall plug for power, and they use the Amiga's audio output for maximum fidelity.

Minimodem-C24 (2400 Baud for C64/C128)	88148	\$79.95
Minimodem-C (1200 Baud for C64/C128)	81576	\$59.95
Minimodem-AM24 (2400 Baud for Amiga)	88150	\$79.95

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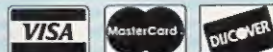
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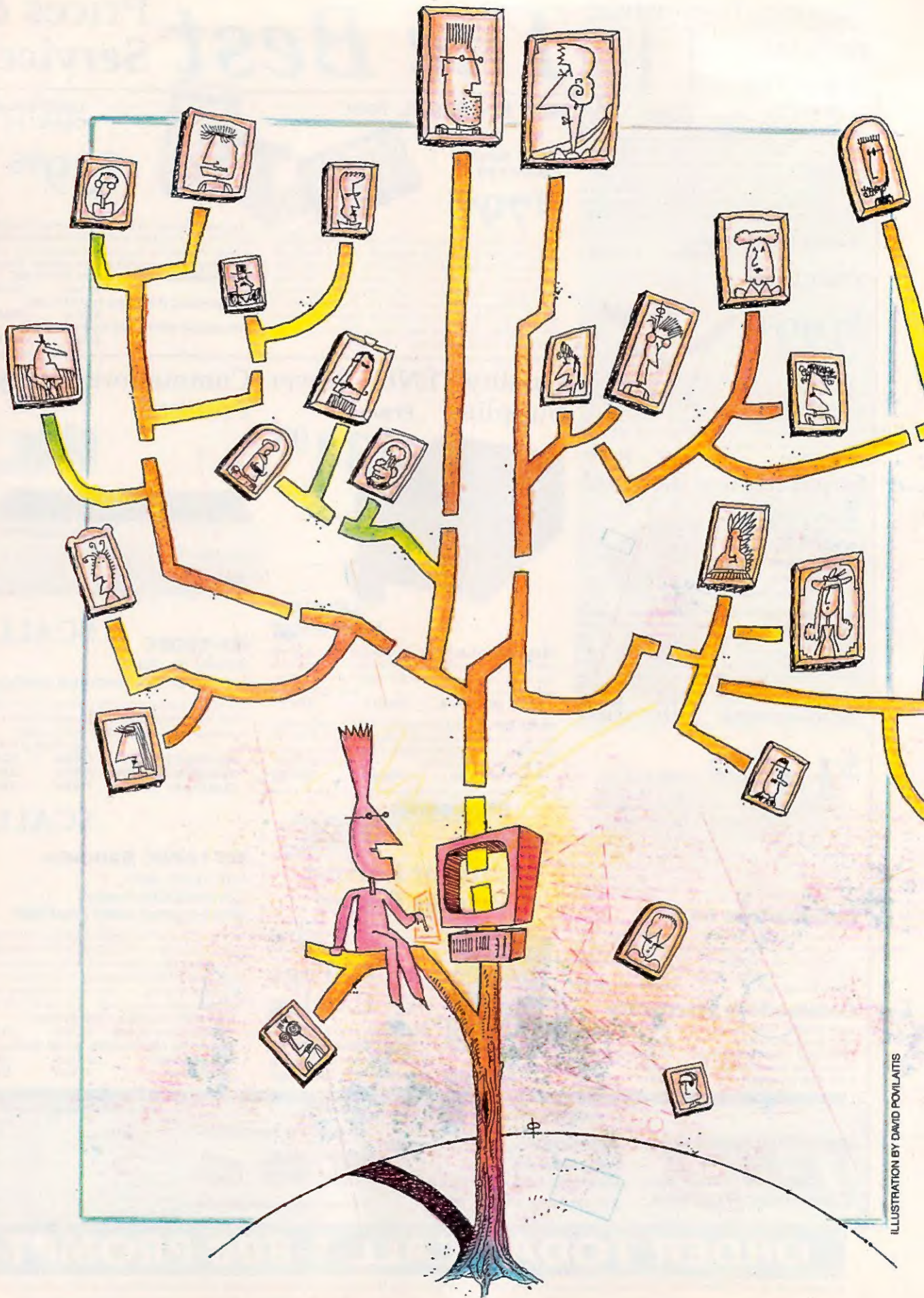
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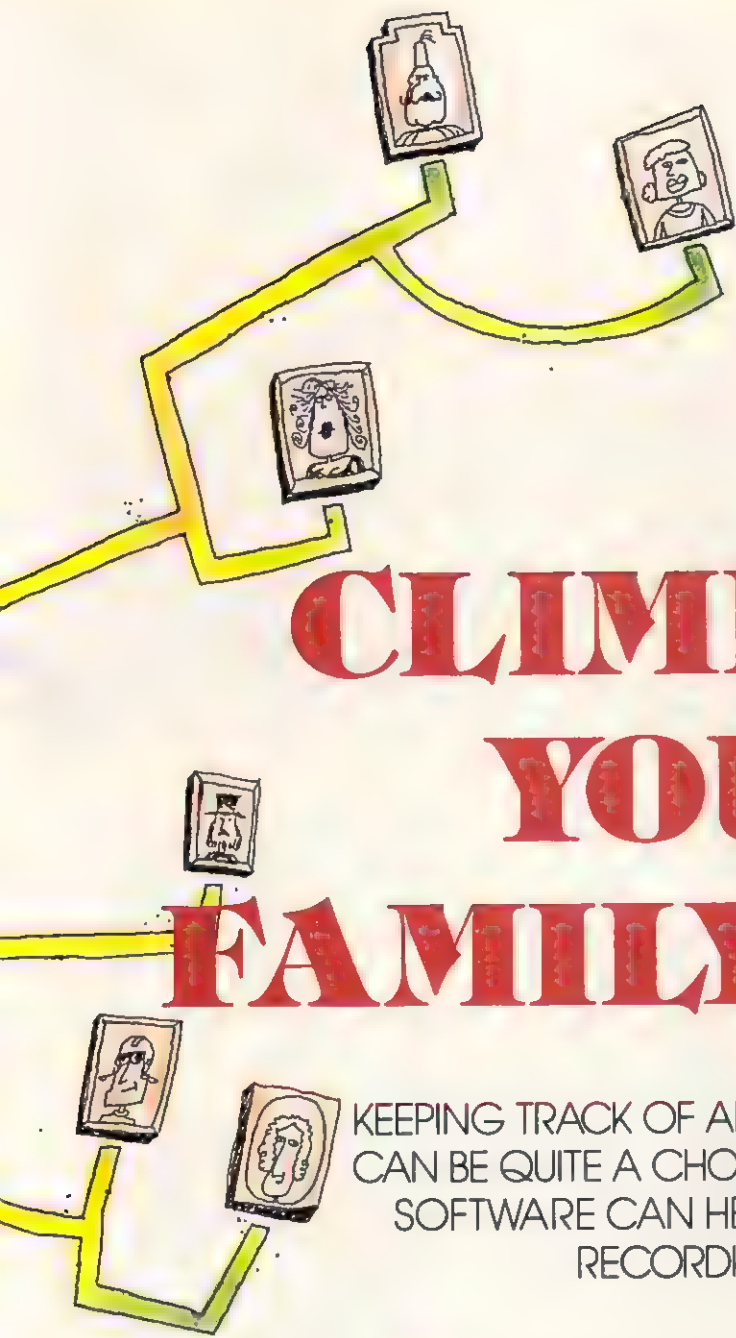
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Circle Reader Service Number 118





# CLIMBING YOUR FAMILY TREE

KEEPING TRACK OF ALL YOUR ANCESTORS CAN BE QUITE A CHORE, BUT GENEALOGY SOFTWARE CAN HELP SIMPLIFY YOUR RECORDKEEPING

**N**o telling whom you'll meet when you start climbing your family tree. Practically everyone has interesting, famous, or even infamous ancestors on one branch or another. Keeping track of all your relations can be quite a chore, but your 64 or 128 can help.

As you compile data for your family tree, you'll want to record all the pertinent names and dates you uncover so the information can be preserved and shared with other family members. Usually this information is kept on charts filled in by hand, but there are a number of computer programs available that can make this job more manageable. ▸

AUDREY COX VOGELPOHL

Being a specialty item, genealogy software is not normally found at your local computer or software store. It's usually purchased through the mail. Before buying, you'd be wise to do some browsing in magazines for genealogy advertisements or asking around to see what genealogy software others are using. Once you've found a couple of programs that prove interesting, you might see if the company offers a low-cost demonstration program or sample printouts of the charts the software should produce.

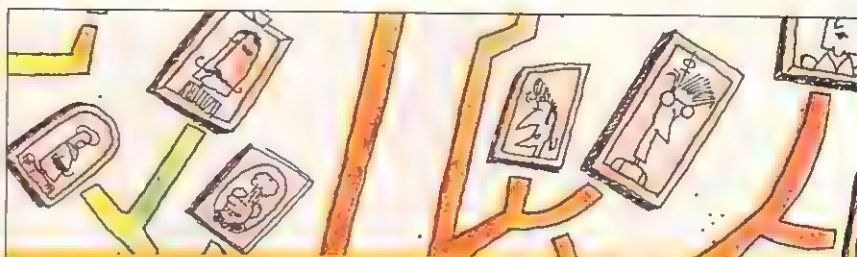
If you're looking to dabble in genealogy, you'll want an easy program that will help you organize your data, print some basic charts, and teach you what to look for. I didn't say *how* to search; that's an entirely different story. (See "Tree Climbing Made Easy.") An experienced genealogist, however, may look for other program features, such as the types of charts and the ability to note sources.

In this article, we'll look at four different genealogy programs for the 64 or 128. I won't be able to tell you which program is best for you, but I can guide you on how to select genealogy software and what you should look for. My viewpoint is nontechnical, coming from the perspective of a genealogist rather than a computer expert. As a genealogist I look for software that lets me enter data in the same format that I use in my manual genealogy. I look for printouts that include necessary information in a readable and familiar format.

### Family

*Family* (\$34.95), from PFA, is software for printing a family group sheet and a five-generation pedigree chart. A family group sheet includes the names of a husband and wife and any children they may have. Marriage dates, birth dates, and death dates should also be included. There may also be information about each spouse's parents. A pedigree chart lists this information for several generations. With *Family*, data is entered using all capital letters. Since I normally type using both upper- and lowercase letters, I found having to use all capitals awkward and very slow. It also took away my personal method of differentiating surnames—typing them in all capitals.

When printing a pedigree chart with *Family*, you need to decide whom to designate as number 1, because ID number 1 is then assigned to that person. If you are a woman, it could be you or even your newborn granddaughter. You should be familiar enough with genealogy numbering systems to know that females are assigned odd numbers. Each data disk



### Tree Climbing Made Easy

Uncovering information about your ancestors can be exciting and rewarding, but where do you start? How do you track down people who may have been dead for years, even centuries?

I'd tell anyone just starting out in genealogy to look for a good how-to book in a library or bookstore. Search for a class in genealogy at a local genealogy society or a Family History Center, which is affiliated with the Mormon church but is open for research to everyone. Pay a visit to your own community library or a field branch of the National Archives. The National Genealogical Society offers a correspondence course, and some colleges also have courses.

When researching your family, start with what you know—data on yourself. Don't start without some knowledge of how to list sources for your data—it's easier to do it correctly at the start than to redo it later. Then go one generation back to your parents and then to your grandparents. The number of direct descendants doubles with each generation as you go back, so you'll soon start accumulating a lot of data. Save information on all the siblings and their children. At about this point, you'll find that the paperwork and filing become overwhelming. This is when it's wise to put the data on computer. As you go back one generation at a time, you'll gradually solve the mystery of your family tree, and no one else has one exactly like it.

holds nine generations (512 direct ancestors, but no siblings).

The fields in this program are already defined for name, birth date and place, marriage date and place, death date and place, burial locations, occupations, and ID numbers used for father and mother. Children are all listed in one field. Data is saved to disk after each field entry, which slows down the process.

You may print a reference list, a family group sheet (more like a person's chart since there's no data on the spouse), and a five-generation pedigree chart. The program prints the chart with any data you supply. The program supports numerous printers, but you must enter the printer setup instructions each time you print.

### PED C and FGS

Byteware puts out a package called *PED C and FGS* (\$39.95) that consists of several genealogy programs plus a utility. *PED C* prints pedigree charts, and *FGS* is for family group sheets. You can't enter the data once and have both programs use it. It must be entered for each program. You can't switch from one program to another without exiting and reloading the program, even to get an included utility program.

Besides the basic information, fields are available for baptism, church affiliation, military service, other relatives, former spouses, and all the information on each child. I kept getting a *field too long* message when I entered data in the occupation

field, but it didn't tell me how long it should be. The field for names wouldn't take the first, middle, and last names unless they were very short. Again, nothing told me how many letters I could enter. This proved unsatisfactory for listing my German ancestors who had three or four given names plus a surname. There's a section at the end, however, for brief notes.

The utilities include a program that writes an inquiry letter, an indexing program for the data disk, a date-estimator program, a copy-file program that lets you create a file for a sibling and associated data, an address list, and a label printer. All are independent programs with need for separate data entry. The manual would've been easier to follow if instructions had been given separately for each program, instead of jumping back and forth with explanations.

### Arbor-Aide

Software Solutions publishes a program called *Arbor-Aide* (\$34.95). Data is saved to a separate Family Disk that can store information on 255 direct-line ancestors (eight generations), the spouse of number 1, and up to 344 nondirect spouses, children, and children's spouses. An unlimited number of data disks can be created, and they can be backed up.

Again, you must know the standard direct-line ancestor numbering system for eight generations and give your ancestors the specific number as represented by the chart position. The

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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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- ▷ **C-128 UTILITIES 2 (6051)** - Desk 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 (6067)** - 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, Desk Catalog System, Sprint, Desk Checker, Fun Print, Fast Format, Times Square and more.
- ▷ **COPY DISK (6004)** - Several copy programs and disk utilities.
- ▷ **DISK SYSTEMS (6219)** - Desk system utilities to manage disks
- ▷ **DISK AND FILE UTILITIES (6216)** - Including Mailman, File Manager, Disk Helpers, VFast File Copy, Superclean, Ultra, Unzip, and more.
- ▷ **C-128 DISK MANAGING UTILITIES (6056)** - 40 and 80 column utilities to manage disks.
- ▷ **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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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**  
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 7378 Zurawski Ct.  
 Custer, WI 54423  
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**Family**  
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 Tucson, AZ 85710  
 (800) 366-1372

**Family Roots**  
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 P.O. Box 216  
 Lexington, MA 02173  
 (800) 637-7668

**PED C and FGS**  
 ByteWare  
 906 W. 6th Ave.  
 Monmouth, IL 61462  
 (309) 734-7096

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 Tuskaloosa, Alabama, please let me know.

BRANDON PIERCE  
1530 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 Jean 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
      $(RL)+CHR$(RH%)+CHR$(1)
JQ 170 INPUT#1,R$:PRINT R$
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 R$
GQ 180 R$=LEFT$(R$,L)
KA 190 PRINT#15,"P"+CHR$(2)+CH
      R$(RL)+CHR$(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 ILLMAN  
CALUMET PARK, IL

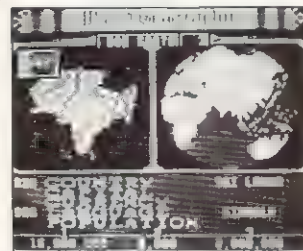
*If your drive can load some programs, a directory, or anything at all, then its electronic components are probably operating satisfactorily.*

*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

**Y**ears 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.

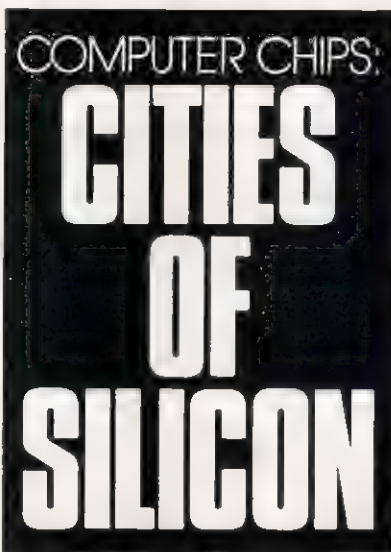
Katie fetches the Flower Painters by parachuting (direct-access style) onto the uppermost balcony of RAM Tower. They take a bus to an open-air stadium (the TV picture tube) filled with cheering crowds. They watch as three ancient pirates' cannons (the electron guns) blast glowing paint—red, green, and 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.

What? You can't type on a computer that small? Who needs to type? Computers that small need only the smallest electrical signal to kick them into gear. You don't place a pinhead computer on a desktop; you wear it! It becomes an intelligent tooth filling that plays soothing music to put you to sleep at night, smart jewelry that remembers credit card numbers and phone numbers and helps you study for tests, and bionic clothing that tells you when it needs to be washed.

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.

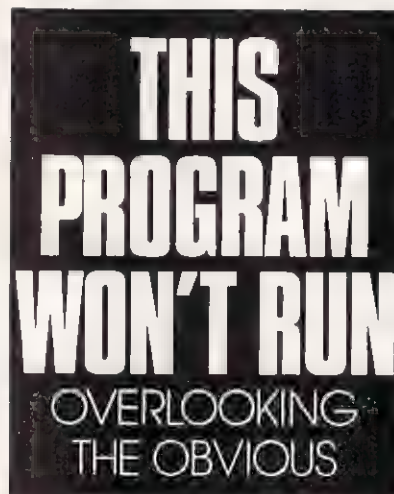
GOTO should be avoided as much as possible because of the often hopelessly tangled code that results. If you were to send me a program for analysis that contains several unconditional GOTOs, I'd probably get lost and not be of much help. Another sometimes overlooked fact: If a program line referred to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

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# MACHINE LANGUAGE

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

**W**hen 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, 6, 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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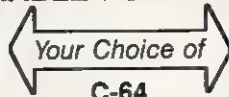
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# PROGRAMMER'S PAGE

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

**M**y 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

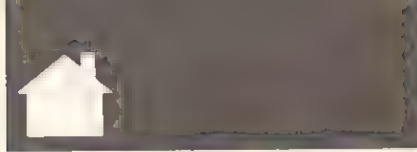
as type-ins. Reading about other programs allows me to consider alternatives. A disk utility, for example, may allow you to sort your files alphabetically within the disk's directory but not to arrange the files in any other order. This might inspire me to write my own utility that not only sorts directories 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 Rhet Anderson and David Hensley's highly entertaining game *Basketball Sam & Ed* (*COMPUTE!'s Gazette*, July 1987) came from a dream Rhet 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

**U**se *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.

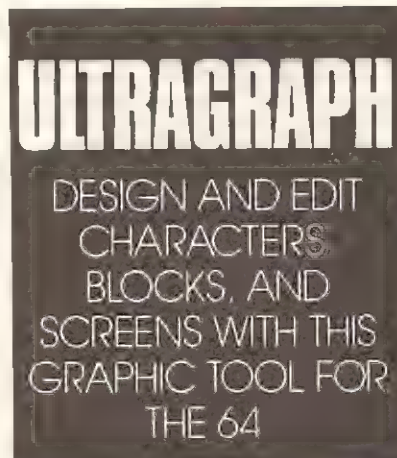
*Ultragraph* is written entirely in machine language. Enter the program

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.



## 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.

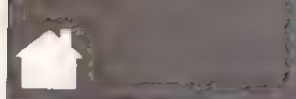
Please note that characters numbered 252, 253, 254, and 255 are reserved for the palette and grid display. Changing them will result in a distorted display and is not advised. As a matter of convenience, character 0 and block 0 should be set to all spaces.

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



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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

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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 07
C068:2D D0 8D FE CF D0 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 20 C4 C1 20 DC
C0D0:07 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
C0F0:01 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 DD
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 FB 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 02 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 02 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 B0 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 00 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 4F
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 F0 F0 0C C9 01 B6
```

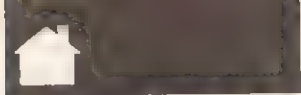
```
C3A0:F0 0B C9 02 F0 0A C9 03 03
C3A8:F0 09 A9 FC 60 A9 FD 60 F5
C3B0:A9 FE 60 A9 FF 60 A5 CB 0C
C3B8:F0 01 60 EE FE CF 60 A9 95
C3C0:00 AA 9D 00 10 E8 E0 C0 4D
C3C8:D0 F8 A2 00 BD FB C3 C9 7A
C3D0:CC F0 07 9D 40 03 E8 4C E1
C3D8:CC C3 A2 00 BD 12 C4 C9 95
C3E0:CC F0 07 9D 80 03 E8 4C F3
C3E8:DC C3 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 01 00 00 81 00 00 81 77
C408:00 00 81 00 00 81 00 00 C7
C410:FF CC FF FF F0 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 A9 32 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 8D 0F 0F
C4F8:01 D0 60 AD 01 D0 CD 54 59
C500:C5 B0 06 18 69 08 CD 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 8D 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 60 33 66 38 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 00 A9 01 8D D1 C5 A9 8A
C5D8:00 8D D0 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 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 C0 D0 D0 08 AD 10 D0 7B
```



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GAZETTE 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 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 EE 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 20 0B 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 AD 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 FE 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 88 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 20 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 03
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 0B 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 0B 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	C9B0:60 AD 9B C9 8D 86 02 20 9A	CC20:B8 CC AD 05 D0 18 69 20 31
C748:AD 21 D0 8D AA C0 A9 00 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 CF 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:F0 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 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 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 PC A9 FC 91 FB E6 67	CC90:A9 00 18 65 FD 85 FB A9 FF
C7B8:3A 20 20 20 20 20 20 20 55	CA28:FB 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:FD D0 0E 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 EF 2A	CA48:85 FD A2 00 A0 00 20 23 DC	CCB8:00 00 00 00 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	CA58:3F AD ED C7 8D F7 CF AD CC	CCC8:B8 CC 6D B9 CC 18 65 FB C8
C7F0:30 8C 5A C8 8C 55 C8 8C AA	CA60:EE 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 E7 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 A9 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 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 60 A0 CE 6D 84	CAD8:FE 85 FE 60 A0 00 A2 00 7F	CD48:D0 20 56 CD 60 20 BC CC C5
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  
 CDAB: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 4D 4C 4D CF 20 39 92  
 CE00:CF 4C 4F 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 0E 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 0C 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 88 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 4C 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 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 PD 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 07 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  
 1158:20 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 04 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 28 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 07 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 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

**T**he 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**

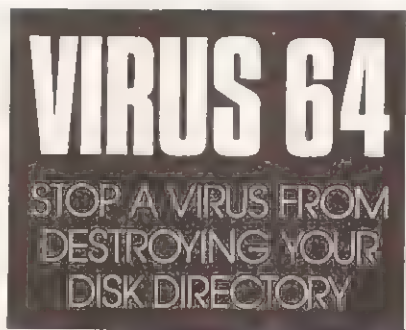
When you've finished typing, be sure to save the program before you exit *MLX*.

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

```

C000:A9 37 85 01 78 A9 7F 8D DB
C008:0D DC A9 01 8D 1A D0 A9 AC
C018:09 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
C088:99 08 31 A9 FF 99 00 35 2D
C088:C8 CA 10 F2 88 99 08 31 3E
C090:A2 D0 BD DF 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 FF 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 0F 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 86 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 D0
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 00 DC C9 7B 7F
C248:F0 04 C9 6B D0 0C AD 00 49
C250:D0 C9 5A 90 17 CE 00 D0 C9
C258:D0 12 C9 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 68 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 08 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:AE 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 80 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 9D 4C
C370:3E 03 90 10 B9 3E 03 9D 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
    
```

C3A8:A7	30	03	4C	13	C3	A5	A5	CD	C660:D0	1A	A4	B2	A9	FF	85	B2	A7	C918:C0	E0	F0	F0	F8	FC	FE	FE	2A
C3B0:8D	15	D0	AD	15	D0	85	A8	D8	C668:59	A7	CB	2D	15	D0	8D	15	F4	C920:FF	FF	FF	FF	FF	FF	FF	00	B3
C3B0:29	02	D0	01	60	A2	05	86	9D	C670:D0	A9	00	8D	08	D4	99	52	C2	C928:00	80	C0	E0	E0	F0	F0	F8	B7
C3C0:AB	18	06	A8	90	6C	A5	AB	9C	C678:03	AD	1E	0D	BD	62	CB	8D	60	C930:FC	FE	FE	FF	FF	FF	FF	00	E1
C3C8:0A	18	69	04	A8	38	AD	02	4C	C680:12	D0	4C	BC	FE	93	11	11	1A	C938:00	00	00	00	80	80	C0	C0	14
C3D0:D0	F9	00	D0	B0	07	3D	B9	18	C688:11	11	11	11	11	11	11	11	16	C940:C0	E0	E0	E0	F0	F0	FC	FC	CC
C3D8:00	D0	ED	02	D0	C9	0A	B0	E4	C690:11	11	08	8E	12	90	40	41	69	C948:F8	F8	F8	FC	FC	FC	FC	FC	58
C3E0:51	C8	38	B9	AD	03	D0	F9	7E	C698:92	05	20	20	20	20	20	20	98	C950:FC	FC	FC	FC	FC	FC	FC	FC	E3
C3E8:D0	B0	07	38	AD	03	D0	F9	7E	C6A0:20	20	20	20	20	20	20	20	2E	C958:F0	FC	F8	F8	F8	F0	F0	F0	B6
C3F0:00	D0	C9	13	B0	3C	AD	15	FD	C6A8:20	20	20	20	20	20	20	20	36	C960:F0	F0	E0	E0	C0	80	80	FF	DB
C3F8:D0	29	FD	8D	15	D0	A9	00	0B	C6B0:20	20	20	12	90	52	20	20	A9	C968:FE	FC	F8	F0	E0	C0	80	7F	73
C400:8D	01	D4	A6	AB	BD	52	03	91	C6B8:20	20	20	20	20	20	20	20	46	C970:3F	1F	0F	07	03	01	00	FF	D9
C408:00	2C	FE	52	03	A6	B2	30	52	C6C0:20	20	12	20	20	42	43	92	C978:7F	7F	3F	3F	1F	1F	0F	0F	2A	
C410:D0	A9	FF	5D	A7	CB	2D	15	BD	C6C8:05	20	20	20	20	20	20	20	C8	C980:0F	07	07	07	03	03	03	03	DB
C418:D0	8D	15	D0	A9	00	9D	52	F7	C6D0:20	20	20	20	20	20	20	20	5E	C988:01	01	01	01	01	01	01	01	1C
C420:03	A4	AB	84	B2	98	C8	C8	64	C6D8:20	20	20	20	20	20	20	20	66	C990:01	01	01	01	01	01	01	03	2A
C428:84	B4	A8	A9	FF	85	0E	4C	4F	C6E0:20	12	90	52	20	20	20	20	1C	C998:03	03	03	07	07	07	0F	0F	C0
C430:51	C5	C6	AB	10	8B	60	A9	80	C6E8:20	20	20	20	20	20	20	12	68	C9A0:0F	1F	1F	3F	3F	7F	7F	00	53
C438:6C	85	94	A9	04	85	95	A9	91	C6F0:20	20	20	44	45	92	05	20	7D	C9A8:01	01	03	07	0F	1F	7F	00	C1
C440:6C	85	9E	A9	D8	85	9F	A2	8E	C6F8:20	20	20	20	20	20	20	20	86	C9B0:00	50	00	0F	50	03	57	50	C5
C448:00	A0	00	BD	EF	CA	F0	15	77	C700:20	20	20	20	20	20	20	20	8F	C9B8:17	67	50	5D	A9	D4	76	ED	0D
C450:C9	39	90	03	38	E9	40	91	CA	C708:20	20	20	20	20	20	20	12	89	C9C0:74	75	EF	74	DF	AB	DC	DA	73
C458:94	A9	0D	91	9E	C8	E8	E0	1C	C710:90	52	20	20	20	20	20	20	64	C9C8:AA	9C	DA	AA	5C	D9	99	9C	F8
C460:29	D0	E8	F0	13	18	A5	94	B7	C718:20	20	20	20	12	20	20	20	37	C9D0:D6	9A	9C	DA	9A	9C	FA	56	4B
C468:69	50	85	94	85	9E	90	04	80	C720:20	20	46	92	05	20	20	20	C2	C9D8:9C	F9	55	9C	DA	5E	9C	1A	51
C470:E6	95	E6	9E	A8	4C	49	C4	79	C728:20	20	20	20	20	20	20	20	B7	C9E0:CE	B0	1A	CE	B0	35	CD	70	9E
C478:A9	00	85	94	A9	04	85	95	CE	C730:20	20	20	20	20	20	20	20	BF	C9E8:35	CF	F0	3F	C0	00	00	14	37
C480:A9	00	85	9E	A9	D8	85	9F	D4	C738:20	20	20	20	20	12	90	52	A2	C9F0:00	00	15	FC	00	17	57	00	02
C488:A2	0B	A0	1A	A9	21	91	94	65	C740:20	20	20	20	20	20	20	20	CF	C9F8:17	67	50	5D	A9	D4	75	EE	4C
C490:A9	02	91	9E	88	10	F5	A5	A1	C748:20	12	20	20	20	20	20	20	54	CA00:74	77	ED	74	DF	AB	9C	DA	74
C498:94	18	69	28	85	94	85	9E	4A	C750:47	92	05	20	20	20	20	20	AC	CA08:AA	9C	DA	AA	9C	D9	99	9C	BB
C4A0:90	04	E6	95	E6	9F	CA	10	05	C758:20	20	20	20	20	20	20	20	E7	CA10:EA	9A	5C	EA	9A	9C	DA	56	4F
C4A8:E1	60	A2	08	BD	28	CB	38	6E	C760:20	20	20	20	20	20	20	20	EF	CA18:BC	D9	55	9C	DA	D6	9C	3A	9C
C4B0:E9	40	9D	D2	04	A9	05	9D	0E	C768:20	20	20	12	90	52	20	20	63	CA20:3E	90	3A	CD	70	35	CD	70	C9
C4B8:D2	D8	CA	10	EF	A9	60	8D	0B	C770:20	20	20	20	20	20	12	20	E3	CA28:3F	CD	70	00	0F	0F	00	00	1B
C4C0:2F	C4	20	98	C5	A9	4C	8D	9B	C778:20	20	20	20	20	48	49	92	6D	CA30:82	00	02	08	00	00	82	00	CC
C4C8:2F	C4	4C	F2	C4	A2	11	BD	04	C780:05	20	20	20	20	20	20	20	82	CA38:02	08	00	00	82	00	01	04	EA
C4D0:31	CB	D0	31	CB	38	E9	40	64	C788:20	20	20	20	20	20	20	20	18	CA40:00	00	41	00	01	04	00	00	16
C4D8:9D	A5	04	BD	43	CB	38	E9	9A	C790:20	20	20	20	20	20	20	20	20	CA48:00	00	00	00	00	00	00	00	DD
C4E0:40	9D	F5	04	A9	05	9D	A5	33	C798:20	12	90	52	20	20	20	20	D5	CA50:00	00	00	00	00	00	00	00	E5
C4E8:D8	9D	F5	D8	CA	10	E0	20	0B	C7A0:20	20	20	12	20	20	20	20	4F	CA58:00	00	00	00	00	00	00	00	ED
C4F0:98	C5	68	68	4C	1E	C1	A9	D3	C7A8:20	20	20	4A	4B	92	05	20	C7	CA60:00	00	00	00	00	00	00	00	F5
C4F8:60	8D	D8	C1	20	A4	C1	AD	12	C7B0:20	20	20	20	20	20	20	20	40	CA68:00	00	00	00	00	00	00	00	FD
C500:00	DC	29	10	D0	F6	A9	CD	65	C7B8:20	20	20	20	20	20	20	20	48	CA70:CC	F0	03	BB	AC	03	AA	AC	38
C508:8D	D8	C1	A0	FF	84	0B	A0	9B	C7C0:20	20	20	20	20	20	20	12	42	CA78:0C	EA	B0	3B	AA	AC	EA	AA	21
C510:08	84	0D	C8	8C	15	D0	C8	0E	C7C8:90	53	20	20	20	20	20	20	5D	CA80:B0	E9	ED	B0	E9	65	C0	7A	92
C518:8C	27	D0	20	D1	C5	AD	AD	7E	C7D0:12	20	20	20	20	20	20	20	59	CA88:AB	05	5E	AA	D5	5E	AA	B4	DD
C520:CB	85	A6	A9	11	8D	04	D4	FD	C7D8:20	4C	92	05	20	20	20	20	10	CA90:7A	56	B0	39	FD	B0	0D	A9	19
C528:8D	0B	D4	A9	8F	8D	05	D4	04	C7E0:20	20	20	20	20	20	20	20	70	CA98:C0	3A	56	C0	EA	AA	B0	3A	91
C530:8D	0C	D4	8D	13	D4	A9	FF	04	C7E8:20	20	20	20	20	20	20	20	78	CAA0:AA	C0	3A	AB	00	EB	FA	C0	24
C538:8D	06	D4	8D	0D	D4	A9	21	AF	C7F0:20	20	20	20	12	90	54	20	3A	CAA8:EC	00	C0	30	03	00	00	00	6B
C540:8D	12	D4	A9	FD	8D	14	D4	6F	C7F8:20	20	20	20	20	12	20	20	50	CAB0:FF	00	0F	AA	C0	3A	AA	C0	D7
C548:A9	0F	8D	18	D4	AD	1E	D0	0A	C800:20	20	20	20	20	20	4D	92	5E	CAB8:3E	AB	00	03	AA	F0	3E	AA	C8
C550:60	A2	05	BD	72	04	79	48	10	C808:05	20	20	20	20	20	20	20	0C	CAC0:AC	7A	AA	B0	5E	AA	F0	79	A4
C558:03	9D	72	04	BD	72	04	C9	E4	C810:20	20	20	20	20	20	20	20	A1	CAC8:ED	B0	E9	65	AF	FA	AA	AB	7F
C560:3A	90	0A	E9	3A	09	30	9D	01	C818:20	20	20	20	20	20	20	20	A9	CAD0:3A	AA	AB	0E	56	BC	0D	FD	42
C568:72	04	FE	71	04	CA	10	EC	7D	C820:20	12	90	55	20	20	20	20	8F	CAD8:B4	3A	56	D5	0E	AA	B5	0E	14
C570:C6	A6	D0	5C	A9	FF	85	B6	F7	C828:20	20	12	20	20	20	20	20	F7	CAE0:AA	C4	3A	AB	00	EA	AC	00	04
C578:E6	A9	A4	A9	C0	08	D0	03	DB	C830:20	20	20	4E	92	05	20	20	CB	CAE8:3B	AC	00	0C	F0	00	00	53	E2
C580:4C	CD	C4	B9	AD	CB	85	A6	28	C838:20	20	20	20	20	20	20	20	C9	CAF0:43	4F	52	45	20	30	30	30	EC
C588:98	0A	A8	B9	18	CB	8D	12	B0	C840:20	20	20	20	20	20	20	20	D1	CAF8:30	30	30	00	4C	49	56	45	32
C590:05	C8	B9	18	CB	8D	13	05	49	C848:20	20	20	20	20	20	12	90	2E	CB00:53	20	33	00	54	52	41	43	61
C598:A0	05	84	AB	AD	15	D0	29	8D	C850:56	20	20	20	20													



# PROGRAMS

R O B E R T B I X B Y

**T**here 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

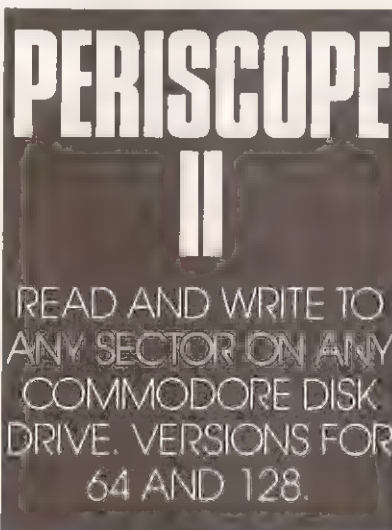
When you load and run *Periscope II*, you'll be prompted to enter the type of disk drive you're using. Press the cursor key until the drive type is highlighted.

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

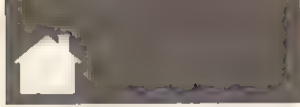
It's very important to enter Q when you're ready to stop reading sectors.

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 GOSUB 720
XR 50 GOSUB 870
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 OPEN 15,DR,15:OPEN 5,DR,5,
"#":OPEN 4,DR,4,"#":GOSUB
220:GOTO 270
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$="A"AND (TR<10TR>8
0ORSE<0ORSE>39) THEN RETU
RN
KD 120 IFTY$<"B" THEN 170
EK 130 IF (TR<10TR>70ORSE<0ORS
E>20) THEN RETURN
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" THEN 220
EK 180 IF TR<10TR>35ORSE<0ORSE
>20 THEN RETURN
CJ 190 IF TR>17ANDTR<25ANDSE>18
THEN RETURN
GH 200 IF TR>24ANDTR<31ANDSE>17
THEN RETURN
GP 210 IF TR>30ANDSE>16 THEN RETU
```

```
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>51 THEN PO=0
BE 250 IFPO>L1 THEN LI=PO
CG 260 RETURN
BC 270 GOSUB 850: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 C$:IFC$="" THEN 290
MA 300 IFC$="J" THEN GOSUB 680
EK 310 IFC$="E" THEN GOSUB 370
SJ 320 IFC$="N" THEN GOSUB 90
KK 330 IFC$="B" THEN GOSUB 650
PS 340 IFC$="Q" THEN 690
SB 350 IFC$="V" THEN GOSUB 990
AP 360 GOTO 270
SS 370 CL=0
KP 380 GOSUB 1020
JB 390 GOSUB 590:GETINS:IFINS=""
THEN 390
MA 400 IN=ASC(IN$):IFIN=23 THEN
630
BM 410 IFIN=22 THEN GOSUB 990:INS
="" :GOTO 390
AD 420 IFIN<13 THEN RETURN
QE 430 IFIN=19 THEN 370
QF 440 IFIN=10 THEN TR=PEEK(C1):
SE=PEEK(C1+1):GOSUB 110:
POKE 197,0:GOTO 370
JG 450 IFIN<2 THEN GOSUB 650:PO
KE 208,0:GOTO 370
GR 460 IFIN=17 AND CL<215 THEN CL=
CL+40:GOTO 530
AH 470 IFIN=29 AND CL<255 THEN 520
MM 480 IFIN=145 AND CL<39 THEN CL=
CL-40:GOTO 530
PE 490 IFIN=157 AND CL<0 THEN CL=C
L-1:GOTO 530
DJ 500 IFIN=18 OR IN=146 THEN 530
KH 510 IFIN<320 OR (IN>127 AND IN<1
60) THEN 390
PS 520 CL=CL+1:IFCL>256 THEN 370
DA 530 POKE 781,(C1-1024)/40
FK 540 C2=(C1-1024)
JP 550 IFC2>39 THEN C2=C2-40:GOT
0550
AB 560 POKE 782,C2
MX 570 POKE 783,PEEK(783) AND 254
:SYS 65520
FA 580 PRINTINS:GOTO 390
JF 590 C1=1024+CL:C2=PEEK(C1):
POKE 820,C2:SYS 49198
DF 600 POKE C1,PEEK(820):C3=PEE
K(C1+1):C4=C2+C3*256
HJ 610 POKE C1,C2:POKE 782,19:PO
KE 781,7:POKE 783,PEEK(78
3) AND 254:SYS 65520
QJ 620 PRINT "{6 SPACES}
{6 LEFT}"C2"{6 SPACES}
{6 LEFT}"C4:RETURN
FD 621 PRINT "{HOME}{RED}
{7 DOWN}";
HB 622 INPUT "WRITE THIS TO DIS
K <Y/N>{16 SPACES}
{12 LEFT}"
GM 623 IFWR$<"Y" THEN 200
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$<"Y" THEN 220
SQ 635 SYS 49171
XK 640 PRINT#15,"U2";4;0;TR;SE
:RETURN
PC 650 PO=PO-4:IFPO<0 THEN PO=LI
:PRINT "{HOME}{RED}
{7 DOWN}NO PREVIOUS SEC
TOR{WHT}":GOTO 670
MJ 660 TR=BK(PO):SE=BK(PO+1)
JG 670 GOSUB 1030:PRINT "{HOME}
{7 DOWN}{20 SPACES}":GO
TO 110
QS 680 TR=PEEK(1024):SE=PEEK(1
025):GOTO 110
HJ 690 INPUT#15,A,B$,C,D:PRINT
A;B$;C;D
EA 700 CLOSE 4:CLOSE 5:CLOSE 15:P
RINT "{CLR}"
HE 710 POKE 808,237:END:REM ENA
BLE STOP KEY AND RUN/ST
OP-RESTORE
PH 720 PO=0:CL=1024:DIM BK(51)
:PRINT CHR$(14)CHR$(8):P
OKE 248,192:TR=1:SE=1
FG 730 POKE 53280,0:POKE 53281,0
:PRINT "{CLR}{WHT}"TAB(1
4)"PERISCOPE 2.0":PRINT
QB 740 BX$="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:FOR I=0 TO 54:READ
A:B=A+B+A
BA 840 NEXT:IFB<>7120 THEN PRINT
"{CLR}{RED}ERROR
{2 SPACES}IN DATA STATE
MENTS":END
KG 850 :
RS 860 POKE 808,234:RETURN:REM
{SPACE}DISABLE STOP AND
RUN/STOP-RESTORE
GD 870 S1=0:S$="158115711541":
TY$="ABC"
QX 880 GOTO 940
JM 890 GETAS:IFAS$="" THEN 890
DQ 900 IFAS$="{UP}" OR AS$="{DOWN}
" OR AS$=CHR$(13) THEN 920
BA 910 GOTO 870
```



# PROGRAMS

GAZETTE COMMODORE 64/128

```

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 GOTOB90
ED 970 IFS1=ITHEMPRINT"{RVS}";
AK 980 FORJ=0TO3:PRINTMID$(SS,
I*4+J+1,1);:NEXT:PRINT:
RETURN
PS 990 INPUT"{HOME}{RED}
{8 DOWN}ENTER VALUE TO
{SPACE}INSERT{WHT}";AS
DX 1000 A=INT(VAL(AS)):IFA>-1A
NDA<256THENPOKEC1,A
MQ 1005 PRINT"{HOME}{8 DOWN}
{26 SPACES}":RETURN
GD 1010 GOTOB90
QD 1020 PRINT"{HOME}{10 DOWN}"
EES:PRINT"TRACK"TR
{LEFT}{2 SPACES}SECTOR
"SE"{LEFT}{2 SPACES}":
RETURN
PJ 1030 FORI=0TO1000:NEXT:RETU
RN
EP 1040 DATA162,005,032,198,25
5
BK 1050 DATA160,000,032,207,25
5
XG 1060 DATA153,000,004,200,20
8
GP 1070 DATA247,076,204,255,16
2
GJ 1080 DATA004,032,201,255,16
2
KG 1090 DATA000,185,001,004,03
2
FQ 1100 DATA210,255,200,192,25
5
GR 1110 DATA144,245,173,000,00
4
XD 1120 DATA032,210,255,076,20
4
JC 1130 DATA255,173,052,003,07
3
ES 1140 DATA128,141,052,003,09
6
MA 9990 FOR TX=1 TO 20-LEN(BX$
)/2:PRINTCHR$(32);:NEX
T:PRINTBX$: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<1ORTR>8
0ORSE<0ORSE>39)THENRETU
RN
RR 110 IFTYS<>"B"THEN160
AJ 120 IF(TR<1ORTR>70ORSE<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<1ORTR>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>LITHENLI=PO
SG 250 RETURN
AS 260 GOSUB780:PRINTMES:PRINT
"TRACK"TR;:SECTOR"SE
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 GOTOB260
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(C1):
SE=PEEK(C1+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<255THENS00
SQ 460 IFIN=145ANDCL<39THENCL=
CL-40:GOTO510
PC 470 IFIN=157ANDCL>0THENCL=C
L-1:GOTO510
SQ 480 IFIN=180RIN=146THENS10
XQ 490 IFIN<320R(IN>127ANDIN<1
60)THEN360
FC 500 CL=CL+1:IFCL>256THEN350
AG 510 POKE7,(C1-1024)/40
RG 520 C2=(C1-1024)
MA 530 IFC2>39THENC2=C2-40:GOT
O530
JR 540 POKES,C2
JM 550 POKES,PEEK(5)AND254:SYS
65520
PR 560 PRINTIN$;:GOTO360
SB 570 C1=1024+C2:C2=PEEK(C1):
POKEC1,XOR(C2,128):C3=P
EEK(C1+1):C4=C2+C3*256
SA 580 POKEC1,C2:POKE8,19:POKE
7,7:POKE5,PEEK(5)AND254
:SYS65520
DJ 590 PRINT"{2 LEFT}"C2"
{LEFT}{"$"}RIGHT$(HEX$(C2

```

```

),2)"C4"{LEFT}{"$"}HEXS
(C4){"5 SPACES}":RETUR
N
QM 600 PRINT"{HOME}{RED}
{7 DOWN}";:INPUT"WRITE
{SPACE}THIS TO DISK <Y/
N>{16 SPACES}{15 LEFT}"
;WR$: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$(8):P
OKE248,192:TR=1:SE=1:TR
AP680
DH 710 POKES3280,0:POKES3281,0
:PRINT"{CLR}{WHT}"TAB(1
4)"PERISCOPE 2.0"
QD 711 BX$="COPYRIGHT 1991 COM
PUTE PUB. INTL. LTD.":G
OSUB 9998
AS 720 BX$="ALL RIGHTS RESERVE
D":GOSUB 9998
FK 730 RES=CHR$(13):ME$="{YEL}
J JUMP TO NEXT LINK"+RE
S+"Q QUIT"+RES+"E EDIT"
+RES+"N NEW SECTOR"+RES
+"B BACK UP"+RES+"V ENT
ER VALUE"+RES+"PRESS KE
Y{WHT}"
XR 740 EES="{YEL}CTRL-J
{2 SPACES}JUMP TO NEXT
{SPACE}LINK"+RES+"RETUR
N{2 SPACES}QUIT"+RES+"C
TRL-B{2 SPACES}BACK UP"
+RES+"CTRL-V{2 SPACES}E
NTER VALUE"
DD 750 EES=EES+RES+"CTRL-W
{2 SPACES}SAVE SECTOR"+
RES+"PRESS KEY{WHT}"
DQ 760 RESTORE:FORI=0TO114:REA
DA:POKE4864+I,A:B=B+A
PH 770 NEXT:IFB<>12696THENPRIN
T"{2 HOME}{CLR}{RED}ERR
OR{2 SPACES}IN DATA STA
TEMENTS{WHT}":END
EX 780 WINDOW 0,16,39,24,1
RX 790 SYS4919:RETURN:REM DISA
BLE STOP AND RUN/STOP-R
ESTORE
CS 800 S1=0:SS$="158115711541":
TYS$="ABC"
PP 810 GOTOB70
RC 820 GETKEY AS
HD 830 IFA$="{UP}"ORAS$="{DOWN}
"ORAS$=CHR$(13)THEN850
AJ 840 GOTOB00

```

# PROGRAMS

MQ 850	IFAS=CHR\$(13)THENTYS=MI DS(TYS,S1+1,1):RETURN	HE 950	NDOW0,0,39,7:RETURN WINDOW 0,12,39,24:PRINT "{CLR}{4 DOWN}"EE\$:PRIN T"TRACK "TR;"SECTOR "SE :RETURN	AQ 1090	DATA003,169,255,141,02 5
EE 860	S1=S1+(A\$="UP")-(A\$="" {DOWN}"):IF(S1<0ORS1>2) THENS1=-2*(S1<0):IFS1>2 THENS1=0	GD 960	GOTO920	DE 1100	DATA003,169,046,141,04 0
SM 870	PRINT"(HOME){9 DOWN}CUR SOR TO":PRINT"HIGHLIGHT ":PRINT"DRIVE TYPE":PRI NT	SH 970	DATA162,005,032,198,255	JH 1110	DATA003,169,019,141,04 1
AC 880	FORI=0TO2:GOSUB900:NEXT SQ 890	SG 980	DATA160,000,032,207,255	MR 1120	DATA003,088,096,000,00 0
AG 900	IFS1=ITHENPRINT"(RVS)";	JD 990	DATA153,000,004,200,208	MC 1130	DATA120,169,064,141,02 4
DC 910	FORJ=0TO3:PRINTMID\$(S\$, I*4+J+1,1);:NEXT:PRINT: RETURN	BR 1000	DATA247,076,204,255,16 2	MB 1140	DATA003,169,250,141,02 5
HQ 920	WINDOW0,0,39,24:INPUT" {HOME}{RED}{8 DOWN}ENTE R VALUE TO INSERT":A\$	DC 1010	DATA004,032,201,255,16 0	JX 1150	DATA003,169,110,141,04 0
RR 930	A=INT(VAL(A\$)):IFA>-1AN DA<256THENPOKEC1,A:PRIN T"(HOME){WHT}{8 DOWN} {27 SPACES}":WINDOW0,0, 39,7:RETURN	BJ 1020	DATA000,185,001,004,03 2	JR 1160	DATA003,169,246,141,04 1
HF 940	PRINT"(HOME){WHT} {8 DOWN}{27 SPACES}":WI	EA 1030	DATA210,255,200,192,25 5	RA 1170	DATA003,088,096,082,07 9
		SH 1050	DATA032,210,255,076,20 4	ED 1180	DATA066,069,082,084,03 2
		AH 1060	DATA255,165,005,041,25 3	KJ 1190	DATA066,073,088,066,08 9
		RH 1070	DATA133,005,165,145,09 6	MA 9998	FOR TX=1 TO 20-LEN(BX\$ ) / 2:PRINTCHR\$(32);:NEX T:PRINTBX\$:RETURN
		PP 1080	DATA120,169,051,141,02		

## B E N C A M P B E L L

**Y**ou're traveling through space in a metallic ball that's armed with forward-firing cannons. The ball is perpetually bouncing, and your only means of control is bouncing left or right using a joystick in port 2.

No space game is complete without hostile aliens, and you'll find there are plenty to keep you busy in this outstanding arcade game. *Bounce* is fairly long, but you'll find it comes close to commercial quality. The object of the game is to blast your way through five zones filled with enemy attack waves. Avoid collisions and watch out for the heavily armed guardians.

### Typing It In

*Bounce* is written entirely in machine language. Type it in by using *MLX*; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

**Starting address: 0801**

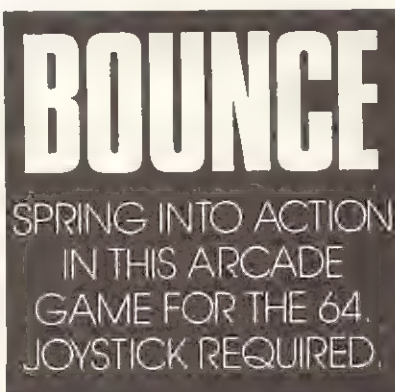
**Ending address: 25B0**

When you've finished typing, be sure to save a copy to disk. Load and run *Bounce* as you would any BASIC program.

### Getting on the Ball

After the title screen has appeared, press the fire button to begin play. Your bouncing ball appears, and aliens head your way. You must destroy them with your cannon, but

you'll have to maneuver your sphere to bounce between those that escape your fire. You'll have to perfect your timing to bounce between those that approach from your rear since your cannon can't fire in that direction.



At the bottom of the playing screen is a window that contains your score, current zone, shield status bar, and distance bar. Keep your eye on the shield status bar. In addition to blasting alien vessels, try to avoid collisions with them. Collisions deplete your shields—and when the status bar reaches 0, your ball explodes.

The distance bar gradually diminishes as play progresses. It represents the distance you must travel before you reach the next zone. When it reaches 0, the end-of-zone guardian appears. This unpleasant alien's vessel is armed with cannons much like the ones on your ball, and it also has

shields. You'll need to score multiple hits on the guardian to deplete its shields and defeat it before you can move on to the next zone.

On higher numbered zones, the guardians have better shields and take more hits to destroy. The attack waves also get harder as you progress through the levels. At the end of each level, you'll be awarded a bonus proportional to the number of shields remaining. In addition, you get 2000 points if you make it through all five zones and complete the game.

While you're playing, press f1 to pause the game. The border will change to a multicolored mode during this time. Press f7 while the game is paused to abort it.

### BOUNCE

```
0801:0B 08 70 17 9E 32 34 30 6E
0809:37 00 00 00 20 20 20 20 96
0811:20 20 20 20 20 A0 C4 B9 06
0819:3C 08 99 F8 00 B9 FD 08 F6
0821:99 33 03 88 D0 F1 A0 09 4C
0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 B0 85 2D A9 25 85 F5
0839:2E 4C 00 01 16 A0 07 B0 75
0841:25 2E 1C B9 6E 09 99 E8 42
0849:07 C8 D0 F7 EE 02 01 EE 19
0851:05 01 C6 F9 D0 ED A2 03 23
0859:20 34 03 F0 33 C9 07 D0 95
0861:16 A2 01 20 34 03 D0 0A A0
0869:A2 04 20 34 03 18 69 07 65
0871:10 05 A2 A0 20 34 03 85 1D
0879:A8 A5 A7 85 A9 A5 FE 85 FB
0881:F7 A5 FF 85 F8 20 6C 03 73
0889:A5 F8 85 FE A5 F7 85 FE 72
0891:E8 20 34 03 D0 1E A2 08 21
0899:20 34 03 A0 02 84 A8 85 2A
08A1:A6 18 A5 FC 65 A6 85 F7 58
08A9:A5 FD 65 A7 85 F8 20 6C EF
```



# PROGRAMS

G A Z E T T E C O M M O D O R E 6 4 / 1 2 8

08B1:03 4C 13 01 E8 20 34 03 FB	08B21:FB B9 9B 0A 85 FC 30 B1 E9	0D91:91 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 A4 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 05 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 00 07 DA C5	0E09:0E 73 CD 1B ED 30 09 DE 95
0931:02 58 4C 13 08 A4 A8 03 9A	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 07 A9	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 A8 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:AF 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 D8 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 86 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	0EA1:82 60 C6 6C 23 B0 28 1A FC
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 70
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 D0 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 85 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 P5 02	08C69:CS 87 02 13 06 84 2C 24 76	0ED9:8E BA BD 46 45 05 D5 52 44
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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 3E 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 20 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 F0 AA 16 16	08C99:18 6D BD 0C 69 94 0A 13 56	0F09:29 0F AA 42 C3 08 B9 D0 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 0F AE 44 BC
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0A59:0F 03 23 15 14 20 19 11 CF	08CC9:ED 04 0D 63 29 02 0D 2C 49	0F39:BE 44 8C 84 8C 8C AD C5 F0 32
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0A71:D5 C3 63 D1 00 01 03 00 F4	08CE1:01 02 03 02 F0 05 CF A0 57	0F51:A0 82 50 91 5A 3C 8C 78 D8
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0AA9:E9 80 7A E9 61 1C 92 20 81	08D19:05 4E 42 1C 13 06 4D 42 E0	0F89:A8 52 78 30 6C 78 48 64 DC
0AB1:F0 60 23 A2 0D 8F AA 6D 42	08D21:45 0F 35 91 07 93 10 47 4F	0F91:02 F8 54 34 1C 05 71 E4 79
0AB9:66 04 A8 0A BD A9 01 F6 45	08D29:48 08 03 51 84 4C BC D0 7E	0F99:29 02 CE 00 15 15 AF 75 78
0AC1:0D 02 A0 27 BE 97 C9 20 6B	08D31:09 85 40 CE 12 54 97 06 3D	0FA1:DC 71 11 3C 6E B4 DC FF 70
0AC9:D0 04 CD 15 78 98 9D 21 D4	08D39:20 1A 13 4C 89 0F 44 F0 13	0FA9:00 28 41 6E 82 AA 00 4B EA
0AD1:0F 60 AD 52 00 5B C0 48 97	08D41:27 20 0C DA 0D C9 FE D0 84	0FB1:96 E1 47 CF 1E 3C 5A 78 88
0AD9:06 00 8D A2 09 92 16 4B D0	08D49:A0 F7 51 80 2E 4C 85 A2 34	0FB9:96 68 17 E6 28 88 19 32 56
0AE1:71 08 FB BD 5A 09 70 BC A0	08D51:BA 88 E8 D8 35 E9 A8 F0 29	0FC1:4B 64 7D 57 B8 49 3C 46 6D
0AE9:69 09 C9 94 9D 87 09 A9 3E	08D59:76 E9 C8 F0 B9 01 01 C4 E9	0FC9:32 3C 2E E2 08 80 00 08 4E
0AF1:40 18 7D 78 09 88 1F E8 F4	08D61:17 61 D8 07 B9 ED 0A BE 43	0FD1:3B 0D 00 B6 43 A0 40 40 99
0AF9:E0 0F D0 E1 A9 55 A9 43 B3	08D69:3A C2 BE 0C 92 5A 0C E3 E3	0FD9:40 FB 6F E3 33 13 D3 53 24
0A81:55 00 0A A8 3B 0A 44 52 6A	08D71:60 66 05 08 80 20 30 01 5C	0FE1:79 23 E2 28 88 94 24 34 77
0B09:00 0A 1B 0F A9 45 54 06 07	08D79:C3 0C 92 07 0C 0D 60 BD 4E	0FE9:64 54 A4 3B 00 02 54 24 6C
0B11:20 31 88 F8 DA E5 28 21 04	08D81:26 17 01 70 8A F8 07 BD 9F	0FF1:28 00 02 53 63 A8 20 8E 26
0B19:DB 8C 96 0A 89 98 C8 12 87	08D89:2F 2C 1D 0B BD 38 0E D0 56	0FF9:82 94 84 74 34 E4 64 C5 1A

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1009:00	02	01	03	04	61	F0	6A	EB	1279:68	00	82	A2	74	96	41	DD	AA	14E9:53	14	20	8E	E0	05	70	0C	B5
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1019:B5	8C	C0	FF	D0	F9	52	6A	CC	1289:F1	05	A5	0A	72	99	09	00	49	14F9:01	20	E3	13	8C	9B	18	20	7B
1021:6A	6A	29	1F	A8	8D	1F	12	F3	1291:03	2C	44	0D	10	D0	A9	07	B9	1501:B9	13	A9	B0	FC	36	17	A9	A5
1029:C6	C3	38	4E	88	B4	00	06	A6	1299:90	90	A9	C2	78	0A	A9	00	CA	1509:03	20	8A	19	03	78	37	88	90
1031:33	88	4C	14	12	A0	0E	A9	B0	12A1:99	ED	0A	BE	43	09	B9	64	51	1511:C8	D0	E4	AD	11	D0	10	FB	33
1039:74	29	07	61	BC	0B	06	98	8B	12A9:15	9D	00	D0	B9	5C	4E	2F	D7	1519:20	2D	1B	6F	1B	0D	20	A3	E9
1041:3D	46	C8	91	FB	60	A9	5F	D7	12B1:DD	0A	B9	6C	15	99	27	D0	73	1521:09	20	1D	01	BE	7D	13	C0	5E
1049:E0	0D	73	48	0E	D1	A9	87	A2	12B9:C8	C0	08	D0	CD	60	DE	04	32	1529:00	F0	E8	A9	08	99	D5	60	F9
1051:85	FB	A9	07	85	FC	20	3C	75	12C1:05	0D	A9	FF	8D	1B	D0	60	BB	1531:5C	22	29	03	C9	00	53	1A	76
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1071:D0	67	03	EC	20	61	12	1B	C8	12E1:E0	D3	0E	9B	08	A7	C3	23	70	1551:0B	0E	35	2B	0E	A9	0C	99	A6
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1129:AD	0D	05	73	0B	9D	01	D0	DE	1399:FF	1C	1A	8D	21	AD	54	0F	5A	1609:FB	19	5B	05	01	39	05	07	33
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1149:64	15	F1	B9	9D	1B	61	0C	E4	13B9:0F	BD	1F	47	98	03	5A	90	45	1629:A0	00	60	02	9D	80	13	E8	CF
1151:07	B9	65	1C	C9	0F	D0	03	03	13C1:AD	E7	38	E9	01	90	20	8D	76	1631:60	BD	0E	20	00	07	0E	9B	94
1159:AD	32	09	99	20	DB	CE	F1	99	13C9:0E	00	F8	12	2C	80	5F	80	D9	1639:31	80	6F	05	10	08	02	6A	6B
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1191:60	A2	00	BD	1D	BE	00	0C	58	1401:AD	4E	17	26	4C	A4	26	E8	42	1671:EB	19	8D	F0	19	E1	5C	00	A3
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11C9:01	0F	0C	0B	00	A0	F8	13	E9	1439:5E	10	3A	9C	61	2C	89	B8	5C	16A9:06	CD	FF	C8	4C	A9	0B	B5	44
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