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64/128 VIEW

Define your computing goals.
Then see if your computer—dinosaur
or not—can get the job done.

Tom Netsel

Take time to flip through the pages that surround Gazette in this issue, and you'll see a section comparing the latest Super VGA monitors and accelerator cards.

If you're impressed by the sweeping changes in monitors, try keeping abreast of the latest features packed into computers themselves. One COMPUTE editor is planning to buy a PC for use at home, but just as he decides on a system, something newer and faster pops over the silicon horizon. Prices are dropping, but buying a new system is still a major investment. Like any consumer, this editor would hate to decide on a computer, fork over the cash, and then find a new improved model hitting the streets a few days later.

The PC market is volatile. What's new and hot today soon becomes yesterday's technology. As Bill Ihlenfeldt said recently in the *The Wall Street Journal*, "I bought the latest computer; it came completely loaded. It was guaranteed for 90 days, but in 30 days it was outmoded."

I spotted something similar the other day as I browsed through some user group newsletters. I came across an article written by Bjo Ashwill in "The Computer Group" of Eugene, Oregon. Ashwill, in a vein similar to his *Journal* colleague's, made a tongue-in-cheek gibe about the way today's technology changes so rapidly. He mentioned his old laptop computer. People called his six-pound laptop a dinosaur, a mere 8086 with a 20-meg hard drive, poking along at a pedestri-

an 8 MHz. "You couldn't prove it by me," Ashwill said. "I'm still starry-eyed about my Commodore 64."

Ashwill knows how easy it is to get carried away by new toys and the latest megaspeed gizmo. SVGA monitors may appeal to many enthusiasts, but many 64 owners still don't own monitors. They hook their computers to TV sets.

No matter how unglamorous the 64 may seem when compared to today's electronic speedsters, the little 8-bitter still gets the job done. That point was illustrated nicely by Max P. Feld, who's one of the Miami Individuals with Commodore Equipment (M.I.C.E.). He wrote in "M.I.C.E. News" about a member who was having trouble with her securities program. It wouldn't produce the financial data she needed. Group members recommended that she define her goals and then look for a way to accomplish them. Instead of trying to coax pertinent data from a fancy but temperamental program, they suggested she use a simple spreadsheet to accomplish the task.

Feld sees a lesson in this for all of us. "What do we expect to get out of our computers?" he asks. "Just why do we use the 64 or 128?" Once we ask ourselves these questions and define our computing goals, we should take another look at our 64s and 128s. They may not be today's pride of Silicon Valley, but can they still handle our needs? If so, it might come as a surprise to discover that our 64s and 128s are not the dinosaurs some folks say they are. □

GAZETTE

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Questions and answers about machine language monitors, memory limitations, and printouts of program listings

Monitor or MLX?

What is the difference between a machine language monitor and MLX, the Gazette utility program that we use for entering machine language programs? I have noticed that with a monitor we must enter eight codes, but in MLX we must enter nine codes.

MAURIZIO GEREVASI
QUITO, ECUADOR

A machine language monitor is a versatile program for entering and editing raw computer code. Its main feature is an assembler for writing programs in assembly language.

LDA # $\$41$;load the accumulator register with the value 65 ($\$41$)

JSR $\$FFD2$;jump to the subroutine for printing the accumulator value

For example, the code above is a simple two-line assembly program for printing the letter A. (The text following the semicolons consists of remarks and isn't part of the code.)

The assembler takes these mnemonic instructions and turns them into machine code, a set of numbers that tells the processor what to do. LDA # $\$41$ is converted to the numbers 169 and 65 ($\$A9$ and $\$41$) and JSR $\$FFD2$ becomes 32, 210, and 255 ($\$20$, $\$D2$, and $\$FF$). In addition to letting you write assembly language programs, a machine language monitor can move blocks of code, search for a specific string of values in memory, and display the assembly language equivalent of machine language.

It also does one more thing. It can perform a hex dump. A hex dump displays the hexadecimal values in memory and allows you to alter them. In a sense, the MLX program works in the same

manner as a hex dump. The difference is that MLX works with specific program data, while the monitor hex dump deals with data in a direct and raw form. Like the 40-column machine language monitor, the 40-column MLX displays eight bytes at a time, too. The ninth byte is a checksum, helping to ensure that the real program data in the other eight bytes was correctly entered. If you use the hex dump capability of a machine language monitor to enter MLX program listings from Gazette, just ignore the ninth (final) character in each row.

Out of Memory

For the past few years I have been using a program called Free-Form Filer (June 1987). It has worked without a flaw since I first typed it in until now. When I try to add another file, I get a message that states I am low on memory. Checking the disk directory, I notice that I have 11 blocks of another program, 152 blocks of the Free-Form Filer program, and 501 blocks of free space. How can I change the program in order to use the remaining blocks on the disk?

G.P. WINDAU
FOSTORIA, OH

It's true that you have 152 blocks of memory remaining on the disk, but you have exhausted your computer's memory. Free-Form Filer grows itself each time you add a record, and you must load the entire program each time you use it. After five years, you have added enough material to fill the 64's memory.

If you notice your opening screen when you first turn on your 64, it says you have 38911 BASIC bytes of free memory. Now load your version of Free-Form Filer, but do not run it. Once the program

has loaded, enter the following to determine how much RAM you have remaining.

FRE(0) - (FRE(0)-0) * 65536

You should see that you have less than 2K of free memory. You can add a few more files, but you've just about pushed the 64 to its memory limit with all the records that you've added over time. You might consider either breaking up your file into smaller sections or deleting records that you no longer need.

Remember, you must use a separate copy of Free-Form Filer for each database you create, and you can use only one copy of the program on a disk. I hope you saved a master copy that contains no data. You can then use it to create working copies on any number of disks.

BASIC Printouts

I wish to point out a serious oversight which occurred in the December 1991 "Feedback." The published tip for skipping folds in fanfold paper will not work with MPS801, MPS803, and 1525 printers. These printers do not support paging. Six years ago, Gazette offered a solution for skipping folds in computer paper that works with these printers. Check out List Pager, December 1985. I use this utility with my MPS803, and it works great.

RANDY CLEMMONS
SAN DIEGO, CA

Thanks for the reminder, Randy. Readers who don't have access to that back issue may want to try a similar utility that's found in this issue. It's a type-in program called Formatted List. It's also available on this month's Gazette Disk, which can be ordered for \$9.95 plus \$2.00 shipping and handling.

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Mode Detection

You recently had a letter in "Feedback" (April 1992) asking how to distinguish between the various 128 modes of operation. I have compiled a list of PEEKs that can distinguish between most 8-bit Commodore computers. (See table printed at right.)

Location 65288 is the place to start. This location can distinguish between all the major variations of the different machines. After determining the variation, you can then find out the specific ROM version it is using by checking other locations. Because of hardware and software considerations native to certain machines, you must first poke in the values at the bottom of the table before peeking the addresses listed for those machines.

WILLIAM LEVAK
ANN ARBOR, MI

All at Once

I've tried and tried to figure out how you can play music in the background, move sprites around the screen, animate background sprites, and read a user's joystick all at once in BASIC. It seems impossible. Is machine language needed?

JON LANE
PLANT CITY, FL

Computer games might seem to be doing many things at once, but they're actually doing only one thing at a time. It's just that they do things quickly. Computers follow instructions sequentially.

To give your program the appearance of simultaneous action, you need to plan ahead. Separate the actions into subroutines. An IF-THEN statement can decide whether or not you want to use GOSUB to go to the appropriate routine. It might help to write the conditions and their

BASIC Version	Address					
	47727	50003	50575	58480	65288	65408
PET 1.0		0	1 ¹	238	169	64
PET 1.0r		0	152 ¹	238	169	64
PET 2.0		1	47	72	6	167
CBM 2.0		1	47	72	6	167
CBM 4.0	4	160	135	170	170	170
PET 4.0	4	160	135	170	170	170
8032 4.0r	234	160	135	176	170	170
PET-12 4.0r	234	160	135	196	170	170
VIC-20 2.0		194	32	198	16	100
B128 4.0	165 ²			249 ²	72 ²	224 ²
64 2-01	133			69	147	170
64 2-02	133			69	149	0
64 2-03	133			69	149	3
4064 2.0	133			69	149	100
SX-64 2.0	133			69	149	67
PLUS/4 3.5					255	
C128 7.0	161 ³	14 ³	211 ³	229 ³	72 ³	0 ³

¹ POKE 1018,173: POKE 1021,133: POKE 1022,2: POKE 1023,96
POKE 1019,143: POKE 1020,197: SYS 1018: PRINT PEEK(2)

² POKE 599,15

³ POKE 981,15

consequences in plain English. For example, if the fire button is pressed, then launch missile and set the missile flag. If the joystick moves, then move the ship sprite. If one second has passed, then play another note of the song. If the missile flag is set, then move the missile sprite again. Repeat the loop.

First, you check for the joystick fire button. If it's pressed, use GOSUB to go to the appropriate routine. If it's not pressed, forget about launching the missile until the next time through the loop. Once you've launched the missile, you want it to continue moving, which is the reason for the missile flag. Next, PEEK the joystick to see if the player wants to move. If so, update the ship's position. Third, check the jiffy clock, the variable T1 or T1\$, to see how much time has gone by. If a second (or whatever time period you've chosen) has passed, play the next note of the song. Next, if the flag is still set, move the missile sprite. Then go back and do it all again.

The program loops around

and around, taking necessary actions one at a time. The computer works quickly, and if the individual actions are coordinated, they appear to happen simultaneously.

By the time you create a few more subroutines to make your game more playable, the computer will have to execute numerous instructions. Converting these instructions from BASIC can take too much time for a fast-paced game. If you want speed, it's a good idea to switch to machine language.

Another technique, which is even closer to simultaneous action, requires an intermediate-to-advanced knowledge of machine language. Sixty times a second, the computer stops what it's doing and redraws the image on the screen. The main program is being constantly interrupted. Using a wedge, or redirection, you can divert the interrupt to your own ML program, which could play music, move sprites, or whatever you choose. Such interrupt-driven routines are sometimes difficult to implement but can be very effective. □

Here's a way to detect modes of operation on any Commodore 8-bit computer, and a look at what's happening while a program runs.

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HAVE TO DO A LOT OF DIGGING BEFORE YOU FIND THE GEMS.

BURIED TREASURE

BY HENNING VAHLENKAMP

The wealth of public domain and shareware programs available to 64 and 128 users can be accurately referred to as buried treasure. Thousands upon thousands of these programs have been written over the years, and they span the spectrum from entertainment to productivity. Best of all, these programs are available for the taking.

Unfortunately, many 64/128 users don't take advantage of these programs, since the sheer volume of them makes it difficult to separate the gems from the duds. Also, like finding buried treasure left by pirates of yesteryear, locating these treasures can sometimes be a problem.

In this article, you'll find a survey of what I've found to be excellent public domain and shareware programs. Don't simply take my word for it, however; download some of these programs and try them for yourself. Plus, I'll show you where and how to dig up some of these treasures as well.

PD or SW?

First, let's clarify our terms. A public domain (PD) program is one which you can use and distribute freely. It's also the oldest type of noncommercial software available to the public. Like PD programs, shareware (SW) can be freely distributed, but the author requests a donation (usually a modest one) if you find the software useful. In many cases, SW authors will provide enhanced versions, written

documentation, and updates to users in return for payment.

Software Sources

Both PD and SW programs are more readily available than you might think. For instance, most major online services have enormous selections of Commodore software. The only charge for the programs is the service's connect-time charge. Many services have a listing of available programs that you can download to get an idea of what's available. Others may have a printed catalogue. If you need a program to do a specific job, leave a message online, and someone will probably offer a suggestion or two.

Local BBSs and user groups also can be treasure troves of wonderful programs. Even if a BBS is running on an Amiga or IBM, it may have a large selection of PD and SW programs for the 64 and 128. Most user groups have hundreds of programs available, charging only a modest fee to cover the cost of the disk.

Downloading more than a few programs from a local BBS can take quite some time, even at 2400 bps. Connect charges for online services and telephone bills for long-distance calls to BBSs can add up. If you're looking for a large number of programs to build your library in a hurry, mail-order disk services may make more sense. Disk services typically offer hundreds of PD and SW disks at reasonable prices. The on-

ly downside is that their collections are rarely as up-to-date as those of networks and BBSs. Check the listing at the end of this article for several popular commercial sources for PD and SW programs.

Best of the Bunch

Now that we've touched on where to find programs, here are some outstanding ones to watch for. Since a significant number of PD and SW programs are of high quality, it's impossible to mention all of the outstanding ones in one article. Nevertheless, I've selected several in a variety of categories that are among the best. They are definitely worth having. Now, on to the treasure!

CREATIVITY

Demo Designer 2

If you've ever wanted to make a professional-quality graphics and sound demo on your 64, Demo Designer 2 is an excellent choice. First, you select a font and musical selection from the many available ones and enter a Koala picture filename. Next, write your scrolling message with the built-in editor. Your stand-alone demo is then saved to disk. What could be easier than that?

Fun Graphics Machine V3.42

Fun Graphics Machine is unique SW for the 64. It's a powerful monochrome hi-res graphics editor, not a paint program. FGM features the ability to use Print Shop graphics,



text fonts, rotation and flipping, reduction and enlargement, reversing, scrolling, and rudimentary drawing. The finished product can be exported to a paint program for further embellishment.

Graphics Assault System

GAS (by COMPUTE's Bruce Bowden) provides more graphics-manipulation capabilities. This useful PD program can compress, magnify, flip, rotate, scroll, diagonally shift, and invert hires and multicolor pictures. Best of all, it can convert hi-res to multicolor and vice versa. GAS is available in separate 64 and 128 40-column versions. If you're into graphics, you must have this one.

DEMOS

Batmania

This outstanding demo was inspired by the Batman movie of a few years ago. Batmania begins with an introduction to the dark knight and then erupts with a wonderfully arranged soundtrack from the movie. Minor animation plus topnotch graphics add the finishing touches to this fine demo.

El Gato

You need a 1764 or 1750 REU to run El Gato, an animation of a cat. The cat is shown walking in a rectangular plane, which simultaneously rotates about a vertical axis. This produces a realistic 3-D effect. Pressing various keys lets you change the speed of the animation. PD versions of this 141K program are available for both the 64 and the 40-column 128.

Eyesoteric

What makes this PD program for the 64 unique is the subject. A large eye opens and closes as it bounces around the screen. Other spheres bounce, too, resulting in 20 sprites on-screen at once—an amazing accomplishment! The music has a nice high-tech sound to it.

Juggler

Perhaps the finest 64 animation ever done, Juggler is based on the famous Amiga animation of the same name. Run this PD program on your 64, and you'll see a robotic figure standing on a checkerboard floor, juggling three reflective glass spheres. Numerous superb multicolor frames make this animated demonstration appear almost as impressive as its Amiga predecessor.

Outspace

Upon loading this PD program for the 64, you'll be treated to a graphics and

sound extravaganza. Highlights include impressive use of sprites and raster interrupts, creating all sorts of movement. On the final screen is an astronaut/alien backed up by superb digitized music. You can select a picture and music with a joystick.

Reticulate

This PD program for the 64 does the seemingly impossible. It presents an unprecedented 320 x 400 pixel interlace on the composite screen. The effect isn't fake, and interlace flickering is no worse than on the Amiga. A variety of great pictures can be loaded by pressing the space bar after the introductory screen. The program won't run from a 1581 because of its custom fastloader. The music is excellent as well. A must-have!

Space Movie

Space Movie is another classic demo for the 64. Although small in size (43 blocks), it's a lengthy minimovie with an equally long soundtrack. It consists of a tribesman beating a drum while a space drama with aliens unfolds on the other side of the screen. All of this is in rhythm with the music.

Swinth

Swinth is by far the most well-known 64 demo of all. A combination of Swish and Synth Sample, it features a colorful, symmetrical kaleidoscope of lines synchronized to music. Most parameters such as colors, display attributes, and music are user-selectable. Viewing it is a relaxing, almost hypnotic, experience that you shouldn't miss.

GAMES

128 Invaders

Taking advantage of the 128's often neglected 80-column screen, 128 Invaders, a Space Invaders clone, delivers a lot of fun. This PD game also features smooth animation and full color! Although the theme is nothing new, its implementation makes 128 Invaders shine.

Adventure/80

Here's another superb 80-column PD game. Players can look forward to an excellent condensed version of the original mainframe Adventure game by William Crowther. All the key elements are preserved in this text journey through Colossal Cave. Fans of the Infocom classics will especially like this one.

CeviuZ

CeviuZ is an automated helicopter assigned to dangerous missions. With it you fly over large, detailed landscapes

while avoiding enemy fire. Program options in this SW package for the 64 include three day or night missions, several levels, high-score saves, an indestructible mode, and a terrain editor for added replay value.

Krakout

Krakout, a commercial-quality game, at least equals its inspiration, Arkanoid. Distinguishing this PD 64 program are great graphics and sound, real playability, and a multitude of options such as bat speed, ball speed, number of bats, and type of background. This one's a winner.

Mah-Jongg

Mah-Jongg is a high-quality clone of Shanghai by Activision. The object of this 128 PD game is to remove all the tiles by clicking on matching pairs with the onscreen pointer. This ancient Chinese game is addicting and requires good strategy. It runs in 40-column mode and supports a joystick or mouse.

Qix

This PD clone of a Taito hit scores high marks for fun with a 64. You guide a diamond and try to cut off sections of the screen to trap the enemy in the smallest space possible. You must also avoid two little bugs that try to get you. The time limit makes Qix all the more challenging.

Rotations!

Once again, a commercial game (Tetris) inspires a good PD clone for the 64. In Rotations!, you manipulate different falling pieces to form horizontal lines on the playfield. Graphics are clean, multiple levels add challenge, and the pause feature comes in handy.


GEOS

Blue Pencil

If you do a lot of writing at home, school, or work, you need Blue Pencil, a PD program for the 64. It's a complete geoWrite document analyzer that counts words, sentences, paragraphs, pages, and graphics. Plus, it figures a variety of averages to help you analyze your writing. The only shortcoming is that it has trouble working with very large documents.

Combiner

Combiner is a SW program that lets you combine two geoWrite documents in many different ways. If you're working on one document, for example, a second document can be appended to it, inserted, or merged as part of your original document. Versatility and



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the ability to handle different geoWrite versions make Combiner for 64 users an indispensable utility around the home, school, or office.

Convert 2.5

With this PD program, 64 users can convert documents from GEOS format to SEQ or PRG text files and vice versa. Conversion is a snap. It's a must-have for serious writers who use multiple word processors or GEOS fans who want to send text on disk to people who don't use GEOS.

Graphic Storm

A graphics importer, Graphic Storm will convert standard hi-res screens or Doodle pictures into geoPaint format. This SW program converts Print Shop, Print Master, and Newsroom graphics into photo album graphics like Graphics Grabber does. This is another useful program that should be in every GEOS user's library.

GRAPHICS

CSlide5

This SW viewer displays both compressed and uncompressed Koala and Doodle pictures. CSlide5 also compresses and decompresses them, which is a very useful feature, and it's lightning fast.

Disp/Lace

Imagine a 640 x 600 pixel interlace on the 80-column screen! That's what this incredible PD program can accomplish if you have 64K VDC RAM in your 128. It takes any six Doodle pictures and displays them simultaneously with their colors intact. Graphics fans shouldn't miss this unbelievable feat of programming.

Artwork

Here's a sampling of beautiful Commodore artwork to watch for. Each of these compressed Doodle files has a GG prefix: BOTTLE, CABIN, CASTLEJS, EGO, FROG.LILY.PAD, GRAYLIBR, HALOWAYN, IGARDEN, KINGFISHER, SERENE, LINCOLN, SCHLOS.CASTLE, SPAZOZ, and URCHINOD. These pictures and JJ MIDDLE EARTH, which is a Koala file, reflect the talent of a few of the best artists in the Commodore community.

MUSIC

StereoPlayer 10.3

Without a doubt, this is the best SID player available in the public domain. A huge program, StereoPlayer plays both mono and stereo SIDs, features a keyboard and animated band, and has

almost every conceivable musical option. The opening screen is spectacular. In fact, this whole program is thoroughly professional. It's PD software at its best.

SID Player Music

There are many outstanding SID player songs. These songs usually have a MUS suffix. Here are a select few: BACK FUTURE, BADMEDICINE, BLAZER THEME, BLESS USA, ETERNAL FLAME, GALACTICA, LEAN ON ME, LIKE A PRAYR, MISSION IMP, MY/DREAMS, NEVERENDING, OLD TME ROCK, STAR WARS, WILD/WEST, and YEARS. All are magnificently arranged. These are just a few of the many excellent musical works available for downloading.

PRODUCTIVITY

Power Budget

Similar to a spreadsheet, this SW budgeting program for the 64 is quite versatile. It allows you to enter and change data quickly, and the computer handles the calculations. Furthermore, budget projections can be calculated for an entire year. Clear instructions are included with this easy-to-use financial program.

The Data Base

This SW program is a superb flat-file database that possesses as much power and flexibility as some commercial ones. All the expected features are here, including multiple records, sorting by several keys, report writing, SEQ translation, search.ng, and so on. This program is excellent for most database needs. There are separate versions for the 64 and 128, and the 128 version has both 40-column and 80-column versions available.

UTILITIES

CS-DOS

CS-DOS is more than a DOS shell; it's an entire operating system similar to MS-DOS. For instance, this SW program for the 128 features a command line, batch files, and so on. A number of programs are available to run under CS-DOS. I think you'll find this to be quite an interesting offering.

Vector Drive

Disk editing requires good tools, and Vector Drive is a PD program that fills those needs. It packs as much power as its many commercial competitors. This menu-driven program for the 64 features search and replace, sector fill, copy, memorize, and BAM display, plus all the other options you'd expect

on an outstanding disk editor. It works with any 1541 or compatible drive.

MISCELLANEOUS

Star Trek

Commodore owners who have a 1764 or 1750 REU will get a real treat with this one. This PD program for the 64 fills an entire disk and utilizes digitized sound. You'll hear the entire introduction to the original "Star Trek" TV series, beginning with "Space, the final frontier. . . ." Very impressive! □

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TEENAGE MUTANT NINJA TURTLES—THE ARCADE GAME

Hey, man! That Shredder creep is back in town with the Foot Clan! Yeah, dudes! And he's got April! We've got to rescue her! He's holding her somewhere in New York. Let's go! Cowabunga!

Sound familiar? What could be the start of an outline for a Teenage Mutant Ninja Turtles screenplay is actually the premise for the latest in Turtle games from Konami—and a hot game it is. Based on the arcade game, this game follows the Turtles through eight levels of battle against Shredder and his henchmen, including key figures Bebop and Rock Steady as well as the highly trained Foot Clan.

You can choose to be any one of the four Turtles: Leonardo, Donatello, Michaelangelo, or Raphael. Then take off after the bad guys. Your first stop is April's flaming apartment. You battle member after member of the Foot Clan. Some are armed, while others have only their ninja skills as weapons. If you defeat all of them and outlast Rock Steady, then it's on to Times Square.

Pick up a pizza for an extra life; watch out for Bebop by the convertible! Next, it's the SoHo Sewers, complete with rats and robots! Then, Vinnie's Valet Parking Garage, Madison Square Avenue, Rock-a-fella Expressway, the Rock Quarry Factory (lair of the Stone Warrior), and finally, level 8, the Technodrome! This is where you meet all your opponents for the ultimate showdown.

As you take on a Turtle

persona, you need to realize that each Turtle prefers a different weapon. This means that each fights a little differently. Experimentation will tell you which Turtle best fits your style of gameplay. One hint: Each Turtle has an awesome side drop kick.

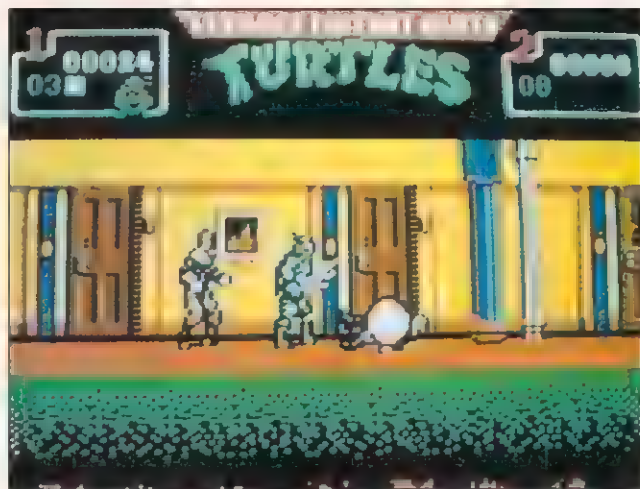
We found a lot to like

Robin, age of discretion: "The graphics are good; the sound, even better. I don't have to go blind to find the password, since it's printed on white paper. I like the fact that the Turtles have different abilities. It makes things more individual and less boring. Donatello is my

cade games require too much coordination for small hands. This can be frustrating to a little guy who's just trying to have some fun. This game has familiar characters, exciting battles, and an ease of play that enables little people to play like the big kids. I'm not advocating that such a game should take the place of an educational game, but everyone likes something that's just plain fun.

Konami is generally pretty thorough in what it does. This program is no exception. One manual serves all versions, with an insert to amend instructions to accommodate Commodore differences. The manual is just what you need to get going. It's concise, informative, and entertaining. However, it is misleading in one item. The manual claims that after your last Turtle life ends (you get three), you are offered two options, Continue or End Game. The Continue option allows you to pick up at the scene where you left off, and you're allowed to do this up to three times. It doesn't happen this way, however, in the 64 version. The death of the last Turtle means the end of the game. There's no explanation of why the 64 doesn't have this option. It's a shame, because such a feature would be a terrific plus.

This misinformation in the manual seems to be the only negative point in a game that is otherwise exciting and lots of fun. When an arcade game is translated into a computer videogame, it can bring the fun home—and even save a few quarters. Teenage Mutant Ninja Turtles—The Arcade Game does this in a very capable, enjoyable fashion that appeals to those aged 4 to 40



Raphael, armed with a pair of Sai daggers and a bad attitude, takes on Shredder's goons in April's burning apartment.

about this game. There is something in Teenage Mutant Ninja Turtles for everyone. We'll let the players speak for themselves:

Michael, age 4: "I like the Turtles! It's my new Turtle videogame. I'm Michaelangelo, and I get rid of those guys! Even the robots. I got 67 points—all by myself!"

Katelyn, age 6: "I like this game 'cause it's fun. I think it's a little hard, though. I like using Leonardo because he has longer swords."

Meaghan (our family's top scorer), age 10: "I like the Turtles Arcade Game. I like Raphael the best. The graphics are great. It's easy, too. Not complicated. But it's a challenge to really win."

preferred hero. The game is challenging, but not so much so that you give up on it. But I have to admit that it makes my hand sore."

David, age 40 or so: "It's one of the few arcade games I like. Maybe because it's one of the few I find playable. Great graphics and sound. Now, if I could just outscore my daughter!"

Kacey and Kelsey, age 15 months, are twins of few words. We can only go by their reaction whenever they hear the music. They love it. They bob, dance, grin, and clap their hands.

OK, so much for the family's individual opinions. We like a game that gives the little kids a chance. Many ar-

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THE SIMPSONS ARCADE GAME

Hey, dudes! Grab your skateboards and get ready for action with *The Simpsons Arcade Game* by Konami. Homer, Marge, Bart, and Lisa will lead you on a wild chase through the streets of Springfield. They're trying to rescue little Maggie Simpson from the jewel thieves who kidnapped her after she accidentally swallowed a valuable jewel.

Simpsons fans will enjoy the colorful graphics and lively music in the opening animation sequence, which sets the scene for the game. You can bypass the animation with a click of your fire button.

The game has two double-sided disks that offer you eight increasingly difficult levels of play. On each level you'll meet a variety of foes who attempt to prevent you from finding Maggie.

You'll face off against ghosts, zombies, tavern thugs, yes-men, and other foes too numerous to mention. The bad guys seldom appear alone. Since the game offers you a two-player option, you can team up with another player and use tag-team tactics against the bad guys.

The Simpson characters are easily recognizable, even though the game re-

lies more on color than on detail to portray them. Other characters from the popular television show, like Krusty the Clown, Mr. Burns, and Smithers, will join in the campaign to stop you from advancing in your search.

Each Simpson is equipped with a special



Each Simpson is equipped with a special weapon to help him or her fight any villains who block the way.

weapon to help him or her fight any villains who block the way. Lisa lashes with her jump rope, Bart bashes with his skateboard, Homer hammers with his fists, and Marge is a maniac with her vacuum cleaner and towering hairdo.

Each Simpson begins the game with four lives, but you should plan to lose a few until you get the hang of the game. You'll have fun testing each character's fighting skills alone and in combination until you find the single character or team that suits you best.

A status window at the bottom of the screen will keep you advised of how well you're doing throughout the game. It shows how many villains you've defeated, the number of lives you have left, and the amount of ener-

gy remaining for your character (or characters). The energy level tells you when it's time to look for burgers and other goodies to restore some of your strength.

From time to time, comments from your character appear in a message balloon that's also in the status

box. These comments are typical of whichever Simpson you're playing, but they won't help with the game. Nor do they have much to do with what's happening on the screen.

One of the drawbacks of the game is that the status window doesn't show you the hit power or the energy of your foes. This makes it difficult to judge how well you're doing during an attack. Since the competition gets tougher on every level, your character will lose more energy when hit, but you won't be able to tell how much damage you're inflicting on your foes.

Most levels have a particularly strong "boss" character whom you must defeat in order to advance to the next level. It would be especially helpful to know how

much damage your blows have inflicted on these super bullies. In most cases, you'll find it takes 1-3 hits to best an ordinary bad guy and about 20 hits to finish off a boss. When you've defeated 50 bad guys, your character earns another life.

Don't expect the instruction manual to offer you much help. This is one of those games that you'll learn while you play it. In fact, there are times when the manual is a bit misleading. For example, the pictures of level 2 and level 5 are reversed in the manual. It also tells you that since the undead creatures on the cemetery level can't be killed, you must try to find an escape route. However, it doesn't offer any clues as to which enemies are undead and which are living.

Appearances are deceiving, too. The ghost dangling from a rope isn't a ghost at all. It's a bad guy hiding in a tree. (Jump up and hit the tree to knock him down.)

As for that escape route, you'll quickly discover that you can't run away from the enemies. You'll be unable to move beyond the end of any screen as long as there are foes alive onscreen. Don't toss the manual away, though; you'll need it for the passwords that are printed in the back to start the game. After that you're on your own.

The more you play *The Simpsons Arcade Game*, the more you learn! That's part of the appeal of this challenging game.

MARTI PAULIN

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REVIEWS

**S.E.C. CHECK
 REGISTER 128**

My biggest complaint with Commodore computers is their slow loading time, but S.E.C. Check Register 128 overcomes that problem beautifully. Within five seconds of turning on my 128, the menu selection is on the screen. Less than a minute later, the program has loaded and is ready to go.

This particular check register program is designed for small businesses, yet it will also keep your personal check register and files balanced and in order. With this program you'll be able to keep a current and accurate check register, print checks and register data, and maintain a recurring payee file. Even with all these options, data entry is fast and relatively easy.

Check Register's main menu is extensive, but easy to use and understand. From there you can enter check information, record deposits and withdrawals, check off transactions that have cleared the bank, print checks, load files, and perform numerous other functions. Most selections are made by pressing a function key.

Each selection has its own menu, which allows you to carry out specific tasks easily. Any transaction can be edited at any time, making the correction of errors hassle-free. You can edit and delete transactions, insert memos, and swap transactions. Check Register also allows you to format new data disks from within the program, a feature I appreciate in any software.

Before setting up your business or personal checking files, it would be wise to browse through the sample files that come with the program. These are the files of a Mr. Jones, which include his check register, recurring payee file, and check format file. Read through these and experiment with the program's various functions to become familiar with them.

Depending on how large your files are, entering your records can be time-consuming. This doesn't need to be done at one sitting, however; you can save your files and add to them or edit them at a later time.

Check Register can do more than simply keep track of your checking account; it can write checks as well. If your bank doesn't supply form-feed checks, you can order checks and other computer forms from the address given in the manual.

A computer printout ruler, available in most office supply stores, will prove

useful when setting up your check format file. This ruler can help you determine the exact spacing required for printing out your checks. Check Register is quite flexible, limited only by your printer and interface features.

Check Register also offers the feature of printing out reports, useful for tax or budgeting purposes. Your register data may be printed out by transaction and reference numbers, by reference numbers and date, by date only, or by payee.

Two other routines allow you to address large and small envelopes for recurring payees with addresses on file. This saves you the trouble of switching to a program to print out labels or addressing them by hand.

The check register portion of the program is easy to use. The initial setup will be the most difficult part of using the program. One minor item to note: When first signing on, you're asked to enter the date in MMDDYY format. Don't put spaces between the numbers; the program won't accept them.

The second part of this program is the S.E.C. Financial Loan Consultant. There's no mention of this section in the manual. Although this part of the program is easy to use, a few words of guidance would've been appreciated.

There are six parts to this section, with room for expansion. When you supply financial information at the prompts, the program will determine the amount of your recurring loan payment and the amount of the final payment. It will also determine terms of a loan, the balance of a loan, and what the total cost would be to borrow an amount of money. It will also analyze the loan and provide amortization information. This feature can help you decide whether or not to buy a car or equipment for your business.

I'd like to see two items improved in future releases. My first request would be for a bit more guidance in the manual; I like lots of detailed instruction. Although Check Register is a very easy program to use, there were a couple of times when I had to stop and decipher what was happening. My other suggestion would be to let the user alter the black and green screen colors.

Otherwise, I consider this a well-thought-out program that can take some of the time-consuming burden out of running a small business or managing your personal checking account.

CHERYL TURNEY

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PROGRAMMER'S PAGE

Randy Thompson

REAL PROGRAMMERS OWN 64S

Computing has changed in the last few years. It used to be that owning a computer meant learning about how it worked and how to program it. In fact, you couldn't even run a program without first getting acquainted with BASIC's LOAD and RUN commands.

This isn't true anymore. Today's software boots automatically, and programming languages such as BASIC are considered optional. The computer industry believes that the less you have to know about a computer the better. Beware this user-friendly attitude that ignorance is bliss.

If you want to be a hot programmer, learn how your computer works. Learn all you can. Learn its capabilities and its limitations. Most important, learn its hardware. Why? Because when you know this, you'll know what your computer can do and how to do it.

Commodore 64 programmers understand this. With a built-in BASIC that lacks commands even to change the screen's colors, 64 owners learn quickly what a hardware register is and where it's located in memory. For example, how many of you don't know the function of location 53280? What about 53281 or 54296? And what true Commodore hacker doesn't know what's stored in memory between 1024-2023 or what important value is kept in location 646?

Those who program the 64 don't care if their computer is considered crude by the rest of the industry. That's because they realize that hacking the bare metal is what programming is all about. Experimenting with the computer's

operating system, interrupts, and video chips is what makes owning a computer so much fun. Sure, the 64 may be primitive compared to the Amiga, but it's still one of the greatest machines around for the hobbyist.

Today's more powerful computers come with high-level languages that take the work out of programming. Ironically, I believe that programmers are losing their edge because of it. You no longer need to understand what binary is to display a bitmapped picture, or how your computer's DOS works to open a file, or where your video registers are located to darken your screen. Unfortunately, too many programmers aren't bothering to try. They're spending more time learning about programming languages than learning about the computers they program on.

I think you should understand your computer first. Whatever programming language you choose to learn is, for the most part, incidental. If you know how your computer operates, you'll know the most efficient ways to control it, no matter what language you select. High-level languages are good as long as you don't forget the computers they're designed to control.

There's also a trend toward writing generic, abstract code. This type of programming produces software that can be easily maintained and transferred to other computers. This is fine (and crucial) for many business applications. But these types of programs are, by nature, bigger and slower than programs that have been written specifically for one computer by a programmer who takes advantage of what that machine has to offer. In my opinion, the best programs don't run on other brands of computers without significant modifications to

the programs' codes.

Whether you own a 64, 128, Amiga, or MS-DOS clone, it's your duty to understand the hardware you program. Let's push these machines to the limit. After all, isn't that what owning a computer is all about?

Stepping down off my soapbox for a second, I'd like to make a request. I'm looking for some neat raster interrupt routines. I'd like to publish a column of impressive raster video tricks. Such routines may display a multitude of sprites, change video modes on the fly, animate the screen's borders, or whatever else you can imagine. Your program should be as short as possible (certainly no larger than what can be listed on this page) and preferably submitted on disk. If possible, try to make your routine something that can be easily included in a BASIC program. This way, all programmers will be able to make use of your efforts. As usual, we'll pay you for any tip we publish.

In the meantime, try running the following pseudo raster interrupt program on your 64. (Your 128 can run this, too, but the effect will be different). Enter it exactly as shown here, with no spaces. Watch carefully. Enter a comma, a period, and 18 colons after the first POKE53280. Also, notice that there's no line number after the GOTO command. Sure, it's weird looking, but try it anyway. It might surprise you.

```
0 POKE53280,.....:
   POKE53280,7:GOTO
```

"Programmer's Page" is interested in your programming tips and tricks. Send them to Programmer's Page, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We pay \$25-\$50 for each tip we publish. □

If you want to be a hot programmer, learn how your computer works. Learn all you can.

BEGINNER BASIC

Larry Cotton

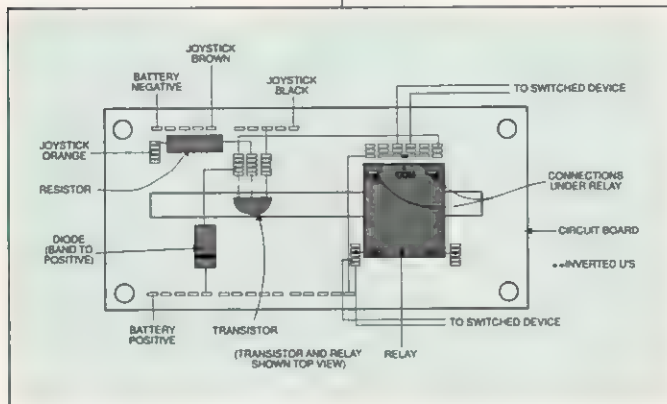
MORE JOYSTICK OUTPUT

Last month we saw how to use a joystick port as a miniature user port. With a short BASIC program, we controlled an LED connected to a joystick cable. Now let's expand on that idea so that we may control a small electrical device. To do this, we'll build an interface on a Radio Shack IC breadboard that will connect the 64 and the device. The interface will use the fire button wire to control a small relay.

the common contact; the other two are the normally open (NO) and normally closed (NC) contacts.

2. Make three small inverted-U loops of bare connecting wire approximately one-half inch long. Use these to connect the three main relay switching contacts to the circuit board.

3. Solder the tops of the inverted-U loops to the three main relay leads, with the six short (one-fourth inch) leads pointing down.



WARNING: You must be thoroughly familiar with electronic construction techniques and associated safety precautions before attempting this project. The relay must switch only small electrical circuits operating on voltages safe to handle. In no case should switched currents exceed 1 amp (1000 milliamperes). Use adequate-sized wiring from the relay to your appliance, or use several wires in parallel. Carefully follow these step-by-step instructions based on the parts list printed at the bottom of the page. Also, refer to the accompanying diagram.

1. Of the five relay leads, bend the three thick ones to a horizontal position. The center lead at one end of the relay is

4. Plug all six leads into the circuit board so that the common contact is in one group of socket holes and the normally open/normally closed contacts are in another. (The two groups of holes are electrically divided by the channel that runs down the middle.) Ensure that the two small coil contacts under the relay are plugged into the same group of holes as the common switching contact. Make sure that any wire or wires running from the relay contacts to your electrical device are of adequate size to handle the associated current.

5. Solder short pieces of connecting wire to the nine-volt battery connector; plug them into the two outside rows of holes on the board carefully noting

polarity. Don't connect the battery yet.

6. Plug in the transistor with the flat face as shown in the diagram printed above.

7. Connect the diode from the transistor to the positive edge of the board. The band on the diode should be toward the positive terminal.

8. Connect the resistor between the transistor and an unused row of holes.

9. Connect wires from the transistor and the positive edge of the board to the two hidden relay coil leads.

10. Connect a short jumper from the transistor to the negative edge of the board.

This completes the construction of the interface. Now run last month's program and make sure that the LED still flashes. Turn off the computer and unplug the joystick cable from the computer. Remove the LED; plug the orange, black, and brown wires into the circuit board as shown; and then enter this program.

```
AS 10 PRINT "{CLR}"
DM 20 PRINT "{2 DOWN}PLUG
      CABLE INTO PORT 1
      {DOWN}"
HH 30 NT=400:FT=400:B=3:
      REM ON TIME, OFF T
      IME AND NUMBER OF
      {SPACE}BLINKS
BS 40 IFPEEK(56321)=255T
      HEN40
QP 50 POKE56323,17
CS 60 POKE56321,16:PRINT
      "ON"
EH 70 FORT=1TONT:NEXT
RK 80 POKE56321,0:PRINT"
      OFF"
MD 90 FORT=1TOFT:NEXT
CM 100 IFPEEK(56321)=238
      THEN120
CP 110 GOTO60
PX 120 POKE198,0
QB 130 POKE56323,0
```

Connect the nine-volt battery and run the program. At

Build this simple interface, and you can use your 64's joystick port to control small electrical devices.

the prompt, plug the joystick cable into port 1. The relay should now start clicking regularly. Its contacts are alternately opening and closing, with their status printed on the computer screen. Note that the keyboard won't respond as long as the joystick cable is plugged in.

Now unplug the cable. The program ends, the relay stops clicking, and the keyboard again responds normally. Disconnect the battery. If you are experiencing any problems at this point and your circuit isn't performing as described, check your wiring carefully and make sure you have a good battery.

Use the common contact and either the normally open or the normally closed contact of the relay to switch a small electrical device. Observe the precautions stated above. Always use electrical tape or shrink tubing to insulate live leads from each other, yourself, and others.

Of course, this project only hints at your computer's potential for controlling electrical devices. The two basic categories of devices which can be controlled are those which need sophisticated timing and those which sense external events. By modifying the program and adding more interfaces, up to five circuits can be controlled independently from one joystick port.

In the first category, your computer can control devices such as solenoids. Timing can be implemented by using either the TI function (the most accurate) or by using FOR-NEXT loops. I had fun building a model of a "drummer boy" which uses low-voltage relays and small solenoids to control its drumsticks. By paying careful attention to its construction, I was able to make the model look realistic. With a few changes in the program, I was able to make his marching drum patterns varied and sound even more authentic.

In the second category, the computer can sense various parameters of the environment. The other joystick (or user) port could be connected to sensors which detect electrical resistance changes or on/off signals. Resistance can vary by light with photoresistor cells or by heat with a thermistor. It can also be changed manually by using a potentiometer, such as that found in computer paddles. By using your imagination and a little knowledge of electronics, you can have your 64 controlling any number of sophisticated appliances and gadgets.

The following list of parts has Radio Shack stock numbers listed as a convenience. Similar items should be available at any well-stocked electronics store for less than \$20.

PARTS LIST

- Circuit board, RS 276-175
- 2A SPDT nine-volt coil relay, RS 275-005
- MPS2222A transistor, RS 276-2009
- 1N914 diode, RS 276-1122
- 1000-ohm resistor, RS 271-023
- Nine-volt battery connector, RS 270-325
- Nine-volt battery
- Joystick cable
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- Electrical tape or shrink tubing for exposed wires

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MACHINE LANGUAGE

Jim Butterfield

SCREEN EFFECTS

When a program is doing a great deal of computation, it may step the border color to indicate that the computer is active. Machine language programs can do this with a single instruction: INC \$D020. Since this instruction doesn't affect the A, X, or Y registers, it's easy to slip it into a program loop. It'll produce a dazzling color display.

The address shown above produces a whole-screen effect by means of a single data store to memory. Sometimes, however, we have good reason to go after the individual characters on the screen. Modifying a thousand distinct character positions in a reasonable amount of time calls for machine language speed.

The character cells of the 64's screen can be referenced directly. Each character occupies a byte of memory. Screen memory usually starts at address \$0400 (decimal 1024), with the last byte at \$07E7 (decimal 2023). There are also 1000 color nybble locations starting at \$D800 (decimal 55296). If we wish to perform screen work without flicker, it's best to wait until retrace time. The video screen is "painted" 60 times a second (50 in Europe). After drawing the screen, the video beam moves back to the top, or retraces. That's the moment we've been waiting for. Our program may then go to work without screen jitter. The action must be performed quickly, but machine language is fast enough for the job.

Our program is called Wipe, and it'll run through the screen 40 times. Each time it'll reverse one column of screen data. The effect is that of a video wipe effect, moving from left to right.

The 40 separate runs are counted in the Y register. The

contents of Y also serve to specify the column to be modified on each pass.

```
2000 A0 00      LDY #$00
2002 . . .
202F C8        INY
2030 C0 28     CPY #$28
2032 D0 CE     BNE $2002
2034 60        RTS
```

Within each pass of the loop, we wait until screen retrace takes place. This serves two purposes: It keeps the screen free from flicker and slows down the wipe effect so that it looks better. To check for retrace, watch the two highest bits of location \$D011; when its value goes down, we know that the screen has just begun to retrace.

```
2002 AD 11 D0  LDA $D011
2005 29 C0      AND #$C0
2007 CD 08 21  CMP $2108
200A 8D 08 21  STA $2108
200D B0 F3     BCS $2002
```

Note that there's an instruction sandwiched between the test (CMP for CoMPare) and the Branch (BCS for Branch Carry Set). This STA instruction doesn't affect the flags produced by CMP.

As our program goes down the screen a line at a time, it sets the top-of-screen address, \$0400, into the indirect address at \$FC and \$FD. After each line has been handled, the program adds 40 to this address, moving to the next line. Before looping, the program tests the address to see if it's reached the end of the screen address area.

```
200F A2 04      LDX #$04
2011 A9 00      LDA #$00
; store a screen line pointer in FC/
FD
2013 86 FD      STX $FD
2015 85 FC      STA $FC
. . .
; move to next screen line (add 40
to FC/FD)
```

```
201D A6 FD      LDX $FD
201F A5 FC      LDA $FC
2021 18         CLC
2022 69 28     ADC #$28
2024 90 01     BCC $2027
2026 E8        INX
; compare pointer to end-of-
screen
2027 E0 07     CPX #$07
2029 90 E8     BCC $2013
202B C9 E8     CMP #$E8
202D 90 E4     BCC $2013
```

The code for the innermost loop is quite simple. The start-of-line has been stored in indirect address FC/FD; the column to be modified is in Y. To reverse the character, use the EOR (Exclusive OR) instruction to flip the high-order bit.

```
2017 B1 FC      LDA ($FC),Y
2019 49 80     EOR #$80
201B 91 FC      STA ($FC),Y
```

That's the whole machine language program. To put the program into a more convenient form for BASIC entry, a complete demonstration called Screen Wipe is supplied below.

```
BD 100 DATA 160,0,173,17
,208,41,192,205,8
,33,141,8,33,176,
243
BQ 110 DATA 162,4,169,0,
134,253,133,252,1
77,252,73,128,145
,252
JE 120 DATA 166,253,165,
252,24,105,40,144
,1,232
XG 130 DATA 224,7,144,23
2,201,232,144,228
,200,192,40,208,2
06,96
HA 200 FOR J=8192 TO 824
4
DP 210 READ X
CG 220 T=T+X
FQ 230 POKE J,X
QF 240 NEXT J
HP 250 IF T<>7508 THEN S
TOP
BQ 300 PRINT "SCREEN WIP
E!"
FF 310 SYS 8192
GH 320 FOR J=1 TO 1000:N
EXT J
RH 330 SYS 8192
```

Modifying a thousand distinct character positions calls for machine language speed.

WORLD VIEW

Steve Jarratt

VIEW FROM THE U.K.

Few (if any) utilities are now released for the 64 in the U.K., so serious users look elsewhere for their software. Here are some sources.

A useful contact for hardened keypunchers is the Independent Commodore Products User Group. If you want more from your 64 than just a high score, write to Jack Cohen at ICPUG, P.O. Box 1309, London N3 2UT. For a fee of under \$30, you get a bimonthly magazine, contact with other like-minded 64 users, and access to a massive library of public domain software.

Alternatively, you could try FSSL Computer Software, which stocks everything from video digitizers to GEOS-compatible programs—all for the 64. I don't have the address, but from the U.S., pick up the phone and dial 011 44 386-553153. (Remember the time difference!) Ask for its catalogue and then gasp in awe at its amazing range of peripherals and utilities.

Even though the 64 is a lowly 8-bit machine, that doesn't mean that you can't teach the old dog some new tricks. The most recent acquisition on the serious side of 64 software is Intro, a starter pack for electronic musicians. If you possess a MIDI-compatible synthesizer but have fingers like a gorilla, this sequencing software lets you use the 64 as an interface between you and the synthesizer's brain. Basically, it's like a word processor for music.

The package includes a hardware MIDI interface with a MIDI-In and two MIDI-Out ports, two five-foot MIDI cables, and version 2 of Dr. T's Keyboard Controlled Sequencer on disk. It's all good stuff, but then for around \$250 (U.K. prices) it ought to be.

While the pack is ostensibly aimed at beginners, its user-friendliness is on a par with that of a four-year-old Doberman called Adolf. If you're not daunted by its alphanumerical tables and machine language-like instructions, then you're obviously from the planet Zog. The kit, however, is very powerful and covers an extensive range of editing and sequencing functions. I won't give you that bull about its making you the next Rick Wakeman (aged hippy keyboarder), but at least it'll keep you off the streets or give your joystick a rest. Intro is already available in the U.S., so if you're interested, write to Dr. T's Music Software, 100 Crescent Road, Needham, Massachusetts 02194 or call (617) 455-1454.

That's one for the musicians, so what about one for the artists? Well, there are enough paint packages around for the 64, but what about trying to create your own 3-D environment? Domark's 3-D Construction Kit enables you to do just that.

Using the Freescape 3-D modeling system pioneered by Incentive Software, this kit allows the user to build houses, rooms, spaceships—even small worlds—given enough time and patience. Once the modeling is finished, you can move around your construction and examine it in 3-D space. (I refuse to use anything as pretentious as virtual reality.)

There are special functions included that enable you to dictate what happens under certain criteria. For instance, you can fire a laser beam at a block, causing it to disappear, move sideways, or fall on top of your 3-D character! These functions are there as the foundation stones of puzzles, and while the kit is primarily designed as an interactive game-making package, the more

ingenious modelers can indulge in all sorts of CAD-based diversions.

The 3-D Construction Kit, which includes a tutorial video, costs about \$40 and can be obtained from Domark, Ferry House, 51-57 Lacy Road, London SW15 1PR.

One of the treats of being in touch with so many 64 users is the constant influx of demos. I'm not sure if this phenomenon is as big in the States, but in Europe there are hundreds of small bands of coders who like nothing more than making the 64 do things it was never designed to do.

These punk programmers push the beige box to its limit, producing visual and aural extravaganzas. Demo teams can create dozens of sprites on screen, rapid 3-D vector graphics, full-screen images without borders, pictures with more than three colors per character block, crisp sampled tunes, and clever raster line tricks. Sometimes it's difficult to believe that the 64 is responsible for such feats of computing prowess!

There are thousands of such demos in British PD libraries, but be warned: Since America's television system and electricity differ from Europe's, some demos won't work. For instance, it's a lot more difficult to put sprites in the border on a U.S. 64 because of the screen timing. For those that do work, however, it's well worth the cost of the airmail. You'll make your 64 sing and dance like never before.

Try dropping these guys in England a note: Binary Zone, 153 Farriers Corner, Westlands, Droitwich, Worcestershire WR9 9EX; Kingsway Computer Services, 72 Glencoe Road, Sheffield; Phoenix, 64 Plumberow, Basildon, Essex; and Silver Wing Software, 185 Callowbrook Lane, Rubery, Birmingham B45 9TG. □

Serious products and exciting new demo programs are still available for the 64 in England. Here are some sources for both.

GEOS

Steve Vander Ark

GEOS GRAB BAG

Well, it's been a year now since I first wrote this column. Over the past 11 months—remember that little "hiccup" in April?—I've covered a lot of GEOS ground. I've also heard from many of you, either via the U.S. Snail Mail or E-mail on QuantumLink. It's been interesting, to say the least.

A lot of the mail lately has been in response to the December column, in which I discussed Susan Lamb's geoStore. Susan has been unable to make a go of geoStore, unfortunately, and as a result hasn't been answering the many requests she's received for a catalog. It's always sad to see this kind of thing happen, especially since it means that most of you will never get to see any of Susan's excellent graphics.

If you're in the market for exceptionally high-quality clip art for GEOS, however, there's another place to turn. The folks who run a company called DigiClips (1401-7235 Salisbury Avenue, Burnaby, British Columbia, Canada V5E 4E6) have been proving themselves lately on Q-Link, where they go by the name Fasung Jai. These guys are dedicated to the Commodore computer; they pledge to support GEOS until their equipment melts down. They've been backing up their promise with exceptionally high-quality clip art uploaded to Q-Link. Their work includes line art, such as you'll find on a Newsroom disk, and highly detailed gray-scale images. Their graphics are some of the best I've seen for the Commodore, easily on a par with the kind of art files you'd find in a Mac or IBM package. Q-Link's libraries have a nice selection of DigiClips files available.

This brings up the subject of uploading and download-

ing files for GEOS, which is the best way to get the new utilities, graphics, fonts, and so on that come from other GEOS users. (It's also about the only way!) A new utility recently made available on Q-Link called geoPack (filename GEOPACK, uploaded by PeterMC3) lets you not only convert files back and forth between GEOS and standard Commodore formats, which is essential for any transfer of GEOS files via modem, but also archive (combine into one large file) groups of files for easier transfer. GeoPack does all this from within GEOS itself, which is a treat for people like me who hate to leave GEOS and stumble around, typing in clumsy DOS commands.

A lot of you have written to ask where you can find all these great GEOS files I talk about if you don't happen to be a Q-Link user. Last year, I published a phone number of a BBS in Grand Rapids, Michigan (where I live), that had an extensive GEOS file section. Unfortunately, the sysop of that board has decided to no longer support GEOS, so I've had to switch my allegiance to another local BBS. This board, Rogue River BBS, is one of the longest-running BBSs in the area. It's running on an Amiga, but the sysop, Jim Foley, cheerfully supports our local Commodore users group and has agreed to let me print his number. I'll be uploading to his board all of the public domain and shareware files that I've mentioned in my columns. Now, any GEOS fan can download them for the price of the long-distance call. The sysop assures me that you should have no trouble downloading on the first call since his BBS has no ratios or file points. Rogue River BBS can be reached 24 hours a day at (616) 361-8267.

Several other new products have been showing up in demo form on Q-Link. (Demo form means that all the features of the programs are not enabled, but users have a chance to sample before buying.) One eagerly awaited program is geoCanvas, a new paint program that allows you to open several windows on one or more documents.

GeoCanvas features many excellent drawing tools for creating high-resolution bitmaps, including some not available in geoPaint. As of this writing, geoCanvas is in Beta testing and is available to the public in demo form only.

Dave Ferguson, whose Dweezil Disks are a must for any GEOS user, has recently released Dweezil Label, a label-making program for GEOS. A new version of his popular geoStamp program, called GeoSTAMPbig, is also available. This new version will allow stamps that are four times the size of the old stamps. The stamp file-handling routines have been improved to make it a cinch to move through your collections and choose a stamp. Each of these great programs is available on Q-Link in demo form. You can order the Dweezil Disks direct from Quincy Software, 9479 East Whitmore Avenue, Hughson, California 95326-9745. Disk 1 (\$17.95) features NewTools, and Disk 2 (\$15.95) includes UltiPatt, the ultimate pattern editor. While you're at it, send Dave \$4.00 for his *GeoPublish Compendium*, a ten-page booklet with supplemental sheets telling you everything you need to laser-print documents from GEOS, even if you don't own a laser printer.

Send your GEOS-related questions to Steve Vander Ark in care of COMPUTE. He can also be reached on QuantumLink as SteveV14. □

Here's a look at
a variety of old
and new products
and services
of interest to GEOS
users.

The Gazette Productivity Manager

(Formerly PowerPak)

Harness the productivity power of your 64 or 128!

Turn your Commodore into a powerful workhorse, keep track of finances, generate reports in a snap, manage your money in minutes—all with the new 1991 *Gazette Productivity Manager!* Look at all your 64/128 *Productivity Manager* disk contains.

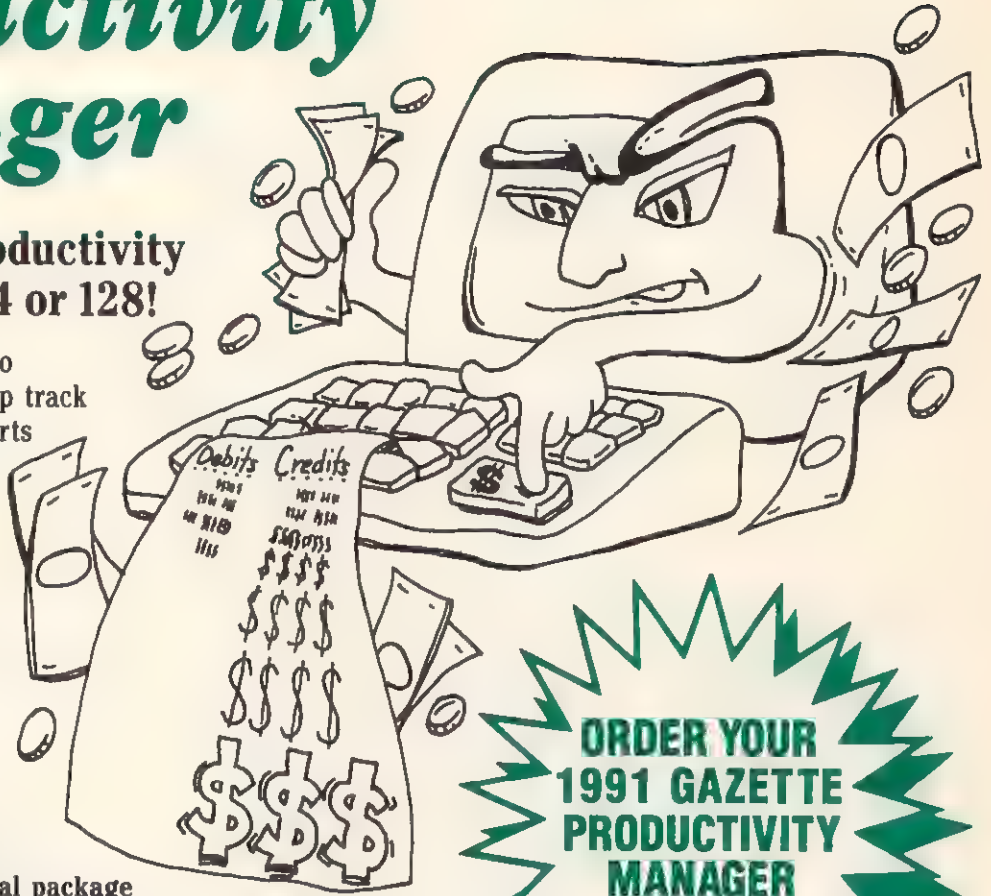
GemCalc 64 & 128—

A complete, powerful, user-friendly spreadsheet with all the features you'd expect in an expensive commercial package (separate 64 and 128 versions are included). Most commands can be performed with a *single* keypress!

Memo Card—Unleashes the power of a full-blown database without the fuss! **Nothing's easier**—it's a truly simple computerized address file. Just type in your data on any one of the index cards. Need to edit? Just use the standard Commodore editing keys. Finished? Just save the data to floppy. What could be easier?

Financial Planner—Answers all of those questions concerning interest, investments, and money management that financial analysts charge big bucks for! You can plan for your children's education and know exactly how much it will cost and how much you need to save every month to reach your goal. Or, decide whether to buy or lease a new car. Use the compound interest and savings function to arrive at accurate estimates of how your money will work for you. **Compute the answer at the click of a key!**

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Send your order to Gazette 1991 Productivity Manager, 324 W. Wendover Ave., Ste. 200, Greensboro, NC 27408.

D'IVERSIONS

Fred D'Ignazio

A SWARM OF NAKED PUPPIES

Have you ever thought of the contrast between the way you learn now and the way you learned as a child?

Recently, I've been an observer of two laboratories of learning: one in a high school and one here in my study. In the high school, I watch teachers learning on computers. At home, I watch two toddlers—Laura, 3, and Tommy, 2½—also learning on computers.

The contrast in their learning styles couldn't be more dramatic. And it's all in their body language. Body language is like a true confession of what's really going on in the learner's mind.

The teachers enter the computer lab at the high school in tight little clusters. They joke nervously and loudly, and they immediately ask where the rest rooms are and how soon they can have their first coffee break. When they sit at the computers, they push their chairs as far away from the tables as possible, sometimes so far that it's impossible to reach the computer keys.

Once the class begins, the teachers are supposed to begin team projects that encourage them to get up and move about. However, most teachers stay glued to their chairs, as if to say, "This is where we are supposed to learn. We are the audience; you are the performer. You jump up and down and be interesting, and we'll stay seated."

Tommy and Laura enter the study in a slightly different manner, more like shock troops, gangbusters, and tornadoes! By the time they get to the study, they have managed to lose most or all of their clothing and have become "naked puppies." And these puppies don't just mosey into the

study—they swarm, they gallop, and they stampede! They bang open the study door; attack both of the computers by immediately pressing all the keys and jerking the poor little computer mice this way and that; and all the while giggle, shout, and jump around. And they never sit down!

The computers are usually in "sleep" mode when the puppies arrive. Their screens are lit up with little fishbowls or scenes of sleepy cityscapes. "Wake up, computer!" Laura yells, as she clicks the mouse and knock-knock-knocks on the computer screen.

"L-M-N-O-Z!" shouts Tommy, as he simultaneously presses 11 keys, using both his hands and his forehead.

Puppies swarm around the computers, and they love to print. They print immediately. They print constantly. They both know the key combinations to crank up the printer, and within a moment after they've entered the study, the printer starts spitting out pictures of crabs, cats, moons, and unicorns on skateboards.

As the puppies' teacher, I try to maintain a semblance of order in the classroom and break up fights. But, overall, the puppies get along pretty well, and I never have to remind them to stay on task.

What is their task? As their teacher, I try to lead them through their early learning programs, beginning at the beginning of the manuals and working toward the end. For some reason, this isn't the way puppies learn. While I'm still at the beginning of a manual, Laura is somehow in the icon-edit section of chapter 33, zooming in on icons, painting red hair on the sun ("See, Daddy. It's a happy face!"), and drawing legs on a pine tree. Meanwhile, Tommy is supposed to be using a music program, but he's found a key combina-

tion that turns the musical keyboard into a talking parrot. A moment later, he and Laura are talking into the computer microphone, trading insults with the parrot.

The teachers in the high-school lab spend six hours in a workshop, trying to learn more like naked puppies learn. And the miracle is that they succeed. Sometimes it takes the entire six hours, sometimes not. By the time they leave the lab, they, too, are swarming over the machines, talking, laughing, pressing buttons a mile a minute, making mistakes, and doing crazy, unpredictable, wonderful things.

Their body language tells all. As they transform from audience to performers, the teachers begin standing, walking, crouching, and crawling under tables, examining wires and cables. They carry a video camera up onto a table and shoot the classroom from a lofty angle, or they fall to the floor and adopt a toddler's eye view. As they begin to imitate my two little puppies, their excitement goes up, their enthusiasm goes up, and their noise goes up. And their learning. And their self-confidence. And their self-esteem. And their independence from their teacher.

I like adults who act like puppies. At the end of a long, exhausting workshop day, if I have a room full of big puppies (all with their clothes on, thank goodness!), I consider the workshop a success. And the teachers do, too. In fact, at this point, they don't care a bit what I think. They're too busy running around the room with video cameras, microphones, magic markers, and colored construction paper, working on projects galore. They're too busy to notice whether they even have an instructor.

That's when I know I've been a good teacher. □

Body language is like a true confession of what's really going on in the learner's mind.

PROGRAMS

SUPERWINDOWS

By Cameron Kaiser

A problem with most computers is that your work is limited to one screen. That is, you have to deal either in text only or graphics only. Some programs offer double screens, but, invariably, one is too large and one is too small. Or they won't act like you want them to. In most cases, they're just a hassle. On the 64, the only way to circumvent this one-screen rule is through raster interrupts, but who wants to do all that work? With SuperWindows, you might not have to.

SuperWindows is a patch that forks into your VIC chip, giving you three screens instead of one. Each screen carries its own attributes, its own background color, its own screen memory (if you want it), and its own screen mode (the screens handle hi-res, too). Each screen can also be shrunk and enlarged to fit your program's needs.

Entering the Program

SuperWindows consists of two programs, Windowboot and Windows. Windowboot is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. When you've finished entering this short boot program, save it to disk before exiting Proofreader.

The main program, Windows, is written in machine language. To enter it, use MLX, our machine language entry program; again, see "Typing Aids." When MLX prompts, respond with the following.

Starting address: C000

Ending address: C10F

Be sure to save a program copy with the filename WINDOWS, because this is the name the boot program expects to load.

For some ideas on how to use SuperWindows effectively, examine Windows Demo. By following this demonstration program closely, you can discover many of the more extraordinary features of SuperWindows. It's written entirely in BASIC. Once again, enter it with The Automatic Proofreader to help avoid typing errors. Save it and Windows on the same disk.

Running the Program

To get SuperWindows up and running, run Windowboot. It loads and executes the main program and then returns you to BASIC. Four SYS codes control SuperWindows. SYS 49170 turns it on.

SYS 49346, *SM,MP,MB,SP,SC,EW* is the syntax for editing Window 1. *SM* is screen mode, the value normally going into location 53265. For text this value is 27; for hi-res, the value is 59.

MP is memory pointer, the value normally going into location 53272. Usually this value is 21 or 23.

MB is memory block, the value normally going into location 56576. Usually this value is 151.

SP is screen page, the value normally going into location 648. Usually this value is 4.

SC is screen color, the value normally going into location 53281. Set this value to whatever color you wish (0-15).

EW is end of window. For Window 1, the default value is 100. Any value less than 49 will go offscreen. Conflicts will result if the value exceeds the end of Window 2's value. Press Run/Stop-Restore if you have problems.

Window 2

SYS 49306, *SM,MP,MB,SP,SC,EW* is the syntax for editing Window 2. Note that the SYS code is less than that for Window 1. Watch out! The codes work the same as those in Window 1, with the exception that the default value for end of window is 192. Again, any value less than 49 will go offscreen and probably conflict with Window 1. Also, the end of window value for Window 2 mustn't exceed that of Window 3.

Window 3

SYS 49383, *SM,MP,MB,SP,SC,EW* is the syntax for editing Window 3. The default value for end of window is 255. Again, the end of window value should be greater than 49. It doesn't matter if the end of window value doesn't cover all the screen; Window 1 will wrap around to fill in the rest. Should you need to turn SuperWindows off, simply press Run/Stop-Restore. The values for the window parameters can be 0-65535; however, the high byte of the values provided, if any, will be stripped off.

One warning: Never use the disk

drive while SuperWindows is active. Disable SuperWindows first, or disk damage could result.

WINDOWBOOT

```
CP 1 REM COPYRIGHT 1992 - COMPUTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
FH 5 IFA=0THENA=1:LOAD"WINDOWS",8,1
FX 10 SYS49170:SYS49346,27,23,151,4,6,100:SYS49308,27,23,151,4,6,192
QD 20 SYS49383,27,23,151,4,6,255:PRINT"{CLR}SUPERWINDO
WS3.2 ENABLED"
HB 30 PRINT"DO NOT USE DISK DRIVE WHILE ONLINE";:NEW
```

WINDOWS

```
C000:00 00 00 00 00 00 00 00 81
C008:00 00 00 00 00 00 00 00 89
C010:8E C0 78 A9 7F 8D 0D DC DB
C018:A9 01 8D 1A D0 A9 03 85 BA
C020:02 A9 1B 8D 11 D0 AD 7C EC
C028:C0 8D 12 D0 A9 38 8D 14 1A
C030:03 A9 C0 8D 15 03 58 60 54
C038:AD 19 D0 8D 19 D0 29 01 29
C040:F0 19 C6 02 10 04 A9 02 5F
C048:85 02 A6 02 BD 7F C0 8D FC
C050:11 D0 BD 82 C0 8D 18 D0 AB
C058:BD 85 C0 8D 00 DD BD 88 86
C060:C0 8D 88 02 BD 8B C0 8D 02
C068:21 D0 BD 7C C0 8D 12 D0 5F
C070:8A F0 06 68 A8 68 AA 68 5F
C078:40 4C 31 EA 5A 38 01 1B D2
C080:1B 1B 17 17 17 97 97 97 88
C088:04 04 04 04 03 06 00 00 FD
C090:20 FD AE 20 9E AD 20 F7 5D
C098:B7 A5 14 60 20 90 C0 8D 3A
C0A0:7F C0 20 90 C0 8D 82 C0 21
C0A8:20 90 C0 8D 85 C0 20 90 4F
C0B0:C0 8D 88 C0 20 90 C0 8D 65
C0B8:8B C0 EA 20 90 C0 8D 7C AE
C0C0:C0 60 20 90 C0 8D 80 C0 C5
C0C8:20 90 C0 8D 83 C0 20 90 5F
C0D0:C0 8D 86 C0 20 90 C0 8D 45
C0D8:89 C0 20 90 C0 8D 8C C0 72
C0E0:20 90 C0 8D 7D C0 60 20 57
C0E8:90 C0 8D 81 C0 20 90 C0 15
C0F0:8D 84 C0 20 90 C0 8D 87 9E
C0F8:C0 20 90 C0 8D 8A C0 20 39
C100:90 C0 8D 8D C0 20 90 C0 EE
C108:8D 7E C0 60 9E 9E BE BE BB
```

WINDOWS DEMO

```
FX 1 IFPEEK(49170)<>120THENLOAD"WINDOWS",8,1
XE 10 PRINT"{CLR}{BLK}{N}{H}";
    :SYS49170:SYS49346,27,23,151,4,3,100:POKE808,237
MK 20 SYS49308,27,23,151,4,14,192:SYS49383,27,23,151,4,1,255:POKE53280,14
CM 30 PRINT"{HOME}{3 DOWN}"TAB
```

PROGRAMS

```

(14)"SUPERWINDOWS"
GA 40 PRINT"[7 DOWN]"TAB(6)"CO
PYRIGHT 1992 COMPUTE INT
"L"
JM 50 PRINTTAB(10)"ALL RIGHTS
{SPACE}RESERVED."
JX 60 PRINT"[8 DOWN]"TAB(6)"PR
OGRAMMED BY CAMERON KAIS
ER"
MA 70 FORX=8192TO10240:POKEX,0
:NEXT
CH 80 POKES3280,15:SYS49346,27
,23,151,4,15,100:SYS4930
8,27,23,151,4,15,192
QB 90 SYS49383,27,23,151,4,15,
255
QE 100 POKES3280,12:SYS49346,2
7,23,151,4,12,100:SYS49
308,27,23,151,4,12,192
PB 110 SYS49383,27,23,151,4,12
,255
ER 120 POKES3280,11:SYS49346,2
7,23,151,4,11,100:SYS49
308,27,23,151,4,11,192
KB 130 SYS49383,27,23,151,4,11
,255
DD 140 POKES3280,0:SYS49346,27
,23,151,4,0,100:SYS4930
8,27,23,151,4,0,192
KS 150 SYS49383,27,23,151,4,0,
255:FORX=1TO900:NEXT
EX 160 PRINT"{CLR}{5}{8 DOWN}N
ORMALLY YOU'VE GOT ONLY
ONE SCREEN TO
[2 SPACES]WORK WITH."
FM 170 FORX=10240TO12288:POKEX
,0:NEXT
GH 180 PRINT"THAT'S THE IDEA B
EHIND SUPERWINDOWS."
GD 182 FORX=12288TO14336:POKEX
,0:NEXT
EK 190 PRINT"IT GIVES YOU THRE
E SEPARATE SCREENS TO
[2 SPACES]CONTROL."
RD 200 FORX=14336TO16383:POKEX
,0:NEXT
RA 210 PRINT"{CLR}SEE?";
BR 220 SYS49308,59,29,151,4,0,
230:SYS49346,27,23,151,
4,0,60:GOSUB63000
RS 230 PRINT"{CLR}SCREENS CAN
{SPACE}BE RESIZED TOO..
EVEN SHRUNK!";
BA 240 FORX=1TO84:SYS49308,59,
29,151,4,0,230-X:SYS493
46,27,23,151,4,0,X+60:N
EXT
DF 250 SYS49308,27,23,151,4,0,
230
HK 252 SYS49346,27,23,151,4,0,
60
QB 253 PRINT"{CLR}AND THE SCRE
ENS ACT INDEPENDENTLY O
F[4 SPACES]EACH OTHER!"
QJ 254 FORX=1TO2500:NEXT
AJ 260 PRINT"{CLR}THIS SCREEN
{SPACE}WON'T CHANGE..."
:FORX=1TO1000:NEXT

```

```

QH 270 PRINT"{HOME}{8 DOWN}...
BUT THIS ONE WILL!"
FH 280 FORX=1TO100:SYS49308,27
,21,151,4,11,230:SYS493
08,27,23,151,4,0,230:NE
XT
CQ 290 PRINT"{CLR}SO MANY EFFE
CTS ARE POSSIBLE THAT T
HIS[2 SPACES]DEMO CAN'T
POSSIBLY SHOW";
HA 300 PRINT" THEM ALL!"
CC 310 FORX=1TO128:SYS49346,27
,23,151,4,X,100:SYS4930
8,27,23,151,4,X+1,192
XD 320 SYS49383,27,23,151,4,X+
2,255:NEXTX:PRINT"{CLR}
";
EB 330 SYS49308,27,23,151,4,0,
192:SYS49383,27,23,151,
4,0,255:FORX=1TO1000:NE
XT
DS 340 PRINT"PRESS D TO SEE TH
IS DEMO AGAIN."
KS 350 PRINT"PRESS RUN/STOP-RE
STORE TO QUIT."
EJ 360 WAIT198,1:GETA$:IFAS<>"
D"THEN360
QA 62999 RUN
DR 63000 FOR X=0 TO 289 STEP1.
5
KQ 63010 Y=INT(90+80*SIN(X/10)
|
XM 63020 CH=X/8:RO=Y/8
RX 63030 LN=Y AND 7
FP 63040 BY=8192+RO%*320+CH%*8
+LN
FX 63050 BI=7-(X AND 7)
SP 63060 POKE BY,PEEK(BY) OR 2
↑BI
SR 63064 IFX=60THENPRINT"{CLR}
{WHT}EXCITING!
{6 SPACES}":SYS49346,
27,23,151,4,14,60
PX 63065 IFX=120THENPRINT"
{CLR}{BLK}PRETTY, RIG
HT? ":SYS49346,27,23,
151,4,4,60
DB 63066 IFX=240THENPRINT"
{CLR}{5}BUT THERE'S S
TILL MORE!":SYS49346,
27,23,151,4,0,60
AC 63067 IFX=180THENPRINT"
{CLR}{WHT}A POWERFUL
{SPACE}UTILITY!":SYS4
9346,27,23,151,4,3,60
KP 63070 IFX=60THENPRINT"
{HOME}{23 DOWN}{BLK}I
T CAN'T BE!"
JM 63071 IFX=60THENSYS49383,27
,23,151,4,15,255
AA 63072 IFX=120THENPRINT"
{HOME}{23 DOWN}{WHT}T
HIS IS AMAZING!"
BQ 63073 IFX=120THENSYS49383,2
7,23,151,4,2,255
BH 63074 IFX=180THENPRINT"
{HOME}{23 DOWN}{CYN}T
HIS DEMO IS GREAT!"

```

```

GG 63075 IFX=180THENSYS49383,2
7,23,151,4,11,255
XS 63076 IFX=240THENSYS49383,2
7,23,151,4,0,255
FX 63079 NEXT
HF 63080 RETURN

```

Cameron Kaiser lives in La Mesa, California. He's the author of Batch File 64 (May 1992).

REVELATION

By Matthew Spinks

Most people who are familiar with the 64's graphics capabilities have used sprites at one time or another. They may have used one to create a pointer in a graphic-driven menu system or to display alien spaceships in a game. In most cases when sprites are used, they are high-resolution or multicolored objects, which contrast well against the background color. In some situations, however, sprites need not be visible to be effective. For example, setting a sprite to the background color enables it to reveal on-screen text smoothly, a pixel at a time.

To achieve this, an unexpanded sprite is created as a solid block measuring 8 x 8 pixels, or one character in size. The color of the sprite is set to that of the background color, and the sprite is then placed on the screen where the first character of the text is to be displayed. The first character is poked into the screen position where it's hidden by the sprite. As the sprite moves across the screen, the character is slowly revealed, pixel by pixel. When the character has been completely displayed, the next character is poked into position beneath the sprite. As the sprite continues to move across the screen, it reveals the text as it goes. This process is repeated until all the text has been displayed. The overall effect is that the text has been revealed pixel column by pixel column.

are patterned or shaped. Thus, by having a sprite shaped as a right-angled triangle, characters could reveal a pixel a row at a time, pixel column by pixel column. By making use of sprite priorities, sprites could reveal first each other and then text, thereby producing a three-dimensional effect. Sprites can work together to reveal text in different places on the screen simultaneously or to reveal text vertically instead of horizontally.

Entering the Program

Revelation is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: CDDC

Ending address: D003

Be sure to save a copy of the program before exiting MLX.

A demonstration program is also provided to show off some of Revelation's features. It's written in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; again, see "Typing Aids." To use the demonstration, first load Revelation with the .8,1 extension and then type NEW. Then load and run Demo.

Other Techniques

These are only some of the ways you can use Revelation. The technique can be adapted for all sorts of purposes. The only limitations on the process are those imposed by your own ingenuity. To use Revelation in your own programs, give the command `SYS 52700,X,Y,SP,A$`. After the SYS call, X and Y are the x and y coordinates of where the text is to be placed on the screen (ranges 0-39 and 0-255 respectively), SP is the speed at which the text is to be revealed (0 is the fastest speed, 99 is the slowest), and A\$ is the text string to be revealed. Be sure to put A\$ text in quotation marks. For example, `SYS 52700,0,0,0,"HELLO THERE"` would print those words in the upper left corner of the screen at the fastest possible speed.

Revelation has considerable scope and flexibility. First, Revelation occupies the upper portion of the area

`$C000-$CFFF (49152-53247)` so that the lower part of the area is still available for use by other programs.

Interrupts

Revelation is interrupt-driven as well. After you've given the SYS command to activate Revelation, you're free to continue with other processing. Revelation also has a latch mechanism so that if you give two Revelation SYS commands in succession, the computer will wait until the first command has finished before it attempts to process the second. This is useful if you only want to reveal text and do nothing else. (See the demonstration program for an example of this.)

Revelation will, as nearly as possible, emulate the standard PRINT command. All color codes, as well as reverse on and off, are supported. All parameters are fully evaluated. Thus the command `SYS 52700,0,0,0,CHR$(5)+CHR$(18)+"HELLO THERE"` will reveal the text in white reversed characters at the top left hand corner of the screen, at the fastest possible speed. Note that you must use plus signs to connect the character strings and text in this mode.

If a Y value of more than 24 is specified, Revelation will cause the screen to scroll, with the text being revealed on the bottom line of the screen. This is to allow scrolling of the screen, similar to the ordinary PRINT command.

Error checking is another supported feature. If any unprintable characters are entered—`CHR$(0)`, for example—they won't be printed. This includes any cursor or other control characters not previously mentioned. Also, if the text to be revealed would wrap around onto the next screen line, either because the text to be printed is more than 40 characters long or because the specified x coordinate is too large, then an ILLEGAL QUANTITY error will be generated, because Revelation will reveal only one screen line at a time.

Revelation also includes a facility that allows you to define your own sprites. This is useful if you wish to employ one of the more complex revealing methods outlined above, such as using a shaped sprite, or if you need to use a VIC bank other than bank 0: Simply poke location 52916 with a 1 to use

your own sprite.

Revelation expects you to use sprite 0. It's entirely up to you to specify sprite size, color, data location, and so on. Revelation will handle sprite positioning for you, however. Use POKE 52916,0 to return Revelation to its normal mode of setting up the invisible sprite for you.

Revelation should also peacefully co-exist with any other software interrupt programs you may wish to use, so long as they aren't raster based. If you're using other software interrupt programs, enable them first and Revelation last. This will ensure that all programs receive their fair share of interrupts. Revelation also uses memory from the cassette buffer to store sprite and character data, so avoid this area while Revelation is in use.

REVELATION

```

CDDC:AD 15 03 C9 CF D0 07 AD 0F
CDE4:14 03 C9 35 F0 F2 20 00 6B
CDEC:E2 E0 28 90 03 4C 48 B2 CC
CDF4:8E F4 CF 20 00 E2 E0 19 77
CDFC:90 05 20 EA E8 A2 18 8E 65
CE04:F5 CF 20 00 E2 E0 64 B0 A8
CE0C:E4 8E F7 CF 8E F6 CF 20 CB
CE14:FD AE 20 9E AD 20 A6 B6 3C
CE1C:C9 00 F0 47 8D F8 CF A0 C1
CE24:00 8C FA CF 8C FF CF B1 F6
CE2C:22 A2 11 DD E0 CF D0 05 70
CE34:8A 09 80 D0 1A CA 10 F3 86
CE3C:C9 FF D0 02 A9 7E 48 4A 1B
CE44:4A 4A 4A 4A AA 68 38 FD EC
CE4C:D8 CF 90 0C EE FA CF AE CE
CE54:FF CF 9D 80 03 EE FF CF 45
CE5C:C8 CE F8 CF D0 C9 AD FA 32
CE64:CF D0 01 60 18 6D F4 CF 74
CE6C:C9 29 B0 81 AD F4 CF C9 12
CE74:1D 90 0C 48 AD 10 D0 09 23
CE7C:01 8D 10 D0 68 29 DF 0A BE
CE84:0A 0A 69 18 8D 00 D0 AD 14
CE8C:F5 CF 0A 0A 0A 69 32 8D E2
CE94:01 D0 AE F5 CF AD F4 CF 0B
CE9C:18 7D F0 EC 85 F9 85 F7 A9
CEA4:B5 D9 29 03 69 D8 85 FA 9D
CEAC:29 27 0D 88 02 85 F8 A9 94
CEB4:00 D0 31 A2 3F A9 00 9D 15
CEBC:40 03 CA 10 FA A2 15 A9 CB
CEC4:FF 9D 40 03 CA CA 10 29
CECC:F8 AD 17 D0 29 FE 8D 17 B9
CED4:D0 AD 1D D0 29 FE 8D 1D 74
CEDC:D0 AD 21 D0 8D 27 D0 A9 D3
CEE4:0D 8D F8 07 AD 15 D0 09 68
CEEC:01 8D 15 D0 AD 86 02 8D 37
CEF4:FD CF A9 00 8D FB CF 8D 44
CF0C:FC CF 8D FE CF 8D F9 CF 27
CF04:78 AD 14 03 8D 9F 02 AD 9A
CF0C:15 03 8D A0 02 A9 35 8D 61
CF14:14 03 A9 CF 8D 15 03 A9 21
CF1C:7F 8D 0D DC 2D 11 D0 8D 2B
CF24:11 D0 A9 FF 8D 12 D0 AD B9

```

```
CF2C:1A D0 09 81 8D 1A D0 58 15
CF34:60 AE F7 CF F0 08 CE F6 E7
CF3C:CF 10 55 8E F6 CF CE FC EC
CF44:CF 10 3B AC F9 CF CC FF AA
CF4C:CF F0 57 EE F9 CF B9 80 EC
CF54:03 10 16 29 7F C9 10 90 A2
CF5C:0B 29 EF AA BD F2 CF 8D 5B
CF64:FE CF B0 DF 8D FD CF 90 20
CF6C:DA AC FB CF 0D FE CF 91 B6
CF74:F7 AD FD CF 91 F9 EE FB 86
CF7C:CF A9 07 8D FC CF AD 12 BC
CF84:D0 D0 FB EE 00 D0 D0 08 1C
CF8C:AD 10 D0 09 01 8D 10 D0 E0
CF94:A9 01 8D 19 D0 AD 0D DC C0
CF9C:29 01 F0 03 6C 9F 02 4C 91
CFA4:BC FE AD 15 D0 29 FE 8D 20
CFAC:15 D0 A9 00 8D 00 D0 8D DB
CFB4:01 D0 AD 10 D0 29 FE 8D 76
CFBC:10 D0 20 84 FF AD 1A D0 A0
CFC4:29 7E 8D 1A D0 AD 9F 02 6A
CFCC:8D 14 03 AD A0 02 8D 15 B0
CFD4:03 4C 94 CF FF 00 40 20 39
CFDC:FF 40 80 80 90 05 1C 9F 15
CFE4:9C 1E 1F 9E 81 95 96 97 4F
CFEC:98 99 9A 9B 12 92 80 00 28
CFF4:00 00 00 00 00 00 00 00 94
CFFC:00 00 00 00 00 00 00 00 9C
```

DEMO

```
MQ 100 REM COPYRIGHT 1992 - CO
      MPUTE PUBLICATIONS - AL
      L RIGHTS RESERVED
CE 110 REM WRITTEN BY M. SPINK
      S
HJ 120 :
MK 130 REM MAKE SURE LOADER IS
      IN MEMORY
XK 140 :
XA 150 V=53248:SA=52700:POKEV+
      32,0:POKEV+33,0:PRINTCH
      R$(147);:POKE646,14
AX 160 BL=52916:SYSSA,0,1,0,"T
      HIS DEMONSTRATION SHOWS
      HOW TEXT CAN BE"
RG 170 SYSSA,0,3,0,"REVEALED S
      MOOTHLY":SYSSA,27,3,0,"
      ON THE SCREEN"
MD 180 SYSSA,18,3,0,"ANYWHERE"
      :SYSSA,3,5,0,"TEXT CAN
      {SPACE}BE DISPLAYED IN
      {SPACE}ANY":A$=""
CJ 190 B$="COLOR":FORT=1TOLN(
      B$):READX:A$=A$+CHR$(X)
      +MID$(B$,T,1):NEXT
BG 200 SYSSA,32,5,0,A$:A$=CHR$(
      18)+CHR$(158)+"OR WITH
      REVERSE ON AND OFF"
QB 210 SYSSA,7,7,0,A$:SYSSA,0,
      0,0,"":POKE646,4:POKEBL
      ,1:POKEV+39,5:POKEBL,1
QF 220 POKEV+39,4:SYSSA,5,9,0,
      "TEXT CAN ALSO BE CURSO
      R DRIVEN":SYSSA,0,0,0,"
      "
SF 230 POKEBL,0:SYSSA,4,11,0,"
      AND CAN BE REVEALED AT
      {SPACE}ANY":A$="SPEED"
BG 240 FORT=1TOLN(A$):SYSSA,3
```

```
0+T,11,T,MID$(A$,T,1):N
EXT
QG 250 SYSSA,2,13,0,"TEXT CAN
      {SPACE}SCROLL LIKE NORM
      AL AS WELL":POKE646,10
SR 260 Y=14:FORT=3.14T06.28STE
      P.2:C=COS(2*T)+SIN(T):X
      =6*C+12:Y=Y+1
GE 270 SYSSA,X,Y,0,"SCROLLING"
      :NEXT:SYSSA,X,Y,0,"":FO
      RT=0T0LE3:NEXT:POKE646,
      3
FG 280 PRINTCHR$(147);:SYSSA,0
      ,1,0,"DISPLAY OF TEXT I
      S INTERRUPT DRIVEN TOO:
      "
MA 290 POKE646,13:A$=CHR$(18)+
      "THAT'S ALL FOLKS !!!":
      SYSSA,10,3,3,A$
XC 300 FORT=0T04:PRINTCHR$(17)
      :NEXT:END
PH 310 DATA158,30,31,153,150,5
```

Matthew Spinks lives in Erica, Victoria, Australia. He's the author of Medium-Density Driver (September 1991).

FORMATTED LIST

By R. Markland

Formatted List is a programmer's utility designed to create more manageable hard copies of BASIC program listings for the 64. Formatted List produces uniform page breaks, rather than printing program lines over page perforations, and prints an identifying header and page number at the top of each page.

Typing It In

Formatted List is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: C000

Ending address: C3B7

Be sure to save a copy of the program before you exit MLX.

Compatibility

In general, Formatted List is compatible with any printer, with or without an interface, that will normally print a program listing with OPEN4,4: CMD4: LIST and recognizes CHR\$(12) as a one-byte form feed. Should you need another form-feed command, you may poke appropriate decimal values to

49424 and 49549 after Formatted List is loaded. Because Formatted List cannot recognize every conceivable printer/interface combination, it processes 50 BASIC program lines per page and then sends a standard ASCII form feed before starting the next page. You may also need to determine if your printer/interface must be set with linefeeds on or off. When some interfaces encounter cursor control or character color symbols, they automatically convert the symbols into words (*up*, *down*, *blue*, and so on). An 80-character BASIC program line may thus require more than one printer line. Usually, Formatted List can compensate for this. On rare occasions a program may contain a series of lines packed with control characters that, when expanded, will corrupt the page formatting. If you can set your interface to print the actual Commodore characters, it's advisable to do so to eliminate the potential problem. After Formatted List is loaded, you may adjust the number of BASIC lines per page by poking 49415 with a decimal value less than 50.

Features and Conventions

Formatted List should be loaded at the beginning of a programming session immediately after power-up by typing LOAD"FORMATTED LIST",8,1. Press Return and then type NEW and press Return again. Now load a program to be edited or begin work on a new program. To use Formatted List, in direct mode type SYS49152 and press Return. Screen prompts will ask for a header line, remind you to check the printer, and inform you that the listing may be aborted by pressing Run/Stop.

Formatted List will print a listing of virtually any BASIC program, from a single line up to more than 30K in length. The listing requires tractor feed paper and should be started with the print-head centered on a perforation if your interface expands lines. Otherwise, you may prefer to adjust the paper to center the text top and bottom. It's advisable to turn the printer off and on after the paper is aligned to establish proper page length.

In the interests of simplicity and compactness, Formatted List assumes that there's a BASIC program in memory and that a printer is connected, on-

line, and loaded with paper. If you run the program without these conditions in place, Formatted List is likely to crash and/or lock up the keyboard. The title line may consist of 1-32 characters and may contain any combination of characters with CHR\$ values in the range of 32-95 decimal values.

Formatted List will list the entire program from beginning to end. If you wish to list only a portion of a program, formatting is unnecessary. A range of lines may be specified in a standard CMD4:LIST *range* command. Should you decide that you need Formatted List after you have a BASIC program in memory, in direct mode, type PRINTPEEK(45);PEEK(46) and press Return. Record the values displayed. Then type LOAD"FORMATTED LIST"8,1 and press Return. Then enter POKE45,v1: POKE,v2 and press Return (v1 and v2 are the values previously recorded).

Here's an important note: If you're test running a BASIC program that loads to or uses memory from address 49152, you'll overwrite Formatted List. Should this happen, reload Formatted List using the alternate loading method described immediately above. Keep in mind that if Formatted List has been overwritten or corrupted, any SYS 49152 call will no doubt send you on a one-way trip into the Silicon Cosmos, so be sure to save your work first as a precautionary measure.

FORMATTED LIST

```
C000:A9 01 85 CC A9 20 20 D2 F4
C008:FF A9 0D 20 D2 FF A2 00 73
C010:A9 20 9D 91 C3 E8 E0 20 DE
C018:D0 F8 A2 00 BD 71 C2 C9 97
C020:00 F0 06 20 D2 FF E8 D0 D9
C028:F3 A9 0D 20 D2 FF C0 D2 5B
C030:FF A9 20 20 D2 FF A2 00 FD
C038:8E 8E C3 86 CC AD 86 02 B1
C040:8D 87 02 20 E4 FF C9 0D 74
C048:F0 34 C9 14 D0 10 AC 8E 78
C050:C3 C0 01 90 E8 CE 0E C3 70
C058:20 D2 FF 4C 3D C0 AC 8E 38
C060:C3 C0 20 F0 D8 C9 20 90 C5
C068:D4 C9 60 B0 D0 20 D2 FF 8A
C070:AC 8E C3 99 91 C3 EE 8E 06
C078:C3 AC 8E C3 D0 BF A9 01 EE
C080:85 CC A5 C7 C9 00 D0 FA 14
C088:A9 20 20 D2 FF A9 0D 20 F8
C090:D2 FF 20 D2 FF 20 D2 FF D2
C098:A2 00 BD F1 C2 C9 00 F0 70
C0A0:06 20 D2 FF E8 D0 F3 A9 A3
C0A8:0D 20 D2 FF 20 E4 FF F0 98
C0B0:FB A9 30 8D B1 C3 A9 31 9A
```

```
C0B8:8D B2 C3 A5 2B 85 FB A5 8D
C0C0:2C 85 FC A0 02 B1 FB 8D BF
C0C8:B3 C3 C8 B1 FB 8D B4 C3 8C
C0D0:A9 00 AA A8 20 BD FF A9 A8
C0D8:04 A2 04 A0 00 20 BA FF 85
C0E0:20 C0 FF A2 04 20 C9 FF 01
C0E8:20 A0 C1 A9 00 8D B5 C3 DA
C0F0:20 E1 FF D0 03 4C 91 C1 36
C0F8:20 1A C1 A9 0D 20 D2 FF 72
C100:EE B5 C3 AD B5 C3 C9 32 3E
C108:D0 E6 A9 00 8D B5 C3 A9 57
C110:0C 20 D2 FF 20 A0 C1 4C 4F
C118:F0 C0 AD B3 C3 85 14 AD 3F
C120:B4 C3 85 15 20 13 A6 A5 31
C128:5F 85 FB A5 60 85 FC A0 4A
C130:00 B1 FB 8D 8F C3 C8 B1 47
C138:FB 8D 90 C3 AD 8F C3 85 24
C140:FB AD 90 C3 85 FC A0 02 DE
C148:B1 FB 8D B3 C3 C8 B1 FB 31
C150:8D B4 C3 A0 00 B1 FB D0 D9
C158:43 C8 B1 FB D0 3E 20 FF 65
C160:C1 A9 0D 20 D2 FF 20 D2 7C
C168:FF 20 D2 FF A2 00 A9 20 D6
C170:20 D2 FF E8 E0 21 D0 F8 6D
C178:A2 00 BD E2 C2 C9 00 F0 61
C180:06 20 D2 FF E8 D0 F3 A9 85
C188:0D 20 D2 FF A9 0C 20 D2 85
C190:FF A9 04 20 C3 FF 20 CC 2C
C198:FF 4C 74 A4 20 FF A1 60 BC
C1A0:A2 04 20 C9 FF A9 0D 20 F7
C1A8:D2 FF 20 D2 FF A2 00 BD 0F
C1B0:B2 C2 C9 00 F0 06 20 D2 2A
C1B8:FF E8 D0 F3 A2 00 BD 91 F1
C1C0:C3 20 D2 FF E8 E0 20 D0 64
C1C8:F5 A2 00 BD C0 C2 C9 00 70
C1D0:F0 06 20 D2 FF E8 D0 F3 B8
C1D8:AD B1 C3 20 D2 FF AD B2 BE
C1E0:C3 20 D2 FF A9 0D 20 D2 3D
C1E8:FF 20 D2 FF EE B2 C3 AD 46
C1F0:B2 C3 C9 3A D0 08 EE B1 D1
C1F8:C3 A9 30 8D B2 C3 60 A0 AD
C200:01 84 F0 B1 5F F0 40 20 83
C208:2C A8 C8 B1 5F AA C8 B1 EA
C210:5F C5 15 D0 04 E4 14 F0 33
C218:02 B0 2C 84 49 20 CD BD BC
C220:A9 20 A4 49 29 7F 20 47 7A
C228:AB C9 22 D0 06 A5 0F 49 75
C230:FF 85 0F C8 F0 11 B1 5F 14
C238:D0 0E A8 B1 5F AA C8 B1 C2
C240:5F 86 5F 85 60 D0 B8 60 73
C248:10 DC C9 FF F0 D8 24 0F 88
C250:30 D4 C8 E9 7F AA 84 49 C1
C258:A0 FF CA FE 08 C8 B9 9E 0C
C260:A0 10 FA 30 F5 C8 B9 9E 81
C268:A0 30 B7 20 47 AB 4C 65 2A
C270:C2 20 20 20 20 20 20 20 47
C278:45 4E 54 45 52 20 54 49 18
C280:54 4C 45 20 46 4F 52 20 22
C288:48 45 41 44 45 52 20 49 EC
C290:44 2E 0D 20 20 20 20 49
C298:20 20 20 20 20 28 31 20 60
C2A0:54 4F 20 33 32 20 43 48 3C
C2A8:41 52 41 43 54 45 52 53 6F
C2B0:29 00 4C 49 53 54 49 4E B5
C2B8:47 20 46 4F 52 3A 20 00 63
C2C0:20 20 20 20 20 20 20 20 46
C2C8:20 20 20 20 20 20 20 20 4E
C2D0:20 20 20 20 20 20 20 20 56
C2D8:20 20 50 41 47 45 20 23 47
C2E0:20 00 45 4E 44 20 4F 46 8B
```

```
C2E8:20 4C 49 53 54 49 4E 47 9B
C2F0:00 20 20 20 20 20 43 48 D4
C2F8:45 43 4B 20 50 52 49 4E 0A
C300:54 45 52 20 41 4E 44 20 3B
C308:50 41 50 45 52 20 53 55 75
C310:50 50 4C 59 0D 20 20 20 3C
C318:20 20 20 20 20 20 20 20 9F
C320:20 20 20 20 20 20 20 20 54 DB
C328:48 45 4E 0D 20 20 20 20 A1
C330:20 50 52 45 53 53 20 41 E3
C338:4E 59 20 4B 45 59 20 54 1A
C340:4F 20 50 52 49 4E 54 20 F2
C348:4C 49 53 54 49 4E 47 0D 17
C350:0D 20 20 20 20 20 20 20 4E
C358:20 20 20 20 20 20 20 20 44 04
C360:55 52 49 4E 47 20 50 52 E2
C368:49 4E 54 0D 20 20 20 20 65
C370:20 20 48 4F 4C 44 20 44 06
C378:4F 57 4E 20 52 55 4E 2F FC
C380:53 54 4F 50 20 54 4F 20 C6
C388:41 42 4F 52 54 00 00 00 F2
C390:00 00 00 00 00 00 00 00 18
C398:00 00 00 00 00 00 00 00 20
C3A0:00 00 00 00 00 00 00 00 28
C3A8:00 00 00 00 00 00 00 00 30
C3B0:00 00 00 00 00 00 00 00 38
```

R. Markland, who lives in Rawlins, Wyoming, has seen listing questions in Gazette many times and says it's time for a definitive solution.

BLANKER

By Charles W. Bozarth

Even with today's newer monitors, there's still a concern about burning a screen image into the picture tube. This can occur if the image on the monitor stays the same for long periods of time. IBM computers have a variety of utilities for blanking the screen while the computer isn't being used. Blanker is a similar screen-blanking utility for GEOS on the 64. It provides various ways to blank the screen from any GEOS program that uses desk accessories.

Entering the Program

Blanker is written in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: 0247
Ending address: 076E

Be sure to save two copies of the program to a GEOS work disk before exiting MLX. Since you can't enter GEOS

PROGRAMS

programs directly, Blanker must be converted to GEOS format before it can be used. One copy of Blanker will be converted by GeoConverter 2.0 into a desk accessory. Keep the other copy as a backup in case something goes wrong with the conversion.

If you don't already have a copy of GeoConverter, we've included the listing here. The converter can be found on COMPUTE's GEOS Collection disk, and it was printed in "The GEOS Column," March 1990. Be sure to use "The Automatic Proofreader" (again, see "Typing Aids") to help prevent typing errors when you enter the program. Save a copy of GeoConverter to the disk that contains Blanker.

To prepare Blanker for use with GEOS, load and run GeoConverter. When prompted for a filename, enter the name you used to save Blanker. GeoConverter will then convert the file into a GEOS desk accessory format. Those who get Gazette Disk should copy Blanker to a work disk before making the GEOS conversion.

Using the Program

To start Blanker in most programs, select it either from the deskTop, or from the GEOS menu in other programs. A dialog box appears on the screen with four choices to blank the screen. Selecting Cancel will return to the application without blanking. Select one of the choices and then click on the OK icon to start the process.

Each option has its own unique way of clearing the screen. For example, Blank is the option that goes directly to blanking the screen with the border color. This is most effective if the border is a dark color such as the GEOS default of black. The Blank option has the same effect as turning off the monitor. Tilt, Dissolve, and Drip are additional choices. Drip is an especially amusing and realistic effect. You'll probably want to touch the screen to make sure it isn't wet. All of these options have the effect of turning off the monitor once the screen is erased.

While the screen is being erased, the mouse pointer moves to the bottom right corner of the screen. The blanking process can be stopped at any time and control returned to the application by pressing any key or clicking

the mouse button

Blanker was written for the 64 version of GEOS 2.0 using geoProgrammer software.

BLANKER

```

0247:0F 03 15 BF FF FF FF 80 B2
024F:00 01 BF FF FD B0 00 0D 4B
0257:A0 00 05 A0 00 05 A0 00 AB
025F:05 A0 00 05 A0 00 05 A0 0E
0267:00 05 A0 00 05 A0 00 05 70
026F:A0 00 05 A0 00 05 B0 00 E3
0277:0D BF FF FD 80 00 01 FF D7
027F:FF FF 4F FE 72 20 00 04 75
0287:3F FF FC 83 05 00 00 04 2F
028F:BA 2C 00 04 53 63 72 6E B7
0297:20 42 6C 61 6E 6B 65 72 3E
029F:56 31 2E 30 00 00 00 00 E3
02A7:43 68 61 72 6C 65 73 20 BA
02AF:57 2E 20 42 6F 7A 61 72 AD
02B7:74 68 20 0F 2C 00 00 44 AA
02BF:65 73 6B 20 61 63 63 65 87
02C7:73 73 6F 72 79 20 66 6F FF
02CF:72 20 62 6C 61 6E 6B 69 2D
02D7:6E 67 20 74 68 65 20 47 98
02DF:45 4F 53 20 73 63 72 65 3A
02E7:65 6E 2E 0F 34 00 00 20 B2
02EF:4E C1 20 B7 C1 00 60 99 73
02F7:08 40 1F 20 53 C2 00 C8 64
02FF:00 00 40 01 A9 80 85 2F A5
0307:20 B7 C1 1F 85 1E 29 9C C8
030F:03 20 B6 06 20 31 07 20 C9
0317:E6 06 A5 02 C9 02 F0 38 57
031F:A9 00 85 39 A9 04 8D A2 59
0327:84 A9 69 8D A1 84 A9 04 56
032F:8D A4 84 8D A9 69 8D A3 84 9D
0337:A9 01 85 3B A9 3F 85 3A 46
033F:A9 C7 85 3C A5 16 0A A8 C2
0347:88 88 B9 29 07 8D 9B 84 A7
034F:C8 B9 29 07 8D 9C 84 60 06
0357:AD 11 D0 09 10 8D 11 D0 CC
035F:A9 30 85 01 20 B7 C1 1E 88
0367:29 1F 85 9C 03 20 A5 C1 E9
036F:00 C8 00 00 40 01 20 B7 A5
0377:C1 99 08 00 60 40 1F 4C 54
037F:3E C2 A9 00 8D 9C 84 A9 1C
0387:00 8D 9B 84 A9 35 85 01 DA
038F:AD 11 D0 29 EF 8D 11 D0 06
0397:60 A9 04 8D 9C 84 A9 C7 A3
039F:8D 9B 84 A9 A0 85 03 A9 49
03A7:00 85 02 A9 00 85 05 85 8F
03AF:06 A9 5A 85 07 60 A6 05 D2
03B7:A4 06 B9 28 05 A8 B1 02 7B
03BF:3D 20 05 91 02 20 0A 05 CF
03C7:18 A9 0A 65 02 85 02 90 96
03CF:02 E6 03 A5 03 C9 BF D0 DA

```

GEOCONVERTER 2.0

```

BA 10 REM COPYRIGHT 1992 COMPUTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
SE 20 IF(PEEK(772)+PEEK(773)*256)=42364 THEN40
PD 30 LIST0,1:LIST4,1:LIST6,1:SA=PEEK(4625)*256+PEEK(4624):GOTO50
SX 40 POKE56,PEEK(46)+40:CLR:P

```

```

OKE53280,0:POKE53281,0:S
A=PEEK(56)*256+PEEK(55)
QQ 50 PRINT"{CLR}{8}{N}{DOWN}"
TAB(12){RVS}GEOCONVERTE
R 2.0{OFF}{GRN}{3 DOWN}"
:PRINTTAB(13)"COPYRIGHT
{SPACE}1992{DOWN}"
KR 60 PRINTTAB(7)"COMPUTE! PUB
LICATIONS INC.{DOWN}"PR
INTTAB(11)"ALL RIGHTS RE
SERVED{2 DOWN}"
MK 70 N=8:PRINT"DRIVE NUMBER "
N"{4 LEFT}";:INPUTN:IFN<
8ORN>11THEN70
QE 80 K$="N":PRINT"IS DRIVE"N
A 1581?"K$"{3 LEFT}";:I
NPUTK$:IFK$<>"N"ANDK$<>"
Y"THEN80
SB 90 T$=CHR$(18):S$=CHR$(1):I
FK$="Y"THEN T$=CHR$(40):S
$=CHR$(3)
RS 100 INPUT"FILE TO CONVERT";
NM$:OPEN1,N,15:OPEN1,N
,8,"0:"+NM$+"",P,R"
BX 110 GOSUB440:IFEN<>0THENPRI
NT"{RVS}"EN$" "EM$E$E$E$
GOTO400
FF 120 GET#1,K$,V$:IFK$<>CHR$(
71)ORV$<>CHR$(2)THENCLO
SEL:CLOSE15:GOTO220
BR 130 PRINT"[DOWN]DECOMPRESSI
NG...":Z$=CHR$(0):GET#1
,ESC$:ESC=ASC(ESC$+Z$):
AD=SA
RQ 140 GOSUB170:IFV<>ESCTHENPO
KEAD,V:AD=AD+1:GOTO140
PP 150 GOSUB170:CT=V:GOSUB170:
CT=CT+V*256:GOSUB170:GO
SUB160:GOTO140
DH 160 FORI=1TOCT:POKEAD,V:AD=
AD+1:NEXTI:CT=0:RETURN
PK 170 GET#1,V$:S=ST:V=ASC(V$+
Z$):IFST=0THENRETURN
SJ 180 IFS<64THENGOSUB440:PRI
NT"[DOWN]LOAD ERROR -
{RVS}"EN$" "EM$E$E$E$:G
OTO400
AF 190 IFCT<>0THENGOSUB160:AD=
AD-1
DG 200 PRINT"[DOWN]WRITING..."
:CLOSE1:PRINT#15,"S0:"+
NM$:CLOSE15
EF 210 OPEN1,N,8,"0:"+NM$+"",P,
W":FORI=SATOAD:PRINT#1,
CHR$(PEEK(I));:NEXTI:CL
OSE1
GP 220 PRINT"[DOWN]CONVERTING.
...":HD$="":FORI=1TO4:RE
ADHE:HD$=HD$+CHR$(HE):N
EXTI
CF 230 FORI=1TO5:READIE:ID$=ID
$+CHR$(IE):NEXTI
DR 240 NL$="":OPEN15,N,15,"I0:
":OPEN2,N,2,"#"
MM 250 GOSUB410:GET #2,NT$,NS$
:FORE=0TO7:D$=NL$:GET#2
,B$:I=1:IFB$=NL$THEN310
PE 260 IF ASC(B$)<>130 THEN310

```

```

AE 270 GET #2,HT$,HS$:I=3:IFHS$
      =" "THENHS$=CHR$(0)
DJ 280 GET #2,B$:I=I+1:IFB$=" "T
      HENB$=CHR$(0)
BM 290 IF (ASC(B$)=160)OR (I=19)
      THEN310
SF 300 D$=D$+B$:GOTO280
EB 310 FORI=ITO31:GET #2,B$:NEX
      TI:IFD$=NMSTHEN340
JX 320 NEXTE:IFNT$=NL$THEN340
CH 330 T$=NT$:S$=NS$:GOTO250
GA 340 IFD$=NL$THENPRINT"
      {DOWN}DISK ERROR!":GOTO
      400
PD 350 DT$=T$:S$=S$:T$=HT$:S$
      =HS$:GOSUB410:GET #2,MT$
      ,MS$:IFMS$=" "THENMS$=CH
      R$(0)
GF 360 FORI=0TO65:GET #2,B$:NEX
      TI:GET #2,CT$,GT$:GOSUB4
      10:PRINT #2,HD$,:GOSUB42
      0
RX 370 T$=DT$:S$=S$:GOSUB410:
      FORI=1TO32*E+2:GET #2,B$
      :NEXTI:PRINT #2,CT$,MT$;
      MS$;
MB 380 FORI=0TO15:GET #2,B$:NEX
      TI:PRINT #2,HT$,HS$:CHR$
      (0);GT$;ID$,:GOSUB420
GR 390 PRINTNM$" CONVERTED!"
HB 400 CLOSE1:CLOSE2:CLOSE15:EN
      D
DQ 410 U$="U1":GOTO430
CS 420 U$="U2"
PA 430 PRINT #15,U$;2;0;ASC(T$+
      "0");ASC(SS+"0"):RETURN
JJ 440 INPUT #15,EN,EM$,ET,EE:EN
      =STR$(EN):ET$=STR$(ET
      ):EE$=STR$(EE):RETURN
EH 450 DATA 0,255,3,21,87,10,1
      ,0,0

```

Charles W. Bozarth, who lives in Kalamazoo, Michigan, began programming on a VIC-20. He recently earned a degree in mechanical engineering, but continues to program as a hobby.

SUPERSAVE

By Jason P. Lewis

Saving your work periodically is a concept that looks great on paper, but applying it is a whole different matter when at the computer. Some programmers avoid it, saying, "I'll never lose any files. It could never happen to me." Others complain that saving takes too much time when they're busy.

SuperSave is a short utility that will greatly assist you in saving your BASIC programs or BASSEM source code files. In the case of a power outage, your chances of recovering most of your file would

be greatly improved with SuperSave.

Typing It In

SuperSave is a two-part program. The main program is written in machine language. To type it in, you'll need MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts you, enter the following values.

Starting Address: \$CF64

Ending Address: \$CFFF

When you've finished entering the program, save it with the filename SuperSave.ML before you exit MLX.

The second part of SuperSave is a BASIC loader or boot program. It's quite short, but you may want to use The Automatic Proofreader to help avoid typing errors. Again, see "Typing Aids." Be sure to save a copy of Boot on the same disk as SuperSave.ML. When you run Boot, it automatically loads and runs SuperSave.ML.

Using SuperSave

When you load and run SuperSave, you'll see a message that the program has been enabled. You'll also see the READY prompt.

In order to use SuperSave, you must either load a program you wish to work on or save a file. This will make that filename active for a short period of time. That filename will remain active from the time the save or load was performed until any other BASIC command is executed. During this time, press Ctrl-Restore. This will make the filename permanently active, at least until you reset or turn off the computer.

Once you have an active filename, you can use SuperSave as many times as you wish. This is done simply by pressing Restore. Each time you've made some changes and want to update the file on your disk, simply press Restore.

SuperSave actually performs two functions during a save. First, it scratches the old version of the file, bypassing the save-with-replace bug on older 1541 and 1571 drives. Then, SuperSave performs a normal BASIC save.

When you press Restore, you won't see the usual message indicating that a file is being saved. In fact, the only

visual sign that you should notice is the drive light coming on to indicate that something is happening. By not printing a message, nothing on the screen is corrupted. After the SuperSave process, you should notice no difference in your program whatsoever.

This permits you to update your file whenever you like, giving you no excuse for losing valuable data during a power outage or similar occurrence. SuperSave will also save you several keystrokes (pun intended).

How It Works

Each time you press Restore, the 64 executes the machine language instructions pointed to by locations 792 and 793. The actual address of the ML program is the contents of 793 multiplied by 256 and then added to location 792 (LC=PEEK(792)+PEEK(793)*256).

SuperSave changes these locations to make the computer execute SuperSave rather than its normal routine. If SuperSave doesn't recognize a keypress in conjunction with Restore, it'll ignore it. Instead, it'll execute the 64's normal Restore routine. This means Run/Stop-Restore retains its usual function and it will disable SuperSave. To enable it again, enter SYS 53092.

Customizing the Boot Program

You may want to customize the boot program for each program you work on. You can replace the new statement in line 40 with a LOAD statement to load your program. For example, if your program's name were HELP, then you would change line 40 to LOAD "HELP",8.

Then, whenever you execute the SuperSave boot program, your working program will automatically load. Press Ctrl-Restore to make that filename active, and you'll be ready for another work session.

SUPERSAVE.ML

```

CF64:AD 18 03 8D E8 CF AD 19 15
CF6C:03 8D E9 CF A9 7B 8D 18 99
CF74:03 A9 CF 8D 19 03 60 AD 16
CF7C:8D 02 C9 04 F0 4F 20 E1 C3
CF84:FF F0 60 AD EA CF 18 69 77
CF8C:03 A2 EC A0 CF 20 BD FF 78
CF94:A9 01 AE EB CF A0 0F 20 1D
CF9C:BA FF 20 C0 FF 20 C3 FF B1
CFA4:A9 01 AE EB CF A0 FF 20 0F
CFAC:BA FF AD EA CF A2 EF A0 97

```

PROGRAMS

```
CFB4:CF 20 BD FF A9 00 20 90 1A
CFBC:FF A9 2B A6 2D A4 2E 30 0F
CFC4:D8 FF A9 C0 20 90 FF 20 75
CFCC:E7 FF 4C E7 CF A5 B7 8D 7A
CFD4:EA CF A5 BA 8D EB CF A0 9A
CFDC:00 B1 BB 99 EF CF C8 C4 0F
CFE4:B7 D0 F6 4C 01 00 00 00 40
CFEC:53 30 3A 20 20 20 20 20 6D
CFF4:20 20 20 00 00 00 00 94
CFFC:20 20 20 00 00 00 00 B8
```

BOOT

```
MM 5 REM COPYRIGHT 1992 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
FE 10 IF A=0 THEN A=1:LOAD"SUP
ERSAVE.ML",8,1
GP 20 SYS 53092
DD 30 POKE 53281,0:POKE 53280,
15:PRINT"{WHT}{CLR}{RVS}
SUPERSAVE ENABLED."
KG 40 NEW
```

Jason P. Lewis is a junior in high school in Ascutney, Vermont. He wrote SuperSave to help him with his other programming efforts.

BALLOON POP

By Maurice Yanney

If you're the kind of person who gets a kick out of popping balloons, you'll love this game for the 64. You can either drop pins on the balloons as they rise toward the top of the screen or go for the extra points by intercepting the balloons with your pin-dropper. It slides left and right across the top of the screen, and you can control it in an effort to pop any elusive balloons before they slip by you. Pop them all and move to a more difficult level. See how many levels you can complete in this fast-paced game.

Getting Started

Although Balloon Pop is written entirely in machine language, the program loads and runs like a BASIC program. To type it in, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts you, respond with the following values.

Starting address: 0801
Ending address: 11C0

Be sure to save a copy of the program before exiting MLX. The program works with a joystick in either port or

from the keyboard with cursor keys and space bar.

Playing the Game

The object of the game is to pop all the rising balloons without letting any get by. You control a pin-dropper, which is located at the top of the screen. Use the pin-dropper to pop the rising balloons by dropping pins on them, or maneuver it so that it breaks balloons as they reach the top of the screen.

To move the pin-dropper to the left, use the Crsr up/down key; to move to the right, use the Crsr left/right key. A joystick (in either port) may also be used to move. Press the space bar or the joystick button to fire a pin downward toward the rising balloons. Only one pin can be fired at a time.

When a pin hits a balloon, you receive 10 points, and the number of popped balloons increases by 1. If the balloon hits the pin-dropper, you receive 50 points, and the number of hits is incremented by 1. To complete the first level, the number of hit and popped balloons must be 10; an additional 5 balloons are needed for each subsequent level (up to 50).

The score, the level, the number of popped balloons on the current level, the number of hit balloons on the current level, and the extra balloons are displayed at the bottom of the screen. Initially, there are five extra balloons. When a balloon reaches the top without being hit or popped, an extra balloon is lost. When there are no more extra balloons, the game is over. An extra balloon is awarded for each 500 points reached.

Complete a level, and you'll get 10 bonus points for each popped balloon and 50 points for each hit balloon. Each level becomes more difficult with the addition of another balloon to the number of balloons that are approaching your pin-dropper. Level 1 begins with three balloons simultaneously rising. The pin-dropper is positioned closer to the rising balloons on higher levels, and five more balloons are required to complete each level.

To quit playing the game, press the Q key. To pause the game, hold down the Shift key or press the Shift Lock key. To continue playing, release the Shift key or the Shift Lock key.

BALLOON POP

```
0801:0B 0B 0A 00 9E 20 32 30 A4
0809:36 32 00 00 00 A9 64 A0 D0
0811:11 20 1E AB A9 80 8D 91 2C
0819:02 A9 00 8D 20 D0 8D 21 ED
0821:D0 20 A6 08 20 33 09 20 F6
0829:AE 0C AD 01 DC 29 10 F0 F5
0831:0D AD 8D 02 C9 01 D0 06 FE
0839:20 E0 0E 4C 2B 08 20 81 53
0841:0B 20 16 0A AD 27 12 D0 41
0849:06 20 21 0E 4C 5E 08 AE 04
0851:27 12 E0 01 F0 03 20 91 0B
0859:0F CA 8E 27 12 AC 26 12 89
0861:C8 8C 26 12 98 29 03 D0 1F
0869:0F 20 90 09 20 16 0A 20 39
0871:78 0A 20 16 0A 20 36 0A EC
0879:AD C2 11 C9 FF D0 06 20 3F
0881:CF 0C 4C 2B 08 AD C1 11 44
0889:18 6D C0 11 CD 1E 12 90 C5
0891:06 20 42 0D 4C 2B 08 A5 8A
0899:C5 C9 3E D0 8D 20 E0 0E 90
08A1:A9 00 85 C6 60 A9 30 85 33
08A9:34 85 38 AD 0E DC 29 FE 4C
08B1:8D 0E DC A5 01 29 FB 85 2C
08B9:01 A0 00 A9 00 85 FB A9 C4
08C1:D0 85 FC A9 00 85 FD A9 91
08C9:30 85 FE A2 00 A0 00 B1 91
08D1:FB 91 FD C8 D0 F9 18 A5 D4
08D9:FC 69 01 85 FC 18 A5 FE CD
08E1:69 01 85 FE E8 E0 10 D0 43
08E9:E6 A5 01 09 04 85 01 AD 6D
08F1:0E DC 09 01 8D 0E DC 18 E7
08F9:AD 18 D0 29 F0 69 0C 8D 66
0901:18 D0 A2 00 A0 00 8E BA 84
0909:11 E0 DE 10 99 C0 37 C8 F6
0911:E8 98 29 0F D0 F3 AD BA 40
0919:11 18 69 02 8D BA 11 AA 2B
0921:E0 08 D0 E5 A0 00 B9 44 DA
0929:11 99 A0 37 C8 C0 20 D0 0C
0931:F5 60 A2 17 A0 00 18 20 71
0939:0A E5 A9 F4 A0 10 20 1E F1
0941:AB A9 A0 8D E7 07 60 A9 46
0949:01 8D BB 11 A9 32 8D 24 1D
0951:12 8D 22 12 A9 00 8D C3 61
0959:11 8D C4 11 8D BF 11 8D 1C
0961:C2 11 8D 27 12 8D 18 12 46
0969:8D 19 12 8D 1B 12 8D 25 05
0971:12 8D 23 12 20 5E 0F A2 B0
0979:05 20 AF 10 CA D0 FA 60 FC
0981:A0 00 20 74 0F A9 79 91 D2
0989:FB C8 C0 28 D0 F9 60 A5 3B
0991:C5 C9 07 D0 03 20 EE 09 66
0999:A5 C5 C9 02 D0 03 20 01 1D
09A1:0A A5 C5 C9 3C D0 03 20 C2
09A9:56 0B AD 03 DC 8D 1F 12 CC
09B1:29 04 D0 03 20 EE 09 AD 20
09B9:1F 12 29 08 D0 03 20 01 59
09C1:0A AD 1F 12 29 10 D0 03 77
09C9:20 56 0B AD 01 DC 8D 1F 73
09D1:12 29 04 D0 03 20 EE 09 44
09D9:AD 1F 12 29 08 D0 03 20 09
09E1:01 0A AD 1F 12 29 10 D0 C4
09E9:03 20 56 0B 60 AC BC 11 41
09F1:F0 FA 20 25 0A AC BC 11 1F
09F9:88 8C BC 11 20 2D 0A 60 46
0A01:AC BC 11 C0 27 F0 E5 20 B1
0A09:25 0A AC BC 11 C8 8C BC 15
0A11:11 20 2D 0A 60 A0 00 A2 24
0A19:00 20 BA 0A C8 C8 E8 E0 49
```

0A21:14	D0	F6	60	20	1C	0F	A9	91	0C51:12	99	DA	11	60	A9	01	8D	7E	0E81:D4	A9	FF	8D	05	D4	A9	0F	29
0A29:20	91	FB	60	20	1C	0F	AD	74	0C59:1B	12	A0	10	20	49	0F	A9	86	0E89:8D	06	D4	20	50	0F	60	A9	B3
0A31:BE	11	91	FB	60	A0	00	A2	03	0C61:74	A0	11	20	1E	AB	A2	0B	EF	0E91:C8	8D	01	D4	A9	85	8D	04	65
0A39:00	BD	02	12	D0	31	B9	DA	B7	0C69:A0	05	18	20	0A	E5	A9	7C	CF	0E99:D4	A9	0F	8D	05	D4	A9	FF	14
0A41:11	19	DB	11	F0	29	20	28	45	0C71:A0	11	20	1E	AB	A5	C5	C9	4D	0EA1:8D	06	D4	20	50	0F	60	A9	CB
0A49:0F	BD	C6	11	8C	BA	11	A0	50	0C79:40	D0	25	AD	00	DC	C9	7F	EB	0EA9:37	8D	01	D4	A9	13	8D	04	EA
0A51:00	91	FB	A5	FC	C9	07	90	51	0C81:D0	1E	AD	01	DC	C9	FF	D0	2E	0EB1:D4	A9	00	8D	05	D4	A9	F0	3B
0A59:09	A5	FB	C9	70	00	03	4C	8F	0C89:17	20	78	0A	20	16	0A	20	72	0EB9:8D	06	D4	20	50	0F	60	A9	E3
0A61:6D	0A	A0	28	BD	C6	11	18	00	0C91:36	0A	20	E0	0E	A2	04	20	7C	0EC1:58	8D	01	D4	A9	81	8D	04	4D
0A69:69	01	91	FB	AC	BA	11	C8	9F	0C99:91	0F	CA	D0	FA	4C	76	0C	A6	0EC9:D4	A9	09	8D	05	D4	A9	F0	74
0A71:C8	E8	E0	14	D0	C3	60	A0	78	0CA1:20	33	09	20	48	09	20	2A	8A	0ED1:8D	06	D4	A9	0F	8D	18	D4	1F
0A79:00	A2	00	00	02	12	F0	09	55	0CA9:10	20	FC	0C	60	20	5E	0F	81	0ED9:20	91	0F	20	E0	0E	60	A2	F0
0A81:38	E9	01	9D	02	12	4C	B2	C9	0CB1:20	2A	10	A2	00	20	81	09	1D	0EE1:19	A9	00	9D	FF	D3	CA	D0	84
0A89:0A	B9	DA	11	19	DB	11	F0	C8	0CB9:20	EB	0E	A9	68	A0	11	20	41	0EE9:FA	60	A2	07	A0	0E	18	20	ED
0A91:20	BD	C6	11	C9	FE	D0	13	0E	0CC1:1E	AB	A9	01	8D	BF	11	20	C6	0EF1:0A	E5	60	8D	20	12	AD	21	37
0A99:38	B9	DA	11	E9	28	99	DA	A2	0CC9:E0	0B	20	56	0C	60	20	16	B6	0EF9:12	69	00	8D	21	12	20	C0	A4
0AA1:11	B9	DB	11	E9	00	99	DB	97	0CD1:0A	20	EB	0E	A9	9B	A0	11	63	0F01:0E	A2	0A	A0	16	18	20	0A	75
0AA9:11	A9	F6	18	69	02	9D	C6	66	0CD9:20	1E	AB	20	E0	0E	A2	96	1C	0F09:E5	AD	21	12	AE	20	12	20	05
0AB1:11	C8	C8	E8	E0	14	D0	C3	E4	0CE1:20	91	0F	E8	D0	FA	AD	18	C4	0F11:CD	BD	A2	F0	20	91	0F	E8	37
0AB9:60	8C	17	12	8E	16	12	20	36	0CE9:12	0D	19	12	F0	09	20	3E	BC	0F19:D0	FA	60	AE	BB	11	AC	BC	8D
0AC1:28	0F	A0	00	B1	FB	C9	79	4C	0CF1:0F	A0	00	A9	20	91	F0	20	B3	0F21:11	20	74	0F	A0	00	60	B9	CE
0AC9:D0	09	20	0A	0B	20	C0	10	97	0CF9:56	0C	60	20	3E	10	AE	BB	99	0F29:DA	11	85	FB	B9	DB	11	85	4E
0AD1:4C	03	0B	AD	1B	12	F0	0F	1B	0D01:11	E0	05	F0	04	E8	8E	BB	28	0F31:FC	60	B1	FB	C9	F0	90	04	33
0AD9:B1	FB	C9	1B	90	03	4C	E5	BF	0D09:11	A9	14	8D	BC	11	A9	05	F3	0F39:A9	20	91	FB	60	AD	18	12	22
0AE1:0A	20	0A	0B	4C	03	0B	B1	2B	0D11:AC	BF	11	18	69	05	C9	32	3A	0F41:85	FB	AD	19	12	85	FC	60	69
0AE9:FB	C9	F5	F0	04	C9	F4	D0	3E	0D19:F0	03	88	D0	F6	8D	1E	12	C6	0F49:A2	09	18	20	0A	E5	60	A9	52
0AF1:06	20	1B	0B	4C	03	0B	C9	73	0D21:A9	FF	8D	C0	11	8D	C1	11	21	0F51:0F	8D	18	D4	20	91	0F	A9	B9
0AF9:F7	F0	04	C9	F6	D0	03	C0	84	0D29:20	56	10	20	81	10	20	E0	5A	0F59:05	8D	27	12	60	A9	00	AD	
0B01:47	0B	AC	17	12	AE	16	12	0E	0D31:0B	AE	BB	11	CA	20	81	09	E7	0F61:00	99	C6	11	99	DA	11	99	C3
0B09:60	A0	00	20	33	0F	A0	28	B8	0D39:A9	F7	8D	BE	11	20	2D	0A	31	0F69:EE	11	99	02	12	C8	C0	14	DF
0B11:20	33	0F	20	0E	0C	20	0A	83	0D41:60	20	E0	0E	A0	0D	20	49	53	0F71:D0	EF	60	98	85	FB	A9	04	FC
0B19:0D	60	20	48	0E	A9	00	8D	FA	0D49:0F	A9	A6	A0	11	20	1E	AB	25	0F79:85	FC	E0	00	F0	11	18	A5	57
0B21:18	12	8D	19	12	A0	00	A9	C7	0D51:A0	1A	20	49	0F	A9	00	AE	A8	0F81:FB	69	28	85	FB	A5	FC	69	2F
0B29:F5	91	FB	20	91	0F	A9	20	5C	0D59:BF	11	20	CD	BD	A2	0A	A0	A5	0F89:00	85	FC	CA	4C	7B	0F	60	24
0B31:91	FB	20	0A	0B	A9	F7	8D	30	0D61:0F	18	20	0A	E5	A9	B3	A0	8B	0F91:A9	B6	8D	BA	11	69	01	D0	90
0B39:BE	11	20	2D	0A	A9	01	20	E2	0D69:11	20	1E	AB	A9	00	8D	20	1B	0F99:FC	AD	BA	11	18	69	01	8D	FF
0B41:F7	0E	A9	20	56	10	60	20	60	0D71:12	8D	21	12	AD	C0	11	F0	C0	0FA1:BA	11	D0	F1	60	38	A9	0F	E0
0B49:0E	A9	05	20	F7	0F	20	81	31	0D79:16	18	AD	20	12	69	0A	20	C6	0FA9:ED	BA	11	8D	C5	11	A9	27	55
0B51:10	20	0A	0B	60	AD	BE	11	B1	0D81:F4	0E	A9	01	20	F7	0F	20	FD	0FB1:ED	BD	11	0D	C5	11	90	3D	F9
0B59:C9	F6	F0	23	20	90	0E	AE	70	0D89:60	10	AD	C0	11	D0	EA	AD	E8	0FB9:C8	38	A9	E7	ED	BA	11	8D	08
0B61:BB	11	AC	BC	11	20	74	0F	FB	0D91:C1	11	F0	16	18	AD	20	12	1A	0FC1:C5	11	A9	03	ED	BD	11	0D	02
0B69:A5	FB	8D	18	12	A5	FC	8D	33	0D99:69	32	20	F4	0E	A9	05	20	89	0FC9:C5	11	90	29	C8	38	A9	63	91
0B71:19	12	A9	F5	8D	1A	12	A9	CF	0DA1:F7	0F	20	8B	10	AD	C1	11	04	0FD1:ED	BA	11	8D	C5	11	A9	00	56
0B79:F6	8D	BE	11	20	2D	0A	60	81	0DA9:D0	EA	20	2A	10	A9	00	8D	42	0FD9:ED	BD	11	0D	C5	11	90	15	F9
0B81:AD	18	12	0D	19	12	F0	56	D0	0DB1:18	12	8D	19	12	20	FC	0C	B6	0FE1:C8	38	A9	09	ED	BA	11	8D	42
0B89:20	3E	0F	A0	00	AD	1A	12	28	0DB9:60	AC	17	12	B9	DA	11	8D	1C	0FE9:C5	11	A9	00	ED	BD	11	0D	F9
0B91:C9	F4	F0	41	B1	FB	C9	F5	03	0DC1:BA	11	B9	DB	11	8D	BD	11	BD	0FF1:C5	11	90	01	C8	60	18	6D	BE
0B99:F0	02	D0	04	A9	20	91	FB	EF	0DC9:A0	00	A2	00	EC	16	12	F0	5D	0FF9:C3	11	8D	C3	11	AD	C4	11	06
0BA1:18	AD	18	12	69	28	8D	18	72	0DD1:15	38	B9	DA	11	ED	BA	11	30	1001:69	00	8D	C4	11	A2	18	A0	B7
0BA9:12	85	FB	AD	19	12	69	00	68	0DD9:8D	C5	11	B9	DB	11	ED	BD	A6	1009:01	AD	C3	11	8D	BA	11	AD	C5
0BB1:8D	19	12	85	FC	C9	07	00	1D	0DE1:11	0D	C5	11	F0	08	C8	C0	93	1011:C4	11	8D	BD	11	20	A6	0F	CA
0BB9:18	AD	18	12	C9	98	90	11	4E	0DE9:E8	E0	14	D0	DF	60	20	0E	0F	1019:18	20	0A	E5	AD	C4	11	AE	3E
0BC1:A9	00	8D	18	12	8D	19	12	EA	0DF1:0C	4C	BA	0D	38	AD	C3	11	5E	1021:C3	11	20	CD	BD	20	F5	0D	AF
0BC9:A9	F7	8D	BE	11	20	2D	0A	BD	0DF9:ED	22	12	8D	BA	11	AD	C4	E8	1029:60	A0	00	A9	20	99	00	04	A7
0BD1:60	A9	F4	D0	02	A9	F5	8D	5E	0E01:11	ED	23	12	0D	BA	11	90	AC	1031:99	00	05	99	00	06	99	98	3C
0BD9:1A	12	A0	00	91	FB	60	A9	7C	0E09:16	18	AD	22	12	6D	24	12	AE	1039:06	C8	D0	F1	60	AC	BF	11	0E
0BE1:02	18	6D	BF	11	C9	14	90	11	0E11:8D	22	12	AD	23	12	6D	25	FA	1041:C8	8C	BF	11	A2	18	A0	0B	B3
0BE9:02	A9	14	8D	1C	12	A0	00	31	0E19:12	8D	23	12	20	AC	10	60	5B	1049:18	20	0A	E5	A9	00	AE	BF	87
0BF1:A2	00	8C	17	12	0E	16	12	65	0E21:AD	26	12	29	07	D0	19	A9	C9	1051:11	20	CD	BD	60	AC	C0	11	DF
0BF9:20	0E	0C	20	0A	0C	AC	17	A1	0E29:90	8D	01	D4	A9	81	8D	04	D0	1059:C8	8C	C0	11	4C	70	10	AC	1B
0C01:12	AE	16	12	C8	C8	EC	ED	D9	0E31:D4	A9	0F	8D	05	D4	A9	F0	9C	1061:C0	11	88	8C	C0	11	C0	09	D4
0C09:1C	12	D0	E6	60	20	97	E0	CF	0E39:8D	06	D4	A9	09	8D	18	D4	56	1069:D0	05	A9	20	8D	D3	07	A2	D6
0C11:A5	8F	29	1F	69	05	AE	16	C9	0E41:20	91	F0	20	E0</													

PROGRAMS

```

10B1:11 C0 0A F0 09 C8 8C C2 22
10B9:11 A9 FE 99 DC 07 60 AD B7
10C1:1B 12 D0 18 20 A8 0E AC FB
10C9:C2 11 F0 08 A9 20 AC C2 18
10D1:11 99 DC 07 C0 FF F0 04 D8
10D9:88 8C C2 11 60 00 00 00 CD
10E1:00 00 00 3C 66 C3 C3 66 F5
10E9:3C 0C 06 00 00 00 00 00 EB
10F1:00 00 00 12 20 53 43 4F 57
10F9:52 45 3A 20 20 4C 45 56 F0
1101:45 4C 3A 20 20 50 4F 50 53
1109:3A 20 20 48 49 54 3A 20 09
1111:20 45 50 54 52 41 3A 20 11
1119:20 20 20 20 20 92 30 30 35
1121:30 30 30 30 12 20 20 92 54
1129:20 20 20 20 20 20 12 20 2F
1131:20 92 20 20 20 20 12 20 D3
1139:20 92 20 20 20 20 12 20 DB
1141:20 92 00 3C 18 18 18 00 2D
1149:00 00 00 00 00 00 00 3C A7
1151:18 18 18 00 FF FF FF C3 4C
1159:00 00 00 00 FF FF FF FF 7B
1161:18 18 18 8E 1C 93 00 42 F2
1169:41 4C 4C 4F 4F 4E 20 50 02
1171:4F 50 00 54 4F 20 50 4C 7C
1179:41 59 00 50 52 45 53 53 39
1181:20 41 4E 59 20 4B 45 59 75
1189:20 4F 52 20 4D 4F 56 45 75
1191:20 4A 4F 59 53 54 49 43 97
1199:4B 00 1D 47 41 4D 45 20 63
11A1:4F 56 45 52 00 45 4E 44 C4
11A9:20 4F 46 20 4C 45 56 45 E3
11B1:4C 00 42 4F 4E 55 53 3A DF
11B9:00 00 00 00 00 00 00 00 DB
    
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Maurice Yanney used Fast Assembler from the Gazette Power Tools disk to write this program. He lives in Lebanon, Pennsylvania.

SUB ATTACK II

By Tai Bush

If you like underwater arcade-style games, you're going to love Sub Attack II. This fast-paced game for the 64 can accommodate up to eight players. Enemy targets include submarines, airplanes, trawlers, and helicopters, and you can play on any of 40 levels. Scenarios are played in different combinations of clear or murky waters and clear or cloudy skies.

Entering the Game

Sub Attack II is written entirely in machine language, but it loads and runs like a BASIC program. To enter it, you'll need MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following.

Starting address: 0801

Ending address: 1B18

Be sure to save a copy of the program before exiting MLX.

Prepare for Action

From the opening menu, select the level and number of players desired. Press f1 to start the game. You control the black ship in the center of the screen. Use a joystick to move the ship left or right. Press the fire button to fire straight up. Tilt the joystick left or right and press the fire button to fire toward the sides. Pull back on the joystick and press the fire button to drop a depth charge. Each level lasts approximately one minute.

Enemy Forces

You'll face a formidable fleet of enemy forces. Here are some important facts about their weapon systems.

Blue submarines fire torpedoes randomly toward the top of the screen. These torpedoes are deadly if they hit your ship or if your ship plows into a water spout created by their explosions.

Airplanes drop bombs as they pass directly over your ship. They also drop bombs whenever they're hit. If you shoot one down, avoid it as it crashes into the water.

Trawlers travel half the distance across the screen, then turn and leave. They drop mines that explode at random intervals.

Helicopters have unlimited ammunition. They drop bombs above your ship. Be careful whenever they hover—they drop bombs continuously.

Turtles are replicas of the first operational submarine, built in 1776 by David Bushnell and called the *Turtle*. These Turtles are black and white, and they fire yellow missiles that explode when they reach the surface.

Gray submarines fire missiles that enter the atmosphere, turn, and explode when they fall back to the surface.

Jet planes drop parachute bombs.

Scoring

Blue submarines, airplanes, and trawlers earn you 10 points each when hit; all other enemies are worth 20 points each. Levels 1-10 are played in clear waters and are considered easy. Levels 11-20 are played in murky waters

and are moderate. Skies are clear in these levels. Levels 21-30 are played in clear waters and cloudy skies, and levels 31-40 are played in murky waters and cloudy skies. These last 20 levels are difficult.

Press P at any time to pause the game. Press it again to continue.

SUB ATTACK II

```

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 F0 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 E1 85 2D A9 1F 85 10
0839:2E 4C 00 01 14 E0 00 E1 89
0841:1F 8F 19 B9 6E 09 99 E8 37
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 0A 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 FF 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
08B1:03 4C 13 01 E8 20 34 03 FB
08B9:D0 1C A0 03 84 A8 E8 20 36
08C1:34 03 F0 08 A2 08 20 34 F4
08C9:03 4C 5C 01 A2 0C 20 34 C3
08D1:03 E6 A7 4C 5C 01 E8 20 AF
08D9:34 03 D0 0A E8 20 34 03 B2
08E1:18 69 04 A8 D0 D6 E8 20 37
08E9:34 03 D0 0A A2 02 20 34 21
08F1:03 18 69 06 D0 ED A2 08 A2
08F9:20 34 03 D0 E6 A9 00 85 F7
0901:A7 A4 FB F0 0C 06 FA 2A 37
0909:26 A7 C6 FB CA D0 F2 A8 D8
0911:60 48 B1 FE 85 FA A9 08 FE
0919:85 FB 68 A4 FE D0 02 C6 4A
0921:FF C6 FE C0 E7 D0 DE A4 B5
0929:FF C0 07 D0 D8 A9 37 85 BA
0931:01 58 4C 0D 08 A4 A8 F0 49
0939:22 A5 F7 38 E5 A8 B0 03 7E
0941:C6 F8 38 85 F7 A5 FC E5 8A
0949:A8 B0 02 C6 FD 85 FC B1 3A
0951:F7 88 91 FC 98 D0 F8 C4 42
0959:A9 F0 0A B1 F7 C6 FD C6 76
0961:F8 C6 A9 10 EC 60 78 E6 98
0969:01 4C 16 08 60 00 0C 08 75
0971:01 00 9E 32 30 36 31 E3 9B
0979:25 A9 1C 47 09 18 A9 80 EC
0981:8D 8A C9 0F 8D 18 65 51 10
0989:A0 9E 20 23 19 20 07 09 2A
0991:6D 04 84 7E 8D BA 03 20 51
0999:AC 0B 20 7F 0E 20 38 10 32
09A1:20 D5 0C D1 C1 0D 20 C0 1B
09A9:15 20 9F FF 81 1B C4 DB 20
09B1:73 45 50 D0 F9 4C 27 B8 ED
09B9:59 AA F3 78 6D 04 15 44 13
09C1:BD DA 15 05 D4 04 35 C1 3F
    
```

09C9:86	02	A9	F8	99	06	B0	05	AF	0BF9:09	0F	49	0F	F0	0D	5F	F0	DD	0E29:CA	D0	FA	AD	5D	F0	0E	00	E3
09D1:E9	52	01	D4	BD	F8	08	99	56	0C01:AB	80	14	83	FE	2E	1A	20	CE	0E31:1A	06	D0	11	5C	49	BD	37	C1
09D9:00	D4	20	FC	99	42	2E	A6	CD	0C09:6D	0B	A6	FB	A4	FC	60	A2	AB	0F39:09	17	A9	09	20	56	08	4C	1C
09E1:FC	A4	FB	60	94	66	5A	A7	BB	0C11:C4	3F	91	00	05	A9	90	2C	A9	0E41:20	0E	A9	0A	20	8F	08	A9	BF
09E9:65	23	AA	A5	FC	C3	2E	E6	61	0C19:88	A2	2E	5D	03	B0	7A	81	0B	0E49:06	8D	20	D0	88	D0	D1	51	59
09F1:BD	CB	08	32	99	12	63	A2	78	0C21:90	04	9E	0B	0A	1A	04	D0	98	0E51:77	16	04	D4	8D	0B	D4	AE	6D
09F9:00	86	FC	8A	D9	BD	EE	67	01	0C29:F5	88	34	E1	A2	50	28	05	AE	0E59:A2	7F	FE	44	BD	40	10	E0	BA
0A01:21	E0	8D	04	D4	4C	8A	08	C4	0C31:D2	FF	A9	04	C0	10	0A	20	A2	0E61:58	05	99	C3	54	03	20	95	DE
0A09:84	FB	A0	07	4C	B4	08	E5	0E	0C39:9A	9F	98	1E	90	A3	63	64	B9	0E69:0C	F6	69	4C	07	09	60	90	E8
0A11:01	90	50	18	11	21	D0	81	85	0C41:65	66	92	83	DC	49	FF	A8	E4	0E71:4E	45	58	54	29	7E	B2	00	FE
0A19:21	21	81	1C	12	A0	E4	0C	E0	0C49:20	B8	0B	4C	06	0C	18	AF	06	0E79:AD	70	11	F0	04	CE	BB	E0	6D
0A21:64	04	0B	0B	60	A0	03	02	08	0C51:82	04	20	08	28	C9	08	F0	99	0E81:B2	1B	D4	A8	C9	38	B0	10	83
0A29:02	01	17	10	57	1C	21	0C	DB	0C59:25	73	49	36	28	8A	86	18	FD	0E89:4A	4A	4A	0A	0A	0A	18	6D	5D
0A31:19	19	86	0D	12	F4	F6	7	D	0C61:86	A4	10	CE	68	48	C9	FE	CB	0E91:11	BD	AA	BD	65	03	1B	1F	63
0A39:FA	B5	F6	23	31	87	92	1E	34	0C69:D0	F6	AA	01	77	AA	37	74	56	0E99:C0	20	90	1C	C0	28	B0	18	12
0A41:1E	1E	4E	D1	72	C1	4F	BE	CA	0C71:F0	72	8A	E1	C9	40	80	30	8E	0EA1:AD	05	3A	7E	30	07	CF	41	83
0A49:06	09	D9	8D	22	D0	18	A0	DB	0C79:0A	81	EE	46	00	24	F0	DD	89	0EA9:AD	09	D0	C9	9A	BC	5D	86	9E
0A51:10	A2	C1	65	E1	F1	00	19	94	0C81:AA	9E	C2	29	61	68	10	1A	68	0EB1:FB	41	09	AE	15	54	4B	29	E1
0A59:81	AD	1E	D0	AD	1F	B6	3F	19	0C89:58	20	8C	B0	23	38	0B	EC	6F	0EB9:02	05	09	00	92	B0	08	D0	71
0A61:4C	CA	2E	A4	6C	2B	09	00	80	0C91:8D	C6	AD	B8	10	02	C6	72	EB	0EC1:05	A2	01	4C	E4	0E	8A	29	8B
0A69:01	02	03	44	05	08	07	1F	94	0C99:C3	0A	0D	95	04	C0	3A	30	D8	0EC9:C7	13	BE	A2	02	2C	26	E4	82
0A71:70	6C	61	79	65	72	AB	3F	28	0CA1:08	E0	A0	D8	10	09	9D	98	10	0ED1:B4	61	0C	B4	03	9D	B7	03	6E
0A79:11	11	D0	40	46	9D	9D	9D	F9	0CA9:0C	0A	0C	F0	10	C9	04	95	20	0ED9:AE	18	8D	BB	03	8A	A6	FB	C9
0A81:67	65	74	A0	A0	72	65	61	36	0CB1:D8	66	91	10	8D	AA	A8	60	C3	0EE1:DE	65	03	AA	AA	57	0D	86	25
0A89:64	79	00	80	73	69	21	3C	F5	0CB9:98	29	0C	DA	F0	06	A8	45	CD	0EE9:CE	AD	0E	02	9A	8D	1C	3C	0A
0A91:71	8D	A7	05	A9	5B	99	A4	99	0CC1:8D	01	60	93	C7	20	1C	8D	AA	0EF1:0E	0A	AA	B9	B4	58	04	20	B7
0A99:A0	90	82	13	39	A4	07	A9	B7	0CC9:77	30	2C	3D	08	94	62	43	9D	0EF9:43	EC	12	05	D0	8A	4A	AA	75
0AA1:AC	8D	00	B3	99	8D	01	D0	80	0CD1:AD	74	28	19	0E	99	C8	E7	C4	0F01:98	0A	FF	C8	38	E9	0A	B0	42
0AA9:A0	01	8C	15	D0	88	8C	01	F3	0CD9:59	01	81	EE	66	60	40	04	37	0F09:FA	B9	91	21	DD	FA	07	B9	F9
0AB1:79	5E	1B	8D	11	D0	B9	9D	33	0CE1:CE	1A	01	AD	03	1A	6B	D0	0B	0F11:2A	02	07	20	F8	34	22	10	94
0AB9:09	0F	35	8C	73	9C	E5	91	2D	0CE9:23	D5	C4	10	29	70	A2	14	07	0F19:D0	98	4A	A8	B9	AD	0F	9D	D9
0AC1:09	93	90	11	71	15	36	26	D4	0CF1:89	18	63	30	28	40	20	30	F6	0F21:29	3A	8E	00	42	A0	51	04	6F
0AC9:46	C3	61	43	61	83	78	34	90	0CF9:64	04	14	43	32	38	E9	AA	EC	0F29:04	44	91	03	1D	4C	43	9F	6C
0AD1:16	8A	84	42	FA	E1	05	20	D1	0D01:8C	8C	6B	21	08	49	E4	01	34	0F31:3C	0D	F0	B1	B1	2A	44	B9	62
0AD9:20	90	00	00	36	15	0D	4A	2E	0D09:46	8B	65	30	EB	5E	31	0A	FD	0F39:A6	0F	F0	1B	AC	06	3F	A9	E3
0AE1:20	E2	0A	1D	D1	A8	8C	AA	C6	0D11:18	69	02	8D	02	D0	90	EE	0E	0F41:C9	1E	B0	11	C9	0A	90	04	8E
0AE9:27	8C	42	18	E8	C8	CA	AC	2B	0D19:4C	B8	0C	90	3F	10	01	A2	F0	0F49:C9	14	1E	FF	87	B6	20	16	82
0AF1:13	DA	3A	A4	E6	40	04	A0	F8	0D21:01	60	A0	DC	0C	18	6D	F8	A4	0F51:00	1B	D0	60	6F	63	D6	E0	AF
0AF9:30	4C	E9	09	8C	41	04	0E	86	0D29:1E	56	08	A9	08	79	05	EE	A2	0F59:E1	DB	DB	E4	E5	E7	E9	C2	8E
0B01:39	5D	81	2F	31	8D	4A	04	86	0D31:8C	AD	01	00	85	29	D0	E4	74	0F61:C7	41	B9	41	C6	61	21	50	0D
0B09:64	58	A8	C0	1E	B0	37	C0	2C	0D39:55	05	16	DE	3E	02	00	96	80	0F69:14	01	D0	04	07	01	07	05	03
0B11:14	B0	0E	A9	C7	5B	8A	9D	18	0D41:FF	D0	1E	97	7F	E1	E5	0D	29	0F71:0B	36	FC	23	C6	57	6F	87	6E
0B19:08	05	E8	BC	C0	0A	B0	25	12	0D49:95	3F	18	4F	48	95	EC	88	F0	0F79:9F	B7	CF	E7	FF	87	1F	D4	FE
0B21:A2	C7	A9	9A	13	8E	E7	66	62	0D51:37	FB	A2	09	A4	BE	44	23	B6	0F81:71	50	47	01	01	00	05	57	CE
0B29:38	02	45	49	1C	34	E6	07	9F	0D59:C9	33	9F	40	9C	AD	CA	F0	3F	0F89:57	B4	B4	D0	D0	C2	C2	DE	1A
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PROGRAMS

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1701:AD 41 C9 28 D0 0D A9 00 20
1709:8D 00 9E 09 14 C5 03 44 64
1711:EE 34 02 AD B2 C9 3A D0 E0
1719:87 EE 49 06 A9 30 8D 4A C3
1721:06 4C CA 19 00 3D 11 11 78
1729:11 9A 53 40 4D 20 41 54 B6
1731:AC 43 4B 20 49 49 45 1F 0B
1739:50 59 52 49 47 48 54 32 FA
1741:38 39 39 32 8B 39 43 4F 3B
1749:4D 18 54 45 01 59 55 42 5D
1751:4C 2E 00 11 B0 31 82 28 B9
1759:53 54 41 52 54 A8 43 33 92
1761:E3 50 4C 41 59 45 52 53 0B
1769:20 20 DC 21 35 C7 4C 45 04
1771:56 45 4C 20 20 30 31 00 CB
1779:3C 46 37 3E 20 51 55 49 5C
1781:54 A9 09 8D C1 BB CE 80 59
1789:14 20 C5 1A AD 60 D0 F5 AA
1791:60 AC 5C 03 B9 54 03 AA A6
1799:BD C9 81 F2 02 65 03 BD E1
17A1:F1 1E 99 6D 03 98 E2 04 9E
17A9:08 A8 8A 18 69 28 AA 90 AA
17B1:EE 60 27 30 AC 30 EC 30 84
17B9:2C 31 6C 31 77 31 AC 31 F5
17C1:B8 31 EA 31 2A 32 6A 32 2A
17C9:AA 32 B6 32 EA 32 F6 32 14
17D1:3A 33 7A 33 B7 33 F4 33 14
17D9:2E 34 74 34 B7 34 E5 34 8C
17E1:0D 35 4F 35 A4 35 CC 35 E9
17E9:11 36 76 36 B7 36 EB 36 05
17F1:2E 37 71 37 DC 37 24 38 EA
17F9:64 38 A4 38 F7 38 1A 39 8E
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1811:53 3B 9B 3B DB 3B DC 78 DE
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1821:D0 20 D0 08 3C 10 86 7E 0A
1829:61 7F FF FE 3F FF FC EF 0D
1831:13 19 10 C5 44 40 53 55 AE
1839:AA 96 41 AA A8 50 4F DC 39
1841:81 06 05 11 22 12 DD C4 3F
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1851:88 59 0A 19 EF 81 40 08 FC
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1861:C2 03 B1 28 9E AA 55 2A A0
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18A9:07 30 EE A6 B0 E6 B0 90 C4
18B1:33 F8 03 17 AF 8C 8E 0B 63
18B9:8F 88 62 21 A3 FA B9 80 2F
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18C9:60 A5 47 25 40 28 40 63 55
18D1:AE 78 04 3D 06 1D 08 00 80
18D9:5F 0A 40 12 81 45 F8 A5 1E
18E1:A0 10 B9 54 20 65 50 29 43
18E9:33 05 55 30 15 56 C0 15 3B
18F1:53 B5 70 01 4C 59 03 04 29
18F9:1C 8A 00 14 03 0C D0 0E 14
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1909:20 C0 C1 78 41 4C 91 52 EB
1911:74 54 78 2C 64 14 6E AF 64

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1939:55 5A 00 15 6E 56 39 59 96
1941:08 21 25 68 0C 55 50 03 44
1949:95 B1 C5 80 84 31 88 40 AD
1951:B1 5C BC 8C 37 02 3E 00 12
1959:01 8C DD 63 2C F9 20 04 AE
1961:63 D2 90 64 A3 B0 71 B0 C5
1969:61 56 9C 16 01 60 0C 05 7D
1971:19 02 45 05 24 01 4C F0 58
1979:0A 90 3A AA 94 F0 02 95 C8
1981:5C 9C A8 44 32 00 0F FC 0F
1989:DD C6 30 A0 03 16 06 A0 89
1991:0F 16 AA AC 56 80 0F 2A ED
1999:8C FF 3F F0 6F 29 C2 00 AE
19A1:02 0B 19 16 02 85 05 80 CC
19A9:40 0A C9 0C C0 00 30 30 0F
19B1:82 6A D7 DD 20 25 E0 20 10
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19C1:30 20 20 1C A3 A8 54 DD 20
19C9:A0 82 0B E6 7B 08 C0 2A 64
19D1:2F 0A 08 0C 2A 1B 07 55 01
19D9:15 55 55 DD 42 B8 60 7E A8
19E1:27 B6 20 42 10 89 00 7B 9F
19E9:24 40 44 22 DD 40 2E 01 36
19F1:50 A9 54 00 40 1A A9 D0 CF
19F9:12 A8 6A 55 A0 B0 93 02 F2
1A01:10 46 20 36 1A 15 01 08 65
1A09:A2 8E 54 28 2E 74 15 00 AC
1A11:6A A4 AA AA A9 0A 55 A9 6D
1A19:8C 0B 10 04 00 04 DD A8 0D
1A21:45 1D 05 71 08 38 34 4C CC
1A29:85 C5 10 3C 0B FE 00 01 AC
1A31:96 03 01 80 01 01 A3 02 EE
1A39:82 22 50 10 7C 48 43 06 D3
1A41:44 1C 07 DD 39 05 07 4D 96
1A49:08 08 14 50 03 DD 55 46 8B
1A51:86 7F 3F 77 90 3C 7E 35 AF
1A59:02 39 10 61 FE FC 99 07 1B
1A61:19 02 50 00 1C C5 40 51 76
1A69:08 00 41 03 19 01 CC 33 93
1A71:34 90 11 FF FF DD 80 80 FE
1A79:A0 0C 80 DD C0 C1 DD 1B D2
1A81:DD 01 DD 06 06 C8 41 03 D9
1A89:72 12 DF 28 68 A0 08 00 CF
1A91:84 14 C6 03 10 0F 04 21 FB
1A99:23 AB 40 C8 48 C8 08 14 68
1AA1:10 D6 38 4E 20 25 19 47 8E
1AA9:A3 40 D9 40 DA 05 B1 28 75
1AB1:10 0A 93 05 26 B3 88 80 C4
1AB9:A2 28 7A 28 37 F0 EA 08 76
1AC1:DC 40 C8 B8 83 CF E2 11 4B
1AC9:84 EE 88 88 A3 64 C3 03 CE
1AD1:61 63 63 43 2A E3 A9 98 FC
1AD9:98 03 A1 28 AB 03 A1 98 17
1AE1:98 43 A0 48 88 05 05 2B 59
1AE9:0F 4E E6 30 0F 90 91 0A 79
1AF1:8F 89 0D 04 EB 00 90 84 1F
1AF9:8C 87 0F 0F AC 89 3B 0A 35
1B01:20 61 14 0A 0A 19 33 61 3F
1B09:8E 83 05 46 A0 00 00 00 71
1B11:0A 00 0F 05 E0 00 00 00 85

```

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TAG IT

By Farid Ahmad

While working on a specific area of a program, you may find it necessary to list the same lines repeatedly. You must either hunt through the entire listing until you find the lines you need or remember and enter the proper numbers each time.

There's an easier way. Tag It is a handy, relocatable utility that makes it possible to list different parts of a BASIC program with a single keystroke. With Tag It you can mark different parts of a listing with different tags and list them easily.

Tag It offers other features as well. These include definable function keys, editing keys, and an escape key to cancel quote or insert mode.

Entering the Program

Tag It is written in machine language. To enter it, you'll need MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following.

Starting address: 0801
Ending address: 1330

Be sure to save a copy of the program before exiting MLX.

Using the Program

When you load and run Tag It, it'll install and activate a machine language routine. Tag It will display the memory area where it has put the routine and then ask if you want to create an object file. For now, answer no. Any response other than Y is taken as a no.

Now hold down the Commodore key and press any of the following keys: Z, P, R, A, S, D, or F. Each combination lists a different portion of the program. You can quickly move the cursor for editing by using other combinations with the Commodore key.

Press Commodore-< to move the cursor to the beginning of a line. Press Commodore-> to move the cursor to the end of a line. Press Commodore-? to move to the middle of a line. Commodore-Crsr Down moves the cursor to the bottom left corner of the screen.

Enter the quote or insert mode. Press the Ctrl key to confirm that you're in this mode. To escape from the

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quote mode, press the Ctrl key and Commodore key simultaneously.

Tags

A tag consists of a REM statement and a letter of the alphabet. You saw a demonstration of a tag if you pressed the Commodore key and one of the letters listed above. For an example, list line 10. If you have entered the line correctly, you should see REM-A. The letter is the tag identifier. You can use any letter of the alphabet as an identifier. Now hold down the Commodore key and press A. You'll notice that the program lists from line 10 onward. Suppose you want to list your program from line 600 onward. Add the following line to your program.

599 REM-T

By using different letters for different lines, you can create up to 26 tags. Note that there's no space between REM, the minus sign, and the letter. This is important.

Tips and Caveats

Most programs are written with many subroutines, each with a specific job. You can use descriptive tags to list them. If a subroutine starting at line 1000 produces a display, you might add 999 REM-DISPLAY to your program. Commodore-D will list this subroutine. Note, however, that Tag It uses only the first letter in the word for identification.

For another example, if in the same program you added 2000 REM-DRAW TITLE, Commodore-D would still list the program from line 999 onward. This is because Tag It reads only REM-D in both of the above lines; and since line 999 is found first, the listing starts from there. In general, whenever the same letter is used in two or more tags, the listing starts from the first occurrence of that tag. If you press Commodore-D with Tag It on the screen, you'll see the program list Data statements that begin with line 480.

Normally, when you press the Commodore key along with a letter key, a graphic character is displayed. These characters are generally typed within print statements. Tag It checks for the quote and insert modes. If either of

these is active, the normal graphic character is displayed. If a tag isn't found in the listing, nothing happens.

Tag It will be disabled when you press Run/Stop-Restore. Reactivate it with SYS and the starting address.

Function Keys

Now, hold down the Commodore key and press any of the function keys. The default function key definitions will be displayed. These can be altered.

List the program to see the default function key definitions in lines 220-250, or press Commodore-F if Tag It is active. You can change these definitions at will. However, the total length of the text of the four function keys (including carriage returns, if used) must not exceed 250 characters. A warning is given if this happens.

Relocation

The BASIC loader puts Tag It at location 49152. This can be changed easily by assigning a new address to variable SA in line 30. The amount of memory used will depend upon the length of the function key definitions.

If you answer yes when the program asks if you want to create an object file, you'll be asked for a filename. After that, a machine language file of Tag It is saved on disk. You can install Tag It from the object file by using the following commands.

LOAD"TAG IT",8,1

NEW

SYS starting address

Before saving the object file, you may want to change the function key definitions to your liking.

If you plan to use Tag It from the BASIC loader, add the following line to it: 395 NEW. When you run this new version of Tag It, you'll not be asked if you want to create an object file. The program will then execute the NEW command after it installs the machine language in memory.

Compatibility

Tag It is compatible with BASSEM and MetaBASIC. If you use Tag It with MetaBASIC, the 8 function keys provided by MetaBASIC will still be active, giving you a total of 12 function keys.

TAG IT

```

0801:09 08 0A 00 8F 2D 5A 00 BE
0809:3F 08 14 00 97 35 33 32 67
0811:38 30 2C 30 3A 97 35 33 9F
0819:32 38 31 2C 30 3A 97 36 09
0821:34 36 2C 33 3A 99 22 93 A1
0829:54 41 47 20 49 54 20 12 8C
0831:57 4F 52 4B 49 4E 47 2E FF
0839:2E 2E 2E 2E 22 00 4C 08 46
0841:1E 00 53 41 B2 34 39 31 E8
0849:35 32 00 5A 08 28 00 45 4C
0851:41 B2 53 41 AA 33 37 35 F2
0859:00 6B 08 32 00 8F 2D 50 51
0861:4F 4B 45 20 49 54 20 49 BB
0869:4E 00 8B 08 3C 00 81 49 C0
0871:B2 53 41 A4 45 41 3A 87 4D
0879:20 44 3A 43 4B B2 43 4B 1D
0881:AA 44 3A 97 49 2C 44 3A 76
0889:82 00 B8 08 46 00 8B 43 FE
0891:4B B3 B1 34 36 31 33 39 C3
0899:A7 99 22 45 52 52 4F 52 49
08A1:20 49 4E 20 44 41 54 41 F0
08A9:20 53 54 53 54 45 4D 45 F5
08B1:4E 54 53 22 3A 80 00 C7 26
08B9:08 50 00 8F 2D 52 45 4C 64
08C1:4F 43 41 54 45 00 D5 08 95
08C9:5A 00 46 4B B2 53 41 AA 94
08D1:33 37 36 00 FD 08 64 00 E8
08D9:48 31 B2 B5 28 28 53 41 D5
08E1:AA 31 33 29 AD 32 35 36 63
08E9:29 3A 4C 31 B2 28 53 41 D7
08F1:AA 31 33 29 AB 48 31 AC 2A
08F9:32 35 36 00 27 09 6E 00 71
0901:48 32 B2 B5 28 28 53 41 3F
0909:AA 33 34 31 29 AD 32 35 70
0911:36 29 3A 4C 32 B2 28 53 94
0919:41 AA 33 34 31 29 AB 48 ED
0921:32 AC 32 35 36 00 51 09 6E
0929:78 00 48 33 B2 B5 28 28 98
0931:53 41 AA 33 34 32 29 AD 30
0939:32 35 36 29 3A 4C 33 B2 27
0941:28 53 41 AA 33 34 32 29 07
0949:AB 48 33 AC 32 35 36 00 47
0951:7B 09 82 00 48 34 B2 B5 E1
0959:28 28 53 41 AA 33 37 36 CE
0961:29 AD 32 35 36 29 3A 4C 24
0969:34 B2 28 53 41 AA 33 37 CE
0971:36 29 AB 48 34 AC 32 35 D0
0979:36 00 93 09 8C 00 97 53 90
0981:41 AA 30 32 2C 4C 31 3A 37
0989:97 53 41 AA 30 37 2C 48 0E
0991:31 00 AB 09 96 00 97 53 79
0999:41 AA 35 36 2C 4C 32 3A 32
09A1:97 53 41 AA 35 37 2C 48 4E
09A9:32 00 C3 09 A0 00 97 53 65
09B1:41 AA 36 31 2C 4C 32 3A 1A
09B9:97 53 41 AA 36 32 2C 48 5A
09C1:32 00 DB 09 AA 00 97 53 D0
09C9:41 AA 36 36 2C 4C 33 3A 84
09D1:97 53 41 AA 36 37 2C 48 86
09D9:33 00 F3 09 B4 00 97 53 BC
09E1:41 AA 39 36 2C 4C 34 3A FE
09E9:97 53 41 AA 39 37 2C 48 B6
09F1:34 00 0D 0A BE 00 97 53 D8
09F9:41 AA 31 30 37 2C 4C 34 B7
0A01:3A 97 53 41 AA 31 30 38 49
0A09:2C 48 34 00 13 0A C8 00 1E
0A11:3A 00 21 0A D2 00 8F 2D E9
0A19:46 4E 20 4B 45 59 53 00 D2
    
```

0A21:56	0A	DC	00	46	24	28	31	C2	0C51:01	9E	35	37	38	31	32	46	DC	0E81:1C	02	83	20	20	32	34	35	06
0A29:29	20	B2	22	50	4F	4B	45	ED	0C59:24	2C	38	3A	97	31	37	33	5C	0E89:2C	32	33	32	2C	31	38	39	A1
0A31:35	33	32	38	30	2C	31	3A	45	0C61:2C	53	41	AD	32	35	36	3A	74	0E91:2C	31	31	38	2C	31	39	33	85
0A39:50	4F	4B	45	35	33	32	38	1A	0C69:97	31	37	32	2C	53	41	AB	80	0E99:2C	32	30	31	2C	30	30	30	24
0A41:31	2C	32	3A	50	4F	4B	45	7E	0C71:C2	28	31	37	33	29	AC	32	58	0EA1:2C	32	34	30	2C	30	32	30	A0
0A49:36	34	36	2C	33	22	AA	C7	4E	0C79:35	36	3A	97	37	38	30	2C	A1	0EA9:2C	32	30	31	2C	30	31	33	39
0A51:28	31	33	29	00	72	0A	E6	83	0C81:31	37	32	00	AF	0C	CC	01	8E	0EB1:2C	32	34	30	2C	30	30	37	B3
0A59:00	46	24	28	32	29	20	B2	2F	0C89:97	37	38	32	2C	45	41	AD	0C	0EB9:2C	30	33	32	2C	32	30	32	3E
0A61:22	46	55	4E	43	54	49	4F	F4	0C91:32	35	36	3A	97	37	38	31	B5	0EC1:2C	32	34	31	2C	32	33	32	DC
0A69:4E	20	4B	45	59	20	32	22	3C	0C99:2C	45	41	AB	C2	28	37	38	59	0EC9:00	15	0F	26	02	83	20	20	ED
0A71:00	8B	0A	F0	00	46	24	28	42	0CA1:32	29	AC	32	35	36	3A	9E	6B	0ED1:30	35	36	2C	31	37	36	2C	DB
0A79:33	29	20	B2	22	4C	49	53	C8	0CA9:36	35	34	39	36	00	BA	0C	77	0ED9:32	33	38	2C	31	36	39	2C	A6
0A81:54	3A	22	AA	C7	28	31	33	B1	0CB1:D6	01	8F	2D	44	41	54	41	4B	0EE1:30	31	33	2C	31	34	31	2C	74
0A89:29	00	A3	0A	FA	00	46	24	CF	0CB9:00	08	0D	B0	01	83	31	32	2E	0EE9:31	31	39	2C	30	30	32	2C	A7
0A91:28	34	29	20	B2	22	52	55	06	0CC1:30	2C	31	36	39	2C	30	31	92	0EF1:31	36	39	2C	30	30	31	2C	EE
0A99:4E	3A	22	AA	C7	28	31	33	C6	0CC9:31	2C	31	34	31	2C	31	34	BF	0EF9:31	33	33	2C	31	39	38	2C	AF
0AA1:29	00	A9	0A	04	01	99	00	77	0CD1:33	2C	30	30	32	2C	31	36	72	0F01:30	37	36	2C	30	37	32	2C	7D
0AA9:CC	0A	0E	01	81	20	52	B2	5C	0CD9:39	2C	31	39	32	2C	31	34	2C	0F09:32	33	35	2C	31	39	32	2C	75
0AB1:31	20	A4	20	34	20	3A	8B	1F	0CE1:31	2C	31	34	34	2C	32	2C	E9	0F11:30	30	38	00	60	0F	30	02	FB
0AB9:46	24	28	52	29	B2	22	22	9E	0CE9:38	38	2C	30	39	36	2C	31	E0	0F19:83	20	20	31	37	36	2C	30	33
0AC1:A7	46	24	28	52	29	B2	22	01	0CF1:37	33	2C	31	34	31	2C	30	F9	0F21:38	39	2C	31	33	32	2C	30	2D
0AC9:20	22	00	D2	0A	18	01	82	D8	0CF9:30	32	2C	32	30	31	2C	30	2E	0F29:30	32	2C	31	36	35	2C	32	95
0AD1:00	0D	0B	22	01	81	20	52	4D	0D01:30	32	2C	32	34	30	00	53	1E	0F31:30	37	2C	32	34	30	2C	30	C8
0AD9:82	31	A4	34	3A	4C	B2	4C	20	0D09:0D	EA	01	83	20	20	30	31	CF	0F39:31	32	2C	31	36	35	2C	32	26
0AEL:AA	C3	28	46	24	28	52	29	35	0D11:33	2C	32	30	31	2C	30	30	E3	0F41:30	36	2C	31	37	34	2C	31	B1
0AE9:29	3A	82	3A	20	20	20	8B	62	0D19:36	2C	32	30	38	2C	30	30	A5	0F49:33	35	2C	30	30	32	2C	31	AA
0AF1:4C	B1	32	35	30	A7	99	22	A7	0D21:36	2C	31	36	39	2C	30	30	F5	0F51:36	30	2C	30	30	30	2C	31	EA
0AF9:46	4E	20	4B	45	59	53	20	D3	0D29:30	2C	31	33	33	2C	32	31	9F	0F59:33	32	2C	32	30	37	00	AB	50
0B01:54	4F	4F	20	4C	4F	4E	47	84	0D31:32	2C	31	33	33	2C	32	31	A8	0F61:0F	3A	02	83	20	20	30	33	23
0B09:22	3A	80	00	1F	0B	2C	01	4D	0D39:36	2C	30	37	36	2C	30	37	EC	0F69:32	2C	30	31	39	2C	32	33	D6
0B11:54	54	B2	AB	31	3A	81	20	0D	0D41:32	2C	32	33	35	2C	31	36	EB	0F71:34	2C	31	36	35	2C	32	31	2E
0B19:52	B2	31	A4	34	00	31	0B	84	0D49:35	2C	32	31	32	2C	32	30	39	0F79:31	2C	31	33	33	2C	32	35	78
0B21:36	01	81	49	B2	31	A4	C3	BE	0D51:38	00	9E	0D	F4	01	83	20	FE	0F81:31	2C	31	36	39	2C	30	30	D7
0B29:28	46	24	28	52	29	29	00	75	0D59:20	32	34	39	2C	31	36	35	F1	0F89:30	2C	31	33	33	2C	32	31	04
0B31:58	0B	40	01	54	24	B2	CA	B1	0D61:2C	32	31	36	2C	32	30	38	6A	0F91:32	2C	31	33	33	2C	32	31	0D
0B39:28	46	24	28	52	29	2C	49	D4	0D69:2C	32	34	35	2C	31	36	35	C7	0F99:36	2C	31	33	33	2C	31	39	1D
0B41:29	3A	54	54	B2	54	54	AA	84	0D71:2C	31	35	37	2C	32	34	30	CA	0FA1:39	2C	31	33	33	2C	32	31	A0
0B49:31	3A	97	46	4B	AA	54	54	DF	0D79:2C	32	34	31	2C	31	36	35	97	0FA9:31	00	F6	0F	44	02	83	20	81
0B51:2C	C6	28	54	24	29	00	5F	9E	0D81:2C	32	30	33	2C	31	33	33	37	0FB1:20	31	36	34	2C	30	30	32	EA
0B59:0B	4A	01	82	49	00	74	0B	0E	0D89:2C	30	30	32	2C	31	36	39	BA	0FB9:2C	31	39	32	2C	30	30	34	3B
0B61:54	01	54	54	B2	54	54	AA	EB	0D91:2C	30	36	34	2C	31	33	33	97	0FC1:2C	32	30	38	2C	30	30	33	C1
0B69:31	3A	97	46	4B	AA	54	54	FF	0D99:2C	32	30	33	00	E9	0D	FE	50	0FC9:2C	30	35	36	2C	31	37	36	DE
0B71:2C	30	00	7B	0B	5E	01	82	B7	0DA1:01	83	20	20	31	36	35	2C	1C	0FD1:2C	30	33	32	2C	31	39	32	66
0B79:52	00	89	0B	68	01	45	41	AD	0DA9:30	30	32	2C	32	30	35	2C	D9	0FD9:2C	30	30	35	2C	32	30	38	36
0B81:B2	45	41	AA	4C	AA	35	00	8C	0DB1:30	38	33	2C	31	39	33	2C	1C	0FE1:2C	30	30	37	2C	31	36	39	67
0B89:98	0B	72	01	8F	2D	41	43	04	0DB9:32	34	30	2C	32	32	36	2C	B5	0FE9:2C	30	33	39	2C	31	33	33	E3
0B91:54	49	56	41	54	45	00	A0	5B	0DC1:31	34	31	2C	30	38	33	2C	5F	0FF1:2C	32	31	31	00	41	10	4E	5F
0B99:0B	7C	01	9E	53	41	00	BE	BC	0DC9:31	39	33	2C	31	36	30	2C	E2	0FF9:02	83	20	20	30	35	36	2C	EE
0BA1:0B	86	01	99	22	13	1D	1D	4D	0DD1:30	30	30	2C	31	38	35	2C	D9	1001:31	37	36	2C	30	32	31	2C	E9
0BA9:1D	1D	1D	1D	12	41	43	02		0DD9:30	38	34	2C	31	39	33	2C	64	1009:31	39	32	2C	30	30	36	2C	F3
0BB1:54	49	56	41	54	45	44	20	83	0DE1:31	39	37	2C	30	30	32	00	33	1011:32	30	38	2C	30	30	37	2C	FC
0BB9:20	20	20	22	00	E1	0B	90	3C	0DE9:34	0E	08	02	83	20	20	32	D1	1019:31	36	39	2C	30	31	39	2C	2E
0BC1:01	99	3A	20	99	22	4C	4F	45	0DF1:34	30	2C	30	31	32	2C	32	97	1021:31	33	33	2C	32	31	31	2C	B4
0BC9:43	41	54	45	44	20	41	54	2A	0DF9:30	30	2C	31	39	32	2C	30	EB	1029:30	35	36	2C	31	37	36	2C	37
0BD1:20	3A	22	3B	53	41	3B	22	B6	0E01:33	34	2C	32	30	38	2C	32	59	1031:30	31	30	2C	31	36	39	2C	7F
0BD9:20	2D	20	22	3B	45	41	00	E2	0E09:34	34	2C	31	36	35	2C	30	F3	1039:30	32	34	2C	31	33	33	00	04
0BE1:15	0C	9A	01	99	3A	99	22	F3	0E11:30	32	2C	31	33	33	2C	32	5B	1041:8C	10	58	02	83	20	20	32	E5
0BE9:53	41	56	45	20	4F	42	4A	26	0E19:30	33	2C	30	37	36	2C	30	BD	1049:31	34	2C	30	33	32	2C	31	83
0BF1:45	43	54	20	46	49	4C	45	3D	0E21:37	32	2C	32	33	35	2C	31	06	1051:30	38	2C	32	32	39	2C	30	3F
0BF9:20	28	59	2F	4E	29	20	3F	DE	0E29:39	32	2C	30	30	34	2C	31	D2	1059:37	36	2C	30	37	32	2C	32	38
0C01:22	3A	97																								

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10B1:34 2C 31 30 35 2C 30 35 10
 10B9:37 2C 31 33 33 2C 32 35 BD
 10C1:33 2C 31 36 35 2C 30 34 FE
 10C9:33 2C 31 33 33 2C 30 30 C2
 10D1:32 2C 31 36 35 00 22 11 9E
 10D9:6C 02 83 20 20 30 34 34 81
 10E1:2C 31 33 33 2C 30 30 33 B3
 10E9:2C 31 36 30 2C 30 30 30 E8
 10F1:2C 31 37 37 2C 30 30 32 83
 10F9:2C 31 33 33 2C 30 30 34 CC
 1101:2C 32 30 30 2C 31 37 37 9A
 1109:2C 30 30 32 2C 31 33 33 36
 1111:2C 30 30 35 2C 32 30 30 69
 1119:2C 31 37 37 2C 30 30 32 AC
 1121:00 6D 11 76 02 83 20 20 A6
 1129:31 33 33 2C 32 35 31 2C CE
 1131:32 30 30 2C 31 37 37 2C 42
 1139:30 30 32 2C 31 33 33 2C 71
 1141:32 35 32 2C 32 30 30 2C B1
 1149:31 37 37 2C 30 30 32 2C 4E
 1151:32 30 31 2C 31 34 33 2C 6E
 1159:32 30 38 2C 30 35 36 2C 59
 1161:32 30 30 2C 31 37 37 2C 72
 1169:30 30 32 00 B8 11 80 02 03
 1171:83 20 20 32 30 31 2C 30 53
 1179:34 35 2C 32 30 38 2C 30 96
 1181:34 39 2C 32 30 30 2C 31 80
 1189:37 37 2C 30 30 32 2C 31 71
 1191:39 37 2C 32 35 33 2C 32 C7
 1199:30 38 2C 30 34 32 2C 31 5E
 11A1:36 39 2C 31 34 31 2C 30 B4
 11A9:33 32 2C 32 30 32 2C 32 6F
 11B1:34 31 2C 31 36 39 00 03 6C
 11B9:12 8A 02 83 20 20 30 37 19
 11C1:36 2C 30 33 32 2C 32 30 1A
 11C9:32 2C 32 34 31 2C 31 36 6C
 11D1:39 2C 32 30 31 2C 30 33 B2
 11D9:32 2C 32 30 32 2C 32 34 44
 11E1:31 2C 31 36 36 2C 32 35 2D
 11E9:31 2C 31 36 35 2C 32 35 2D
 11F1:32 2C 30 33 32 2C 32 30 48
 11F9:35 2C 31 38 39 2C 31 36 7E
 1201:39 00 4E 12 94 02 83 20 80
 1209:20 30 34 35 2C 30 33 32 DD
 1211:2C 32 30 32 2C 32 34 31 C4
 1219:2C 31 36 39 2C 30 35 38 E
 1221:2C 30 33 32 2C 32 30 32 AD
 1229:2C 32 34 31 2C 31 36 39 55
 1231:2C 30 31 33 2C 31 34 31 90
 1239:2C 31 31 39 2C 30 30 32 2E
 1241:2C 31 36 39 2C 30 30 31 D5
 1249:2C 31 33 33 00 99 12 9E 92
 1251:02 83 20 20 31 39 38 2C 68
 1259:30 39 36 2C 31 36 35 2C 66
 1261:30 30 34 2C 31 33 33 2C DB
 1269:30 30 32 2C 31 36 35 2C B3
 1271:30 30 35 2C 32 34 30 2C 12
 1279:30 30 35 2C 31 33 33 2C 14
 1281:30 30 33 2C 30 35 36 2C E1
 1289:31 37 36 2C 31 35 39 2C 9A
 1291:30 39 36 2C 30 36 34 00 68
 1299:E4 12 A8 02 83 20 20 30 F6
 12A1:30 34 2C 30 30 35 2C 30 52
 12A9:30 36 2C 30 30 33 2C 30 D2
 12B1:34 37 2C 30 34 34 2C 30 41
 12B9:35 35 2C 30 30 37 2C 30 35
 12C1:31 30 2C 30 32 38 2C 30 0E
 12C9:32 30 2C 30 31 38 2C 30 8E
 12D1:31 34 2C 30 32 31 2C 30 03
 12D9:32 36 2C 30 32 39 2C 30 2C

12E1:33 33 00 2F 13 B2 02 83 4A
 12E9:20 20 30 33 34 2C 30 33 45
 12F1:37 2C 30 34 32 2C 30 33 DB
 12F9:36 2C 30 33 39 2C 30 33 8B
 1301:38 2C 30 34 31 2C 30 36 68
 1309:32 2C 30 31 37 2C 30 31 68
 1311:33 2C 30 32 32 2C 30 33 DA
 1319:30 2C 30 33 31 2C 30 30 66
 1321:39 2C 30 32 33 2C 30 32 F4
 1329:35 2C 30 31 32 00 00 00 F4

Farid Ahmad says he'd still love Gazette even if we didn't publish Tag It. He lives in Islamabad, Pakistan. □

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each *Gazette Disk* and are printed in all issues of *Gazette* through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free printed copies of both of these handy programs for you to type in. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope. Send a self-addressed disk mailer with appropriate postage to receive these programs on disk.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

Gazette is looking for utilities, games, applications, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it on disk to

Gazette Submissions Reviewer
COMPUTE Publications
324 W. Wendover Ave.
Ste. 200
Greensboro, NC 27408

Please enclose an SASE if you wish to have the materials returned.

ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, Gazette Disk offers bonus programs. Here's a special program that you'll find only on this month's disk.

Pyramid

By Robert Cook
 Watertown, MA

This month's bonus program, Pyramid, is a commercial-quality solitaire card game that is actually two games in one: Pyramid1 and Pyramid9. In both games, cards are stacked to form a pyramid. The object of both games is to remove as many cards as possible.

In Pyramid1, you must remove from the bottom of the pyramid-shaped pile a card whose number is one more or one less than that of the top card in the discard pile. Draw from the deck when you have no play.

In Pyramid9, you are to select two cards whose numbers total 9. Both cards may be from the pyramid, or one from the pyramid may be combined with the top card on the discard pile. Once again, you must pull cards from the bottom of the pyramid.

Both of these games are simple, addictive, and a lot of fun. They're ready to play on this month's Gazette Disk.

You can have this program and all the others that appear in this issue by ordering the August Gazette Disk. The price is \$9.95 plus \$2.00 shipping and handling. Send your order to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.