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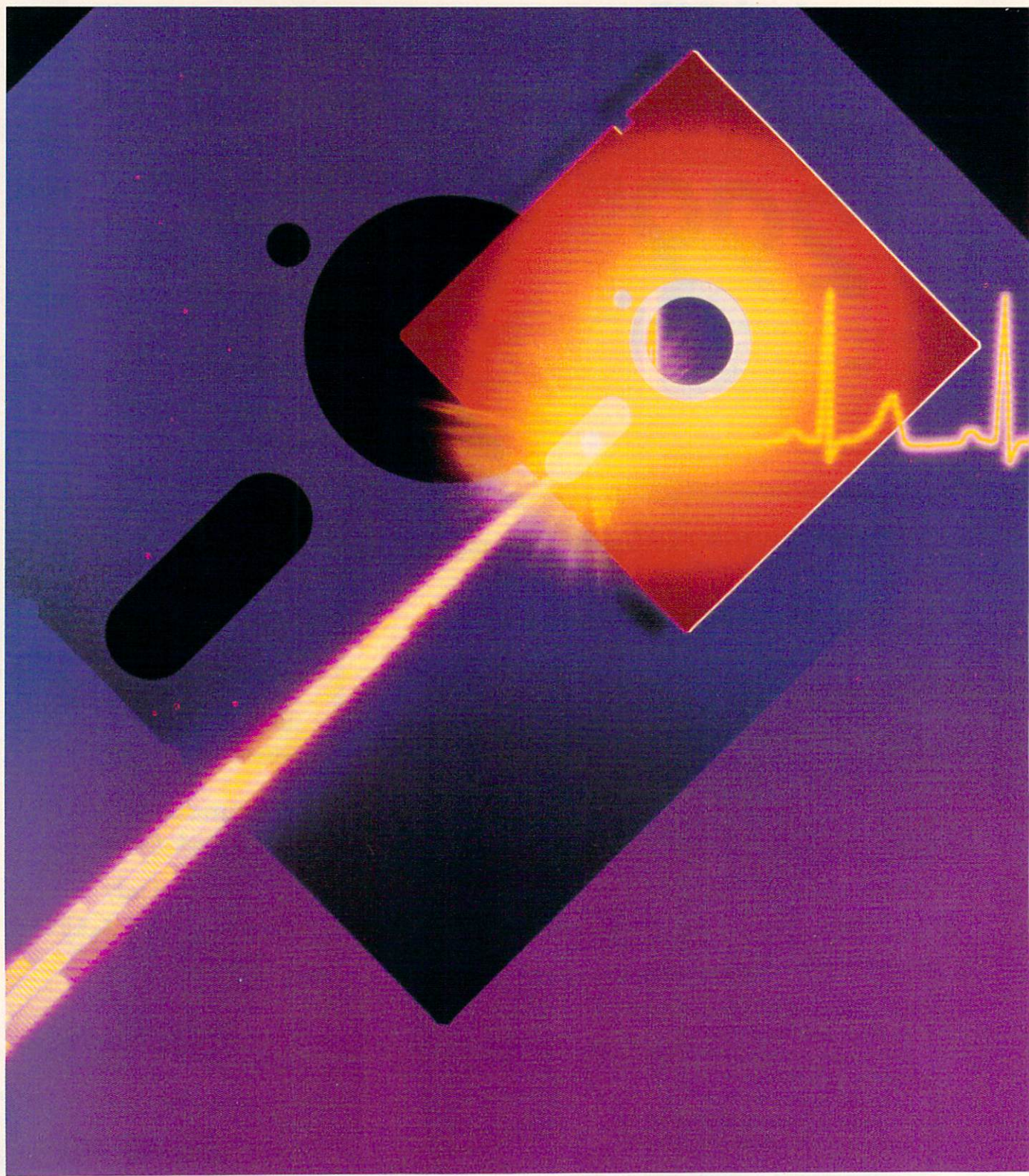
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BY GEORGE GUNN

The 1581 drive is a great piece of hardware for anyone who owns a 64 or 128, and it's also compatible with Plus/4, Commodore 16, and VIC 20. The 1581 is smaller than either the 1541 or 1571, yet it stores much more data on its disks. The 1581's 3½-inch disk holds nearly a megabyte of information (808,960 bytes). After formatting, 3,160 blocks are available to the user, with 40 blocks reserved for the disk's main directory. On a 1541, this would be equivalent to 4¼ floppies, each with 664 available blocks!

Having all this space makes it possible to store a huge number of files on one disk, but the directory scrolls off the screen if you have more than 22 files. This can make file management particularly difficult.

For this reason, the 1581 has a feature known as partitions. A partition is a space on a disk which the user sets aside for special use. For all intents and purposes, each partition is seen by the computer as a separate disk. Within the limits of certain parameters, you can create numerous partitions on each disk, with each partition containing whatever files you wish. Each partition can also have its own directory. You can even store files with the same filename on the same disk, because the computer thinks each partition is a separate disk drive.

### Logical Disk Organization

When creating partitions, it's helpful to remember the 1581's logical disk organization. Although each 1581 disk is double-sided, the computer sees it as single-sided, with 80 tracks per disk (numbered 1-80) and 40 sectors (or blocks) per track (numbered 0-39).

It might be helpful to think of a formatted disk as consisting of a series of concentric circles. Each circle is a track, and each track is divided into several sectors.

Each partition must consist of one or more complete tracks; thus, a partition must be a multiple of 40 sectors in length and must begin on sector 0 of a given track. Remember that track 40 is reserved for the disk's main directory, so tracks 1-39 are available for partitioning, as are tracks 41-80. A partition may not include or pass over track 40.

### Creating Partitions

The commands for creating partitions described in the 1581 user's guide are unwieldy and difficult to understand. Of greater help is the Partition Aid program on the demo disk that's supplied with the drive. Through a series of screens and prompts, this program asks for the partition name, beginning

track and sector, and total number of blocks you want in the partition. Suppose you want to create a partition called Arcade Games and set aside 600 blocks for it. After loading and running Partition Aid on the demo disk, you'd be presented with a screen that lists the following options.

1. SHOW PARTITIONS
2. CREATE PARTITIONS
3. DIRECTORY
4. CHANGE UNIT
5. QUIT

Since we don't have any partitions at this time, you'd skip the first choice. Choosing option 2 would take you to the next screen called Create a Partition. Here you'd see the following instructions on your screen.

#### MODIFYING SPEEDSCRIPT

Most people set their 1541 or 1571 as drive 8 and designate the 1581 as drive 9. If you use SpeedScript, which normally uses drive 8, there was formerly no easy way to save your files to drive 9 and use the 1581 as the data storage device.

Now there's a way to alter the program to access drive 9 instead. This will let you load SpeedScript from a 1541 or 1571 and save data to the 1581. Of course, since SpeedScript is fairly small, you can save this modified version to the 1581 and direct all of its disk commands to drive 9. To accomplish this, load a copy of SpeedScript into memory, but don't run it. Then enter the following two lines below in immediate mode.

```
POKE 4843,9: POKE 4908,9: POKE 5274,9:  
POKE 5873,9: POKE 5967,9  
POKE 6367,9: POKE 6883,9: POKE 7003,9:  
POKE 7073,9
```

Then save the modified program to disk using a unique filename, such as SPEEDSCRIPT9. All disk commands will now access device number 9. You won't be able to switch at will between drive 8 and drive 9 from within SpeedScript, but you can choose to work from whichever version of SpeedScript you wish. If you try to alter such a program, however, be sure you don't alter your only copy of it. Make a backup copy first.

Of course, you must set the switches on the back of your 1581 to the proper combination. If both of your drives are set to the same device number, your system will lock up.

To set the drive number, turn off your 1581's power and look at the drive from the rear. To set it for drive 8, push both switches to the up position. To set it for drive 9, pull the left switch down and push the right switch up. To set the 1581 to drive 10, set the left switch up and the right one down. Pull both switches to the down position to set it for drive 11.

TO CREATE A SUBDIRECTORY YOUR PARTITION MUST

- (1) START ON SECTOR 0
- (2) BE AT LEAST 120 BLOCKS
- (3) BE A MULTIPLE OF 40 BLOCKS

At the prompt *Enter a partition name*, you would enter *Arcade games*.

Next, you're prompted for the beginning track. Since track 40 is reserved for the disk's directory, it may not be used. The partition may begin on any other track on the disk. This prompt appears onscreen as follows.

FIRST TRACK (1-39 or 41-80)  
?

We'll begin this partition on the first track of the disk, so we should enter the number 1. Next, you're prompted for the first sector.

FIRST SECTOR (0-39)  
?

For practically all purposes this would be 0, so enter 0 at the prompt.

Finally, you're prompted for the number of blocks you want in the partition. This must be a minimum of 120 and a multiple of 40.

NUMBER OF BLOCKS IN PARTITION  
?

We're making a partition of 600 blocks (which, by the way, covers 15 tracks since 600/40=15), so at this prompt we enter the number 600.

After this last prompt, all the necessary information has been gathered, and we're taken to a third screen, bearing the title *Create a Partition*. At the top of the screen we see the following message.

CREATING PARTITION: ARCADE  
GAMES STATUS: 0 OK 0 0

Next, we're asked if we want to make a subdirectory for this partition. For most uses, you'll need a subdirectory, so at the prompt type *Yes*.

This brings up another prompt asking for a directory name. Here you should type the Partition Name *Arcade games*.

Finally we are prompted for the familiar two-character alphanumeric ID, well known to users of CBM BASIC. Let's number this partition 01.

From this prompt, the drive checks its status and tells us to press a key to continue.

We're then returned to the opening screen, where we may exit by pressing number 5. At this point we have placed a partition of 600 blocks on

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tracks 1 through 15 of the disk. The first track of this partition will be reserved for the partition's own directory. On the disk's main (root) directory, the partition will show up as the following.

#### 600 "ARCADE GAMES" CBM

#### Partition from BASIC

The series of prompts in this program makes the process very easy. Of course, you can create partitions from BASIC if you can decipher the following code given in the user's manual.

```
PRINT#file#,"/0:partition name,"+
CHR$(starting track)+ CHR$(starting sector)+
CHR$( < # of sectors)+ CHR$( > # of sectors)+
",C"
```

Especially confusing are the expressions *< # of sectors* and *> # of sectors*. Evidently a misprint in the book has placed these two expressions in reverse order. After much experimentation, I've found that they essentially refer to the range of sectors contained in the partition. The expression *< # of sectors* should refer to the high number of this range (600 in our example above), and *> # of sectors* should refer to the bottom of this range (0 in our example). However, since a CHR\$ value may fall only within the range of 0-254, any partitions of more than 254 sectors have to use an adjusted value.

The *>* and *<* signs actually refer to the high byte and low byte for a given expression. There's a way to calculate values for partitions greater than 254 sectors. If N equals the number of sectors for a partition, the high byte would be represented by INT(N/256). The low byte would be represented by N-(low byte)\*256. Thus, for our partition of 600, the high byte is INT(600/256) = 2. The low byte is 600-2\*256 = 88. So, to create our partition of 600 blocks, we'd issue the following commands.

```
OPEN 15,8,15
PRINT#15,"/0:ARCADE GAMES,"+ CHR$(1)+
CHR$(0)+ CHR$(88)+ CHR$(2)+ ",C"
```

CHR\$(1) refers to the starting track of 1. CHR\$(0) refers to the partition's beginning sector in track 1. CHR\$(88) refers to the 600 block partition's low byte. CHR\$(2) refers to the 600 block partition's high byte.

#### Another Format

At this point the required blocks have been set aside as a partition, but the partition can't be used yet. It has to be formatted before you can store files in it even though the disk itself has already been formatted. This creates a partition directory (or subdirectory) on

the first track of the partition. So, with the disk still in the drive, the new partition is selected by the following line.

```
PRINT#15,"/0:ARCADE GAMES"
```

Then the NEW or HEADER commands are used to format this partition area. Enter the following line.

```
PRINT#15,"NO:ARCADE GAMES,01":
CLOSE15
```

#### CARTRIDGES

In addition to holding more information, the 1581 loads programs significantly faster than the 1541 or 1571. Because of a slightly different DOS than that used in a 1541, the 1581 isn't compatible with some fast load cartridges. I use the Epyx Fast Load Cartridge with my 1541, but it has to be disabled before I use the 1581. There are a couple of fast load programs for the 1581, and these work quite well.

Recently, I bought a Super Snapshot cartridge, after reading that it was compatible with the 1581 drive. After using it for a while, I'm very impressed with the performance of this cartridge. Most of its features work quite well with the 1581. The only shortcoming I've found is that its file utility isn't able to scratch a file from within a partition.

The partition is now ready to be used. We've done in BASIC what the Partition Aid program did for us through a series of easy-to-understand prompts. Files in the partition may now be written to, read from, scratched, re-named, and so on.

If you're interested in constructing your partitions from BASIC rather than using Partition Aid, the following table may prove useful. Consult it for a list of the high byte and low byte values of the given numbers of sectors.

No. of Sectors	High Byte	Low Byte
120	120	0
160	160	0
200	200	0
240	240	0
280	24	1
320	64	1
360	104	1
400	144	1
440	184	1
480	224	1
520	8	2
560	48	2
600	88	2
640	128	2
680	168	2
720	208	2
760	248	2

#### Partition Management

Now that you have partitions on your disk, how do you make practical use of them? One of the more useful purposes for partitions is grouping similar files. For example, on my SpeedScript word processing disk, I've set up one partition for the word processor itself. I have SpeedScript's accompanying programs and utilities (mail merge, 80-column preview, right margin justified, columns, and so on) in a partition located at tracks 1-8 (320 blocks). In addition, I have made three other partitions out of tracks 9-39 for holding document files. I call these DOCUMENTS1 (tracks 9-19), DOCUMENTS2 (tracks 20-29), and DOCUMENTS3 (tracks 30-39).

In each partition, the first track is reserved for a directory of that partition; the rest of the tracks are available for files. This partition directory doesn't show up when the disk's main (or root) directory is listed. After the partition has been selected, the computer treats that partition as if it were a disk in itself, and its own directory may be listed. On the disk's main directory, partition names are listed like other files, but the three-letter code (PRG, USR, SEQ) for a partition is CBM. Thus, on the word processor disk I described above, the disk's main directory looks like the following.

```
320 "SPEEDSCRIPT"      CBM
400 "DOCUMENTS1"      CBM
360 "DOCUMENTS2"      CBM
360 "DOCUMENTS3"      CBM
5 "CHANGE UNIT"      PRG
51 "1581 FAST LOADER" PRG
1 "1581 PATH"        PRG
12 "COPY 81"         PRG
1651 BLOCKS FREE
```

The first four items are my partitions, the next four items are utilities I commonly use with the 1581 drive that are stored on the unpartitioned part of the disk, and the last item lists the blocks still available.

#### Partition Selection

Once the disk is inserted in the drive, a partition can be selected from BASIC. The syntax for selecting a partition follows.

```
OPEN 15,8,15,"/0:partition name"
```

Of course, if you're using the 1581 as device 9, you should substitute the number 9 for the 8 in this statement. Once the partition has been selected, you simply work with it as if it were a separate disk of its own, loading, saving, verifying, validating, and so on. All of these commands affect only the selected par-

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tion, not the rest of the disk.

With the 64, all of the familiar BASIC 2 commands, NEW, COPY, RENAME, SCRATCH, INITIALIZE, and VALIDATE, which work with the 1541 drive, work with the 1581. If you have a 128, use the BASIC 7.0 commands as with the 1571. A partition's directory may also be listed from within the partition with the standard LOAD "\$",8: LIST.

Rather than using BASIC, I prefer using 1581 Path, a short machine language program that appeared in the June 1990 Gazette. This one-block program offers a simplified syntax for selecting partitions, loading programs, and moving between partitions.

From within your word processor, it's usually quite easy to move from partition to partition. Most word processors have a command for accessing the disk drive. In SpeedScript, the keypress sequence is Ctrl-Å. After pressing these keys you simply type /*partition name* and hit Return. If you need to go to the disk's main directory, enter Ctrl-Å, simply type /, and press Return. This should result in the message 02, *partition selected*.

### Using Different Device Numbers

A potential software problem involves programs that routinely access drive 8. If you're using the 1581 as drive 9,

you'll encounter problems. If you're familiar with machine language monitors or disk sector editors, you may be able to modify such programs to work from drive 9. Most programs use the following six-byte combination to open a disk file.

**A9 02 A2 08 A0 02**

These bytes are the same as the BASIC command OPEN 2,8,2. To access other drives in BASIC, substitute the new drive number instead of using 8. The most recently accessed drive number is stored in memory location 186.

In machine language, therefore, you'd change the *A2 08* to *A2 BA* so the program would load its files from the drive from which you booted it.

### Utilities for the 1581

In addition to 1581 Path, which I've already mentioned, the utilities that come on the demo disk supplied with the 1581 are very good. Also, I have found several Gazette programs worthwhile additions to my 1581 library.

Check out 1581 FastLoader (January 1990). This program provides high-speed data transfers that are up to nine times faster than the standard Kernal load routine. It works with both the 64 and 128 and allows you to relocate

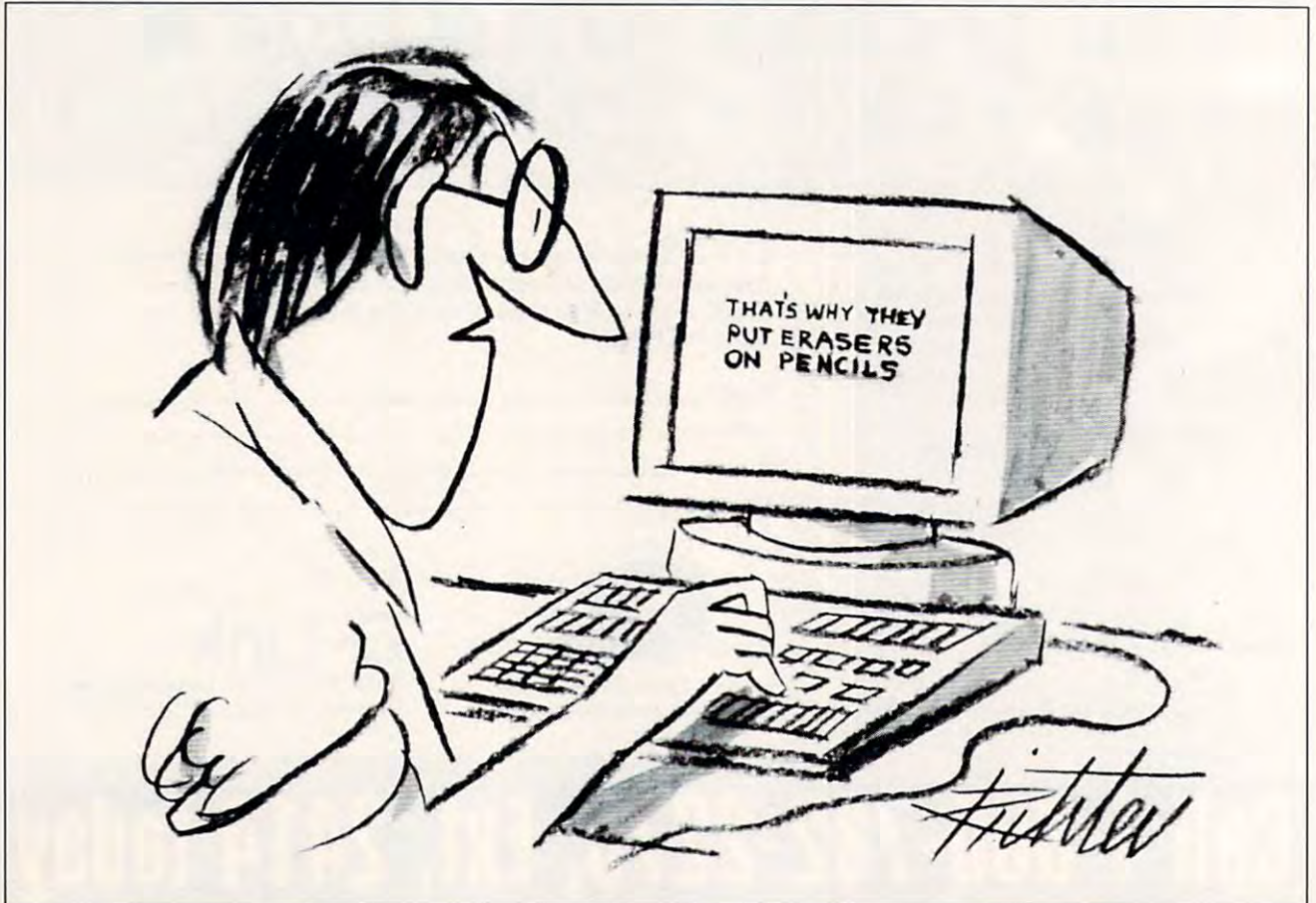
the program to nearly any memory location and to create autoboot files.

Copy 81 (November 1989) allows you to copy any BASIC or machine language file from the root or a partition of one disk to the root or a partition of another disk. It also lets you copy files from the root or partition of one disk to another partition on the same disk.

Another helpful program is 1581 Directory Sorter (July 1989). It sorts your directory entries in both alphabetical and reverse alphabetical order. It also allows you to arrange files manually in any order you want. This utility has the ability to detect whether it's running on a 64 or 128 and whether the 128 is in 40- or 80-column mode. In 128 mode, the program uses fast mode whenever possible. Unfortunately, this program works only on the disk's main directory, not on a partition's directory.

All in all, I highly recommend the 1581 drive to all 64 and 128 users. Its speed and storage capacity are immense improvements over the 1541 drive and, to a lesser extent, over the 1571 drive. Rigid-shelled 3½-inch disks are easier to handle and store than vulnerable 5¼-inch floppies. □

George Gunn is a Commodore owner who lives in Redding, California.





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If you love puzzles, then Chip's Challenge from Epyx is for you. As the game begins, Chip MacCallahan, a real nerd, finds out he may be able to join his beloved Melinda's computer club, the Bit Busters. However, there's a catch to this offer. He must first complete 144 levels of a maze-like puzzle before he can attain the highest membership privilege of this very exclusive club. (That privilege is to be near Melinda, of course!) Your job is to help Chip complete these levels so he can be close to the love of his life.

The first few levels of Chip's Challenge are easy. But don't be fooled; the game gets more challenging as you progress to the higher levels. Each level is slightly more difficult than the previous one, but you have more than one chance to pass a level. For example, if you get killed by a monster, then you get to try that level again.

Some levels provide hints on what to do; others don't. From time to time you'll encounter levels that seem impossible to pass. Don't lose sleep over this, though. After several tries, the game gives you the option of continuing at this level or going to the next. It's best to avoid both of these options, however. Since scores are based on what level you reach and how quickly you pass to the next level of play, restarting or not completing a level only lowers your score.

If you exit the game for any reason, you don't have to start at the first level. Just remember the code for the level you reached, and you can start again at that point

Each level has different types of puzzles to solve. No matter what obstacles you encounter, you must pass through a blinking exit to go to the next level. You may have to find your way through a maze in a certain amount of time. At another level, you may have to col-

lected along the way.

There are many items to aid you at each level. Shields are important in that they allow you to walk through fire or even on water. Cleats prevent you from slipping on ice. Another very useful item is a magnet. If you manage to get



*You'll find plenty to keep you busy as you try to complete 144 levels of maze-like puzzles in Chip's Challenge.*

lect a required number of microchips or other items while avoiding creatures that chase you. Some chips and items may be hidden or placed where they aren't easy to find. You'll have to solve a problem or two to get to these items. For example, walls can appear that were once invisible, or you may have to find a way to cross a castle moat.

Sometimes the order of how you try to accomplish a task is vital. At some of the more difficult levels, more than one type of puzzle must be solved at the same time. An information window always displays your level, the amount of time you have remaining to complete that level, the number of chips still to be collected, and the tools or keys you've

one of these, then you have control on force floors. If you can't get through a colored door, you may need a key of the same color. Colored buttons can also unlock doors for you and sometimes either control the movements of creatures you may encounter or deactivate bombs. Sometimes these creatures are guarding these keys or items you need. Blocks of dirt help you get across water. Numerous teleports jump you to other areas of the puzzle within that same level.

Chip's Challenge is very easy to learn and play. You use your joystick to control Chip's movements. The manual tells you what types of obstacles you'll face, but the experience you gain along the way is important, too. As

you progress to higher levels, you'll know more of what's expected of you and have a better idea of how to solve a particular puzzle. Thus, what you learn from early levels can help later in the game. For example, you may realize that certain creatures move in similar patterns or shoving a particular block on the water will help you build a bridge to cross a moat.

The documentation is brief but effective in getting you on your way to solving the 144 levels of puzzles. After a quick reading, you'll know what to expect and pick up some useful hints. It also provides a list of items and obstacles that you'll encounter while playing the game.

The graphics and sound for Chip's Challenge were average for the 64. Sometimes I found it was hard to tell what an onscreen item was supposed to be. If you have the manual nearby, most of the items in question can be matched to appropriate items from the list. The game's music gets boring after the first ten levels, so I did turn down the volume.

Overall, I rate Chip's Challenge highly. This delightful and interesting one-player game is a lot of fun to play. It'll keep you amused for hours and test your problem-solving skills as well.

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## PERFECT PRINT

I love GEOS. I use it all the time, but there's practically no way around the weak link in its system. GEOS dot-matrix printouts look like they've been, well, printed on a dot-matrix printer. Professional Page on Amiga or geoWrite on the IBM use beautiful scalable fonts that make dot-matrix printouts rival laser printouts for quality. With GEOS, unless you have a laser printer, you're stuck with blocky, jaggy, amateurish-looking fonts.

That's all changed now, because Creative Micro Designs, a company that seems determined single-handedly to carry the Commodore computers through the 1990s, has released Perfect Print, a new print package for geoWrite. Its printouts, using the GEOS LQ application, are incredible!

Let's get a few details straight. For one thing, Perfect Print works only with geoWrite. It won't work with geoPublish, no matter how hard we might wish. GEOS LQ, which produces the incredible geoWrite printouts, is only one part of the Perfect Print package.

Also included are a set of HQ (for High Quality) printer drivers and fonts designed to work especially well with each other. These drivers are standard GEOS printer drivers that work with any application, enhancing the printouts by using advanced interpolation techniques. They offer better results than the drivers that come with the GEOS system, even better than double-strike drivers. They aren't the stars of the Perfect Print show, though. You can find printer drivers on QuantumLink that will outperform the ones in the Perfect Print package.

The star of the Perfect Print package is GEOS LQ. Nothing anywhere can beat it. You won't believe it the first time one of these printouts comes slowly (and I do mean slowly) out of your lowly 9-pin workhorse.

I'm not talking about some pattern that's been

der the printhead.

To be fair, there are a few niggling inconveniences. Speed is the primary trade-off, as I mentioned above. A full page from geoWrite can take ten or fifteen minutes to print. Also, larger point sizes don't have the exquisite quality of the smaller ones. As a

vert their fonts to LQ format.

GEOS LQ is one of the more user-friendly programs around. You can start it from within geoWrite, using an included desk accessory. The control panel screen includes features you've probably never considered. The system fully supports both 9- and 24-pin printers, and everything is well explained in the documentation. You need know virtually nothing about control codes or your printer's inner workings to use GEOS LQ.

If you have any technical expertise, though, you'll find it possible to affect the GEOS LQ system at a basic level by changing the configuration files. These files are actually geoWrite documents, containing the various information your system needs to properly use GEOS LQ. Since they're standard geoWrite documents, they can be examined and altered quite easily. Some variations are already included on the disk, such as a file to set page length to label height and another to tell GEOS LQ to look for the fonts on a different drive from the one geoWrite is on.

These nifty touches are just icing on the cake, however. Unless you use GEOS for geoPublish or geoPaint only, you won't want to be without the Perfect Print package. Once again, CMD takes the Commodore and GEOS to unexpected and incredible heights.

STEVE VANDER ARK

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This text is formatted in California 10-point. I'm going to print it out using an Epson 24-pin printer and the LQ-1500 printer driver. I'll switch to 14 point, bold face, italics, and outline modes and even print a graphic:



This text is formatted in CaliforniaLQ 10-point. I'm going to print it out using an Epson 24-pin printer and Perfect Print's "GEOS LQ" system. I'll switch to 14 point, bold face, italics, and outline modes, use a fancy-styled font, and even print a graphic:



Here are examples of the way GEOS prints text and graphics (above). Beneath them are similar examples from Perfect Print.

overprinted so many times that all the jaggies have been mashed into the weave of the paper and struck so repeatedly that a small font looks like a smudge. No, this is print with absolutely perfect details, with precise curves and angles—even on a six-point font in italics. I'm talking printouts to die for!

Oh, come on, you say; there must be a catch. The manual is probably sketchy and obscure. The setup procedure probably requires a degree in advanced systems analysis to implement. The thing probably overheats the printer. But, no, the manual is clear and concise. It contains more information than most users will ever need. The setup procedure is straightforward, and your printer won't get hot un-

der the printhead. matter of fact, the larger sizes are basically printed using the same kind of interpolation routine used in the HQ drivers, which is good but not perfect. And while you can use most of the features of geoWrite, you can't use the page, date, or time functions in the header or footer to let the system print those for you automatically.

The only fonts that will print out in such high quality are the specially designated LQ fonts. Of course, there are more than 40 such fonts available with plenty of great designs to choose from. If you're so inclined, you can always convert or create more using the font-creation utilities included on the disk. On top of this, CMD has been actively soliciting some of the leading font designers to con-

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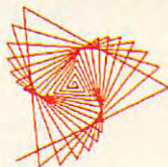
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## REVIEWS

### PREDATOR 2

So many computer games based on movies are nothing more than poor games wrapped in catchy visuals and logos from the film they represent. That's why you should be especially careful when buying games of this type. You should look beyond the references to and scenes from the film and search for some indication of what the game's all about.

Predator 2 has a strong basic game element that was adapted to fit the movie's plot. This is the way it's supposed to work. Predator 2 is a four-level shoot-'em-up that puts the player in the heat of battle in 1997 Los Angeles. You play the part of Danny Glover's character in the movie, Detective Lieutenant Mike Harrigan. Your ultimate goal is to beat the Predator creature that is stalking Los Angeles. You must survive four levels of action before the climactic battle. Each level is tougher than its predecessor and gives you less time to breathe. Although Predator 2 isn't difficult to play, only the best of the best will make it through the game. Most of your efforts will be spent trying to surpass your previous score in an attempt to make to the end.

Game mechanics are simple. Move the cross hairs around the sideways-scrolling screen with a joystick (recommended) or keyboard and press the fire button or space bar to fire your current weapon. Take out all the criminals who show signs of resistance and do it quickly. Power items make your stay on the current level more manageable. These include better and faster-firing weapons, body armor, and ammo clips that appear occasionally on the screen. Fire at them to collect them. A wave of criminals at the end of each level usually depletes your reserve lives and eliminates your chance for success. During this last volley, all of your shots must be well placed or the enemy will overwhelm you.

It'll take a few games before you get anywhere with Predator 2. More than any other computer game, good aim and conservation of ammo are extremely important. If you hold down the fire button, your weapon will continue to fire at its maximum rate. The Mark I Assault Shotgun shoots as fast as a machine gun, and it's very tempting to spread your fire. It's important to shoot the enemy in short bursts rather than laying down a constant bombardment because you'll need the firepower later in the level. Therein lies the key to Predator 2. Successful players will

learn to anticipate the enemies' appearances and eliminate the enemies before they get a chance to shoot. The longer you avoid return fire, the longer your current life lasts, and the better your chance at finishing the game.

The four levels are varied, with numerous challenges and unique features. You see the Predator's outline in all of the levels as he stalks his prey, but don't fire at him! If you do, he turns one of his weapons on you instead of the criminals. The first level takes place on the Los Angeles streets, with drug criminals against the police. It's a practice level compared to what's coming next.

The second level thrusts you into the penthouse apartment of the drug lord Ramon Vega. There are more criminals, and they come from all directions. The third level takes place in the subway tunnels. Just as in the real world, the subway's lights affect gameplay, especially when they shut off and you can't see the enemy. If you can survive, you'll soon confront the Predator. The last level opens the doors of a slaughterhouse for your infiltration. This abandoned warehouse is the perfect lair for the Predator. An exciting battle concludes the game—if you can make it this far.

Graphics are standard for Predator 2. This late in the life cycle of the 64, developers are more concerned with providing a good game with good graphics than they are with providing a poor game with great graphics. Predator 2 is the former. You can distinguish the guns before you collect them, but to help the less experienced, the name of each gun appears below it on the screen. An addictive theme tune makes Predator 2 a bit more exciting. Sound effects are fairly common. From a bells-and-whistles point of view, Predator 2 doesn't have much to offer. What shines through is strong gameplay.

Predator 2 is the latest product from the Konami/Image Works partnership for the 64 and 128. It makes good use of the machine's sprite and animation capabilities and packs a lot of fun in a simple game framework.

The constant challenge and addiction most players will find in Predator 2 is especially attractive to diehard shoot-'em-up fans. See if you can take out one of the more intelligent and deadly hunters in the universe!

RUSS CECCOLA

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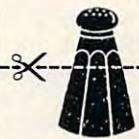
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# BEGINNER BASIC

Larry Cotton

## JOYSTICK OUTPUT

As we all know, the ubiquitous joystick has been around almost as long as the computer. When plugged into one of the 64's two joystick ports, it becomes an input device, translating hand movement to input the computer can use.

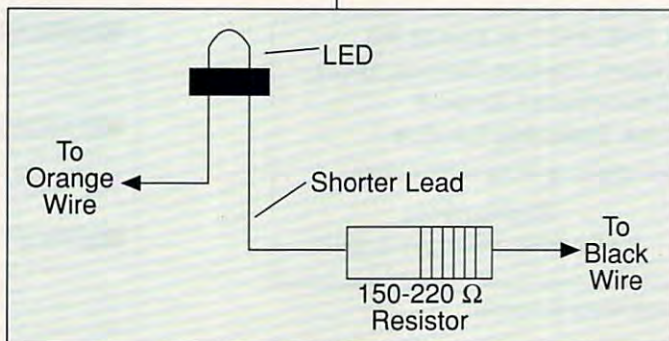
Few people know that joystick ports can also be used for output. Perusing the *Programmer's Reference Guide*, I noticed two little-mentioned memory registers—56322 and 56323—known as Data Direction Registers (DDR) for ports

a 17, bits 0 and 4 will be set for output. (All the rest will be at 0, for input.) Thus, one can independently control each of a particular joystick port's lines. It happens that bit 4 of 56323 controls port 1's fire button line.

How can we put this knowledge to use? Let's do a little work with some hardware. Locate a discarded joystick and remove its cable. If you don't have one, Radio Shack sells a connector (catalogue number 276-1538), but you'll have to wire it yourself.

Most joysticks use six wires

Joystick ports are usually input devices that receive data. Here's an easy way to reverse that flow.



A and B. These are ports 2 and 1, respectively, as labeled on the computer.

These two registers, when properly programmed, have the ability to change a joystick ports' direction of data flow from input to output! Address 56322 controls joystick port 2's memory register 56320; 56323 controls port 1's register at 56321. They behave similarly to the DDR at 56579, which determines whether the user port lines at 56577 are set for input or output.

Each memory register in the 64 contains one byte, or eight bits. Those bits (numbered 0 through 7) can be controlled independently from BASIC with the Poke command.

If you poke memory register 56323 with a 1, for instance, bit 0 will contain 1; it will be set for output. If you poke it with

within the cable: the ground, the four direction lines (up, down, right, left), and the fire button. The fire button wire is usually orange, and the ground wire is usually black.

Select these two wires and join them with an LED and a resistor, as shown above. Connect the shorter lead of an LED to either end of a 150-220-ohm resistor and the longer lead to the orange fire button wire. Complete the circuit by attaching the free end of the resistor to the black ground wire.

If you don't happen to have LEDs at home, try Radio Shack's super-bright LED, catalogue number 276-087.

Now enter the following.

```
10 NT=900:FT=300:B=3: REM ON  
TIME, OFF TIME, AND NUMBER  
OF BLINKS
```

```
20 POKE56323,17: REM FIRE  
BUTTON OUTPUT, DISABLES  
KEYBOARD, TURNS LED OFF  
30 FORT=1TOFT:NEXT  
40 FORI=1TOB  
50 POKE56321,16  
60 FORT=1TONT:NEXT  
70 POKE56321,0  
80 FORT=1TOFT:NEXT  
90 NEXT  
100 POKE56323,0: REM  
RESTORE TO NORMAL
```

Save the program to disk before going any further!

Memory register 56323 normally contains a 0. Because of the way the 64's keyboard is wired, poking values to that register will interfere with the keyboard's normal operation. To try this, poke a 1 to 56323.

Turn your computer off and on again to restore keyboard operation. Plug the joystick cable into port 1. (That's the port closest to you.) Load and run the above program. The LED should blink three times and possibly will glow softly afterwards. The LED turns off completely when the line is changed to output.

Line 10 defines the constants NT, FT, and B for LED on-time, off-time, and number of blinks. Try changing these values. Line 20 pokes the DDR with a 17, which disables the keyboard and changes the fire button line to output. Poking a 16 works also but leaves the cursor in a strange place.

Lines 30, 60, and 80 control the times the LED is on or off. Line 40 begins a FOR-NEXT loop for the number of blinks; line 90 ends it. Lines 50 and 70 turn the fire button wire on (positive DC voltage) and off (ground potential), respectively. Line 100 restores port 1 to normal operation.

We'll look at more useful applications next month and learn how to control small electrical appliances. □



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Circle Reader Service Number 221

# MACHINE LANGUAGE

Jim Butterfield

## SIMPLE STACK USAGE

The stack is used automatically by many activities. When your program calls a subroutine with JSR, the stack stores the return address. Later, the subroutine returns with RTS, and the stack delivers the stored address. Similar actions take place with RTI and interrupts. In every case, the stack is returned to its former condition automatically when the job is done.

The stack takes care of itself so well that it often remains a mystery to programmers. Since they don't often use the four stack-manipulation commands, programmers feel ill at ease with them. Here are those commands.

**PHA** Push (copy) the contents of A to the stack.

**PLA** Pull the contents of the stack into A.

**PHP** Push (copy) the PSW (program status word) to the stack.

**PLP** Pull the contents of the stack into the PSW.

Using these commands is simple. Do you have something in the A register that you know you will need soon but not right now? Push it to the stack with PHA. You can store it there for a while then bring it back later with PLA. Perhaps you have a condition flag that you'll want to test later in the program but not immediately? Push all the flags with PHP, and bring them back with PLP when you want to test them.

There's only one vital rule that you must follow: If you put it on the stack, you *must* take it off. Leave a messy stack, and your program will crack. The last thing that you pushed

onto the stack is the first thing you must pull. After you push something to the stack, be very careful that your code never branches away, leaving a bad stack in place.

Let's write a small but useful program that uses the stack commands. It's a program to print the contents of a sequential file to the screen or to a printer.

The program will connect to the input file, take a byte, and disconnect. It will then connect to the output file, send that byte, and again disconnect. Then it will test to see if the input has signaled end-of-file (EOF). If not, back we go to do it all again.

The EOF condition is signaled in variable ST (status), address \$90 on current Commodore 8-bit machines. But here's the catch: It's signaled immediately following the input operation. If you examine the logic flow described above, you'll see that we test for EOF after we've performed an output operation. That's the right program point to do the test, but by that time, variable ST will have lost the vital EOF signal that was present after the program performed the input operation.

That means we should test the value of ST immediately after the input but we shouldn't branch based upon that test until a later program point. How may we preserve the condition flags? We do it with the PHP and PLP instructions.

A second problem arises. We read a byte from our input file by means of a call to the Kernal subroutine at \$FFE4. The value is placed into register A, which is just where we'll want it for output. Our next call, however, is to \$FFFC in order to disconnect from the input stream, and that will destroy the contents of the A register. The easiest solution is to preserve A with

the PHA and PLA instructions. Gosh, this is easy. Let's go to the code.

Logical file 1 will have been opened as our input; logical file 2 as our output. First, let's connect to the input stream.

```
2000 A2 01    LDX #$01 ;
             logical file 1
2002 20 C6 FF JSR $FFC6 ;
             connect input
2005 20 E4 FF JSR $FFE4 ;
             input a byte
```

Now we test ST, address 90. A value of 0 means that we aren't at EOF and there are no other problems. Loading ST into the Y register will automatically set the Z flag if the value is 0; otherwise, the Z flag will be cleared. Either way, we'll push the flag to the stack and test it later.

```
2008 A4 90    LDY $90 ;
             read ST (Z flag)
200A 08      PHP ;
             save conditions to stack
```

The byte we received from the input stream is still in the A register. But we're about to make a couple of calls that will wipe it out. So let's put that on the stack, too. Remember that since it's the most recent thing we've put on the stack, it must be the first thing we pull.

```
200B 48      PHA ;
             save input byte
```

Now that the byte is safely stacked, we can disconnect our input.

```
200C 20 CC FF JSR $FFCC ;
             restore default I/O
```

Then we connect to our output stream, logical file 2.

```
200F A2 02    LDX #$02 ;
             logical file 2
2011 20 C9 FF JSR $FFC9 ;
             connect output stream
```

**The stack takes care of itself so well that it often remains a mystery to programmers.**

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Now that we've connected, we're ready to output. All we have to do is pull the data byte and send it.

```
2014 68 PLA
; restore input byte
2015 20 D2 FF JSR $FFD2
; output it
```

We've used the Kernal subroutine at \$FFCC before, to disconnect the input stream. Now we use it to disconnect the output stream.

```
2018 20 CC FF JSR $FFCC
; restore default I/O
```

Now the program is ready to test for EOF. Let's bring back the Z flag that we stashed quite a while ago.

```
201B 28 PLP
; restore condition flags
201C F0 E2 BEQ $2000
; if not EOF, do it again
201E 60 RTS
; else back to BASIC
```

The BASIC code pokes the machine language code in

place, opens the input and output files, and then calls the machine language with a SYS command. When the ML program returns control, BASIC closes the two files.

This example of stack usage runs on all recent Commodore 8-bit computers. To run this program on the older CBM and PET computers, change the value 144 to 150 in line 100 and the value 4388 to 4396 in line 250.

```
100 DATA 162,1,32,198,255,
32,228,255,164,144,8,
72,32,204,255
110 DATA 162,2,32,201,255,
104,32,210,255,
32,204,255,40,240,
226,96
200 FOR J=8192 TO 8222
210 READ X
220 POKE J,X
230 T=T+X
240 NEXT J
250 IF T<>4388 THEN STOP
300 INPUT "NAME OF INPUT
FILE";F$
310 OPEN 15,8,15
320 OPEN 1,8,3,F$
330 INPUT# 15,E,$,E1,E2
```

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```
340 IF E<>0 THEN PRINT
E;E$;E1;E2:STOP
350 INPUT "OUTPUT TO
SCREEN OR PRINTER";D$
360 D$=LEFT$(D$,1)
370 IF D$="S" THEN
A=3:GOTO 400
```

```
380 IF D$="P" THEN A=4:GOTO
400
390 GOTO 350
400 OPEN 2,A
410 SYS 8192
420 CLOSE 2
430 CLOSE 1
```

## TYPING AIDS

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# GEOS

Steve Vander Ark

## IN SEARCH OF A BETTER DESKTOP

Which GEOS application do you use the most? You might think it's geoWrite, but it's the deskTop. The deskTop lets you erase and copy files, page through disk directories, and load and run applications. The deskTop is like home base—where you go when you click on Quit.

Whenever you hit a quit button, GEOS looks for and runs the file called DESKTOP. Obviously, it wouldn't do to have an unsuspecting user rename his or her deskTop. That's why it's invisible to the system and why it isn't called an application in its info box. It's a GEOS system file 4, which is a file type you can't rename.

The deskTop, especially the 2.0 version, is very efficient, but it has some faults. Moving from page to page on the notepad, for example, is a fairly slow process, since the system must load each page and its icons separately. Also, the deskTop provides only marginal support for a third disk drive and until recently provided none at all for devices such as CMD's RAMLink.

Over the years, programmers have created several different file-handling applications to supplement the deskTop. These programs buy speed by using text instead of icons to list files. Most of them patch the GEOS system with a different filename so that a Quit command returns you to them instead of the deskTop. Here's a list of such programs.

**DualTop.** DualTop, as its name implies, does the deskTop one better by displaying the directories of two disks side by side. Standard file functions are accomplished by highlighting the filename and then clicking on one of the buttons on the screen. DualTop

supports three drives, including RAM drives.

On Q-Link, the 128 version is called 128DTV27.SFX, uploaded by RedSonia. DUALTOP is the 64 version, uploaded by JBUS.

**WormDesk.** This program provides all normal file functions, as well as an elaborate view system. The directory displayed can consist of only one type of file at a time. This usually is fine, but once in a while it's nice to be able to peruse an entire directory, an option not available on WormDesk.

The Q-Link filename is WORMDESK5.0, uploaded by geoWorm. It's for the 64 only.

**QwikTop.** The QwikTop screen is divided into eight boxes, each of which displays the files from a single page of the deskTop's notepad. The result is that you get to see seven pages at once, plus the border, with filenames shown in text. QwikTop saves space by including only the most often-used file functions, but the fact that you can view most of a disk's files at once and move them around from page to page almost instantly makes this one a joy for those of us who like to organize our disks. This one's a winner!

Q-Link filenames are QWIKTOP, uploaded by IL-LINI70, and QWIKTOP128.2, uploaded by GEOREP JIM.

**Mini-Desk.** This Jim Collette masterpiece is a desk accessory which provides access to a few essential file-handling options while you're within another application. I find this nifty program especially helpful when I'm working on a project where the application and the document are both in RAM. Mini-Desk lets me copy the file I'm working on to another drive, assuring me of a current copy even if the power fails.

Released as part of CommPlex Software's GeoWizard disk, the entire package is

\$16.95 from CommPlex Software, 6782 Junction Road, Pavilion, New York 14525.

**Switcher.** To avoid the delay while one application quits to the deskTop and another one loads, Switcher avoids the deskTop and provides a dialog box from which to open the next application. This isn't really a full-fledged deskTop replacement, but if your work requires moving from program to program, Switcher will certainly keep you jumping. Its very small size makes it a boon for single-drive geoPublish users. Its Q-Link filename is SWITCHER 1.3, uploaded by Student t.

**gateWay.** GateWay is more than a deskTop alternate. It's a full-blooded replacement with lots of great features. Until recently, gateWay was the only file-handling system which supported CMD's RAM-Link and RAMDrive. For more information, see the Gazette review (November 1991).

GateWay (\$29.95) is available in 64 and 128 versions from Creative Micro Designs, P.O. Box 646, East Longmeadow, Massachusetts 01028.

**geoShell.** GeoShell takes the GEOS environment full circle, replacing the graphics interface of the deskTop with text commands. While this might seem to you like a step backwards, the many hot-key commands and the speed of this program might instead lead you to decide that it's the most efficient file-handling routine around. For example, by typing the filename of a file on the current disk and pressing Return, geoShell quickly scans the directory and then loads and runs the file. There's no need to page through a slew of icons or scroll through a directory.

For more information about geoShell, contact Maurice Randall, 215 East Harris, Charlotte, Michigan 48813. □

The GEOS deskTop is a very efficient program, but it has its faults. Here's a look at some deskTop alternatives.

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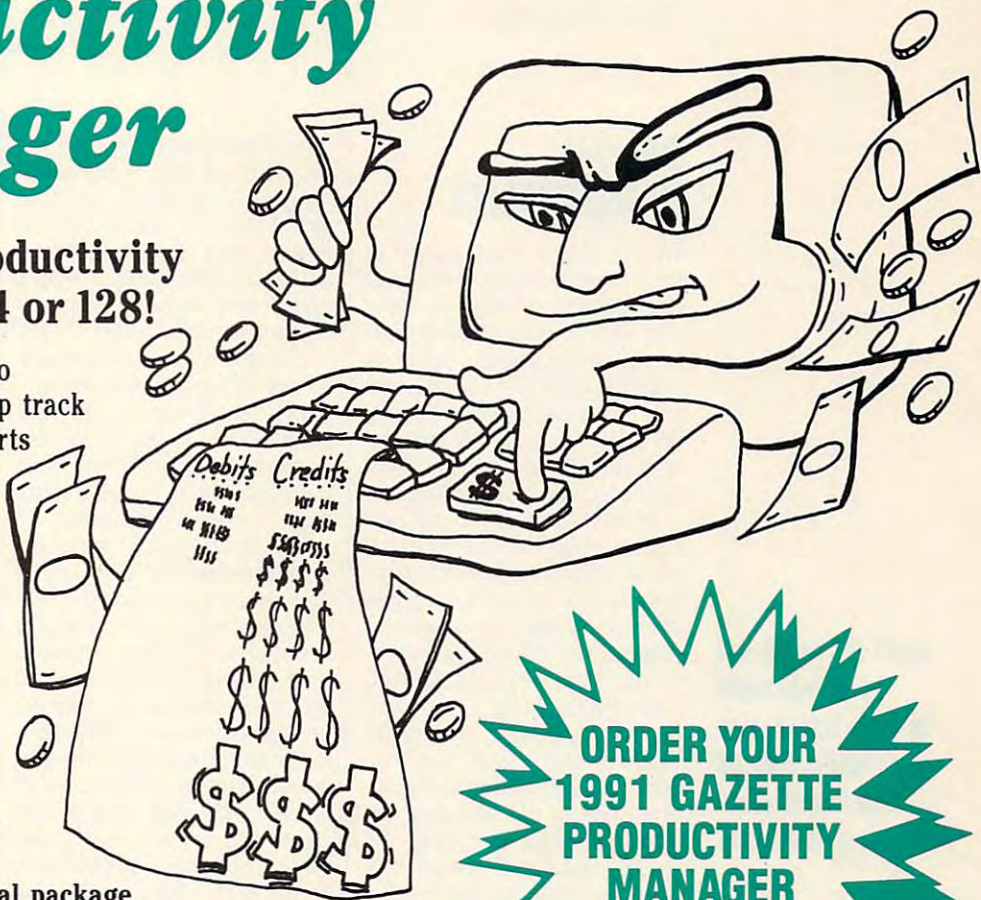
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# D'IVERSIONS

Fred D'Ignazio

## DIGITAL IMMORTALITY

When I was a child, I used to think I was immortal. I couldn't die. This type of attitude naturally led to several life-threatening experiences, such as jumping off roofs, almost getting hit by cars, and climbing on cliffs. I concluded that my surviving these activities demonstrated my invulnerability.

When I grew older and had experienced the deaths of my uncle, a favorite grandmother, and a few assorted movie stars and pets, I grew wiser. I realized that maybe I wasn't immortal. Maybe I could die. But, heck, I was young. Death was probably 50, 60, maybe 80 years away. I was hopeful. Someone was bound to discover a cure for old age way before I got close to dying.

I clung to this notion of a fountain of youth for quite a few years, but now it's starting to dry up. It's getting harder to believe in medical miracles. I'm 43, and there doesn't seem to be a miracle drug on the horizon. In fact, things seem to be getting worse. With the upsurge in crime, violence, AIDS, and so on, I feel far more at risk now than I did when I was younger.

The other night I was watching television, feeling kind of blue, and I spotted a commercial that features Elton John playing alongside Louis Armstrong, Humphrey Bogart, and James Cagney. Through special digital techniques, movie images of these long-dead superstars have been added to a new ad that features a very much alive Elton John.

The next night I tuned into the Grammy Awards and saw Natalie Cole win a Grammy for her song "Unforgettable." To create this version, she used digital techniques to weave her father's original song into

a new recording in which the two of them sing a duet. Nat King Cole is dead, but that didn't stop his daughter from resurrecting his unforgettable solo and changing it into a hauntingly beautiful father-daughter masterpiece.

Both of these instances qualify as digital immortality. I know that Cagney, Bogart, Cole, and Armstrong are dead, but I did see and hear them on television the other night in new productions.

The Elton John commercial and the Natalie Cole song have been so successful that they're sure to spawn a host of imitations. Television companies, movie houses, and ad agencies will search their archives to resurrect film stars, political figures, authors, athletes, heroes, villains, and saints to mix their images with contemporary media figures. We'll soon be flooded with songs and commercials digitally combining the dead and the undead: Marilyn Monroe with Madonna, W. C. Fields with Danny DeVito, Lou Gehrig with Jose Canseco, Teddy Roosevelt with George Bush, Steve Martin with the Three Stooges.

In fact, virtual immortality is nothing new. We've been getting accustomed to it for years. What's the effect of media stars dying? If they're popular, it doesn't mean that we no longer see them. All it means is that we don't get any new material. We still see reruns of their best work.

Are Bing Crosby and Danny Kaye gone? It doesn't seem like it after I've watched *White Christmas*. What about Judy Garland? Not after seeing *Wizard of Oz* with my three-year-old. How about Spencer Tracy, John F. Kennedy, or Jim Morrison? It's hard to imagine Lucille Ball gone after watching one of her wonderful "I Love Lucy" episodes.

The truth is that my memory of a star's death pales in comparison to the vivid, poignant evidence of his or her survival on the television or movie screen. The stars seem still alive when I see them in the midst of news programs, sitcoms, and commercials that feature the products and celebrities of the here and now.

This brings me to my own death, or, hopefully, my own virtual immortality. I may give up on cryogenics, miracle drugs, and fountains of youth, but I might still achieve immortality through multimedia.

I can see a whole new industry springing up as funeral homes retrofit middle-aged and older Americans with digital re-creations of their lives. They can interview us to capture our voices and images. They can scan in photographs and digitize home movies and audio tapes to capture us during our youth and our adulthood. They can embed us in the era in which we lived and put a spin on the whole presentation. How do we want to be remembered? Nostalgically? Romantically? Dashingly? Respectfully? Producers at multimedia funeral homes will be able to remaster our lives digitally and dramatize them according to our wishes.

"This Is Your Life, Fred D'Ignazio." That's what I'll get. I'll pay about a thousand dollars. It'll take only a couple of days to create at the local funeral home equivalent of a one-hour Insty-Prints or Moto-Photo. I'll be packaged on CD-ROM. I'll get a dozen copies to distribute to my wife, children, and close friends. Whenever they miss me or want to remember how I was, they'll boot up my disc in their computer, and I'll spring to life, just like Bogart, Armstrong, Cagney, and Cole.

I'll be immortal. I won't notice, but others will. □

Don't let death act as an obstacle to your future. Use multimedia as a springboard to immortality.

# PROGRAMS

## POP-UP

By Richard Penn

While entering data for an applications program, you suddenly need to make a calculation. You press a key, call up a calculator screen, determine the answer that you need, and then continue with your main program.

The telephone rings while you're working on a report, and you need to check a date while discussing an appointment. You press a key, call up a calendar, and then return to your report.

Afterward, prior to printing your report, you call up a smart help screen—one that knows you're ready to print and displays only a summary of printer commands, not the ten previous pages of instructions that you don't need.

If you think this sounds like something only an expert programmer could do in machine language, you're wrong. Pop-Up allows you to add pop-up desk tools to BASIC programs as easily as writing a GOSUB subroutine, and it lets you call them with a single command!

### Typing It In

Pop-Up consists of three programs. The first is the actual machine language routine, so you'll need to use MLX, our machine language entry program to enter it. See "Typing Aids" elsewhere in this section. When MLX prompts you, respond with the values given below.

**Starting address: C000**

**Ending address: C607**

Before exiting MLX, save a copy of this program with the name POP-UP. The enclosed demonstration program looks for that name when it runs.

A second machine language program contains sprite data for an on-screen calculator that's used in the demonstration program. Again, you'll need MLX to type it in. When MLX prompts you, respond with the following values.

**Starting address: 3E00**

**Ending address: 3FFF**

When you've finished typing, be sure to save a copy of the program as CALCULATOR.SPR.

Finally, Demo is a BASIC program

that shows how to use Pop-Up. To prevent typing errors, enter it with The Automatic Proofreader; see "Typing Aids" again elsewhere in this section.

### Put It to Work

To use Pop-Up in your own applications, add lines 30-40 of Demo to the beginning of your BASIC programs. Now let's take a look at how it works.

### Two Commands

Pop-Up works by setting up a branch key. Whenever f1 is pressed, the running BASIC program is suspended, and execution branches to a selected line. This subroutine, which runs independently with its own variables, contains the code for the pop-up tool. Pressing f1 again returns you to the main program without a hint that anything ever happened. Think of it as a powerful GOSUB key that jumps to a subroutine with its own screen, VIC-II chip, and variables.

There are only two commands to learn. The first, SYS 49752, *line*, enables Pop-Up and selects the line to branch to. This command should be used at the beginning of your program. The second command, SYS 49877, disables Pop-Up.

### Programming Desk Tools

A BASIC routine for an accessory such as a calculator is practically no different from any other subroutine, except that you must write it as a stand-alone program that loops endlessly. Think of an accessory as a new program that runs from the main program whenever you press f1. This new program continues until you press f1 again to exit. You'll see a programming example of this by using a calculator in Demo.

When you press f1, the machine language routines save all important information about the main program, such as BASIC pointers, screen and color memory, the VIC-II chip, and variables. Then BASIC jumps to the subroutine selected by the SYS 49752, *line* command and executes it, just as if RUN were typed. This subroutine has its own variables (2559 bytes stored at memory locations 50689-53247) that are cleared each time you press f1. The display, however, isn't cleared, so

your pop-up tools can be printed over the current screen for a window effect. The only quirk is that the cursor is positioned one column to the right of the home location whenever f1 is pressed the second time.

No changes made to the screen or sprites by the subroutine called by Pop-Up are permanent. Pressing f1 again restores the original program and screen. The only exception is the SID chip, which cannot be peeked and therefore cannot be saved.

### More Than One

What if you want several accessories? Include a menu at the beginning of the Pop-Up subroutine for the user to select. You might include a calculator, calendar, and notepad.

When programming Pop-Up tools, it's best to write them separately and then merge them with your main program once they're debugged. This is because only the main set of variables is available to the BASIC editor. If you press Run/Stop while a Pop-Up subroutine is running and then type PRINT A, the value of A in the main program, not the subroutine, will be returned.

Also, note that a renumbering utility won't recognize the new SYS 49752, *line* command. You'll have to change its line number yourself.

### Smart Help Screens

Suppose you have a two-part program in which you first enter data and then print a report. Some programs offer a help key, and dumb help screens are always displayed in the same sequence. That means users who need information about printing but don't need help for entering data have to see the data-entry help screen anyway because it comes first. Smart help screens eliminate flipping through unwanted screens because they know where you are in a program and only display relevant information.

Programming them with Pop-Up is easy. In our example program, you might insert the command POKE 679,1 at the beginning of the data-entry routine, and POKE 679,2 at the start of the report-printing routine.

The help screen subroutine (called with f1) would check location 679 with a line such as IF PEEK(679)=1 THEN

# PROGRAMS

2000 : REM PRINT DATA ENTRY HELP SCREEN. If it contained a 1, the data-entry help screen would be printed. If location 679 held a 2, the program would jump to 3000 where a report help screen would be displayed. For a longer program, just include more flags and IF/THEN statements.

## New Look and Feel

Pop-Up gives BASIC a new look and feel. Never before could software written in BASIC be so user-friendly, nor did the BASIC programmer have so much power at his fingertips. The possible click-on accessories are limited only by your programming ability.

Even if you don't want to program your own accessories, you can use the demonstration's Pop-Up calculator in your own programs by including lines 20-60 and 1000-1390.

## POP-UP

```
C000:A2 02 B5 00 9D FD A2 E8 1D
C008:E0 FB D0 F6 A9 FF 85 FB D6
C010:A9 00 85 FC A9 F6 85 FD 19
C018:A9 A3 85 FE A0 00 B1 FB 5C
C020:91 FD E6 FD D0 02 E6 FE 02
C028:E6 FB D0 02 E6 FC A5 FB C8
C030:C9 10 D0 EA A5 FC C9 03 1B
C038:D0 E4 A9 00 85 FB A9 04 04
C040:85 FE A9 07 85 FD A9 A6 87
C048:85 FC B1 FB 91 FD E6 FD 92
C050:D0 02 E6 FE E6 FB D0 02 52
C058:E6 FC A5 FB C9 E8 D0 EA 7F
C060:A5 FC C9 07 D0 E4 A9 00 0B
C068:85 FB A9 D8 85 FC A9 EF D1
C070:85 FD A9 A9 85 FE B1 FB 8B
C078:91 FD E6 FD D0 02 E6 FE 5A
C080:E6 FB D0 02 E6 FC A5 FB 21
C088:C9 E8 D0 EA A5 FC C9 DB 82
C090:D0 E4 A2 00 BD D0 9D 35
C098:D7 AD E8 E0 2F D0 F5 BA FF
C0A0:8E 06 AE A9 36 85 01 A2 C7
C0A8:02 BD 00 A0 95 00 E8 E0 04
C0B0:D9 D0 F6 A2 F3 BD 00 A0 93
C0B8:95 00 E8 E0 FB D0 F6 A9 EA
C0C0:EB 85 FB A9 A0 85 FC A9 72
C0C8:FF 85 FD A9 00 85 FE B1 CB
C0D0:FB 91 FD E6 FD D0 02 E6 01
C0D8:FE E6 FB D0 02 E6 FC A5 6B
C0E0:FB C9 6D D0 EA A5 FC C9 3F
C0E8:A2 D0 E4 AE FC A2 A9 37 74
C0F0:85 01 9A A9 F6 8D 24 03 9C
C0F8:A9 C1 8D 25 03 A9 13 8D 36
C100:77 02 A9 0D 8D 78 02 A9 C6
C108:02 85 C6 A9 1A 8D 02 03 6F
C110:A9 C2 8D 03 03 A2 1A B5 87
C118:D8 09 8D 95 D8 CA D0 F7 3F
C120:A2 08 BD F7 07 9D EA C5 78
C128:CA D0 F7 4C 31 EA A9 36 C7
C130:85 01 A2 02 BD FD A2 95 8B
C138:00 E8 E0 FB D0 F6 A9 FF 87
C140:85 FB A9 00 85 FC A9 F6 25
```

```
C148:85 FD A9 A3 85 FE A0 00 E6
C150:B1 FD 91 FB E6 FD D0 02 F0
C158:E6 FE E6 FB D0 02 E6 FC 05
C160:A5 FB C9 10 D0 EA A5 FC 6A
C168:C9 03 D0 E4 A9 00 85 FB 4E
C170:A9 04 85 FC A9 07 85 FD BC
C178:A9 A6 85 FE B1 FD 91 FB BF
C180:E6 FD D0 02 E6 FE E6 FB 2E
C188:D0 02 E6 FC A5 FB C9 E8 3B
C190:D0 EA A5 FC C9 07 D0 E4 AC
C198:A9 00 85 FB A9 D8 85 FC 1A
C1A0:A9 EF 85 FD A9 A9 85 FE 83
C1A8:B1 FD 91 FB E6 FD D0 02 49
C1B0:E6 FE E6 FB D0 02 E6 FC 5D
C1B8:A5 FB C9 E8 D0 EA A5 FC 50
C1C0:C9 DB D0 E4 A2 00 BD D7 F0
C1C8:AD 9D 00 D0 E8 E0 2F D0 91
C1D0:F5 AE 06 AE A9 37 85 01 DC
C1D8:9A 4C F3 C5 EA EA A9 1A
C1E0:83 8D 02 03 A9 A4 8D 03 F7
C1E8:03 A9 57 8D 24 03 A9 F1 8E
C1F0:8D 25 03 4C 31 EA A9 57 89
C1F8:8D 24 03 A9 F1 8D 25 03 5A
C200:08 A9 00 20 90 FF 28 20 EA
C208:60 A6 AD EB C2 85 15 AD DF
C210:EC C2 85 14 20 A6 A8 4C E7
C218:AE A7 78 8D E9 C2 8E EA 29
C220:C2 A9 83 8D 02 03 A9 A4 CE
C228:8D 03 03 A9 57 8D 24 03 6C
C230:A9 F1 8D 25 03 A9 00 8D 57
C238:E7 C2 A9 36 85 01 A2 2D 9D
C240:BD FD A2 95 00 E8 E0 39 70
C248:D0 F6 A9 37 85 01 AD E9 12
C250:C2 AE EA C2 58 4C 83 A4 0C
C258:A9 EE 85 FB A9 C2 85 FC 3F
C260:A9 00 85 FD A9 A0 85 FE 25
C268:A0 00 B1 FE 91 FD E6 FD 84
C270:D0 02 E6 FE E6 FB D0 02 76
C278:E6 FC A5 FD C9 FD D0 EA 18
C280:A5 FE C9 A2 D0 E4 20 FD 54
C288:AE 20 8A AD 20 F7 B7 A5 8F
C290:14 8D EC C2 A5 15 8D EB D5
C298:C2 A9 00 8D E7 C2 78 A9 A7
C2A0:AB 8D 14 03 A9 C2 8D 15 9A
C2A8:03 58 60 A5 C5 CD E8 C2 26
C2B0:F0 20 8D E8 C2 C9 40 F0 A5
C2B8:19 C9 04 D0 15 AD 8D 02 47
C2C0:D0 10 AD E7 C2 49 02 8D B3
C2C8:E7 C2 F0 03 4C 00 C0 4C 71
C2D0:2E C1 4C 31 EA 78 A9 31 38
C2D8:8D 14 03 A9 EA 8D 15 03 DF
C2E0:A9 00 8D E7 C2 58 60 00 A3
C2E8:04 40 00 03 EA FF 94 FF 31
C2F0:00 AA B1 91 B3 22 22 00 DA
C2F8:00 4C 00 FF 00 04 00 00 A1
C300:02 00 7F CB 19 16 00 0A 60
C308:76 A3 04 EA 0B 00 00 00 3B
C310:76 A3 B3 BD 51 00 00 00 98
C318:00 01 08 01 C6 01 C6 01 B9
C320:C6 FF CF 00 00 FF CF FA 9F
C328:FF FA 00 4F 0C 5C 4E D3 A5
C330:17 03 02 53 41 24 18 1E 62
C338:18 FF 0B 00 00 00 1E 18 81
C340:00 03 4C B7 00 00 69 17 77
C348:62 17 00 00 00 00 00 0A D0
C350:76 A3 19 00 00 00 00 90 AF
C358:CB 7A 00 00 00 76 00 80 BE
C360:A3 E6 7A D0 02 E6 7B AD 20
C368:06 02 C9 3A B0 0A C9 20 B1
C370:F0 EF 38 E9 30 38 E9 D0 19
```

```
C378:60 80 4F C7 52 58 40 FF 2B
C380:00 00 55 FF 00 00 00 00 B2
C388:03 00 00 80 00 00 00 24 BD
C390:6C 55 00 00 00 00 00 00 A3
C398:00 00 00 00 D6 17 00 00 33
C3A0:3C 03 00 00 00 06 00 60 7F
C3A8:08 FA 9F 00 00 00 00 E6
C3B0:A0 01 08 04 00 00 08 0C 26
C3B8:00 04 00 02 20 00 00 00 62
C3C0:04 00 00 27 00 85 00 FF D2
C3C8:00 00 FF FF 00 00 FF FF 50
C3D0:00 00 FF FF 00 00 FF FF 58
C3D8:00 20 20 34 39 37 35 35 F5
C3E0:00 30 30 30 30 FF 00 00 FE
C3E8:FF FF 00 00 FF FF 00 00 70
C3F0:FF FF 00 00 FF FF 00 00 78
C3F8:FF FF 00 00 FF FF 00 00 80
C400:FF FF 00 00 FF FF 00 00 89
C408:FF FF 00 00 FF FF 00 00 91
C410:FF FF 00 00 FF FF 00 00 99
C418:FF FF 00 00 FF FF 00 00 A1
C420:FF FF 00 00 FF FF 00 00 A9
C428:FF FF 00 00 FF FF 00 00 B1
C430:FF FF 00 00 FF FF 00 00 B9
C438:FF FF 00 00 FF FF 00 00 C1
C440:FF FF 00 00 FF FF 00 00 C9
C448:FF FF 00 00 FF FF 00 00 D1
C450:FF FF 00 00 FF FF 00 00 D9
C458:FF FF 00 00 FF FF 00 00 E1
C460:FF FF 00 00 FF FF 00 00 E9
C468:FF FF 00 00 FF FF 00 00 F1
C470:FF FF 00 00 FF FF 00 00 F9
C478:FF FF 00 00 FF FF 00 00 02
C480:FF FF 00 00 FF FF 00 00 0A
C488:FF FF 00 00 FF 7D EA 00 DD
C490:FF 00 22 0E BC 81 7D EA 11
C498:7D EA 00 17 C8 0E BC 81 86
C4A0:85 BD 0C BD BA 0E 0F FF E5
C4A8:7D EA 02 07 20 21 DA E4 7C
C4B0:0D 07 FF 7D 78 85 01 00 36
C4B8:22 CF E5 00 0A 14 E1 64 CC
C4C0:A5 85 A4 81 F4 17 81 80 B2
C4C8:00 00 00 01 86 60 00 00 18
C4D0:00 0E 01 0C 74 A7 79 A6 9A
C4D8:9C 2C 9E 35 32 30 39 35 DC
C4E0:00 35 00 00 00 00 00 00 B7
C4E8:2E 4F 42 4A 22 2C 38 2C A8
C4F0:31 00 00 00 00 00 00 00 13
C4F8:00 00 00 00 00 00 00 00 82
C500:00 00 00 00 00 00 00 00 8B
C508:00 00 00 00 00 00 00 00 93
C510:00 00 00 00 00 00 00 00 9B
C518:00 00 00 00 00 00 00 00 A3
C520:00 00 00 00 00 00 00 00 AB
C528:00 00 00 00 00 00 00 00 B3
C530:00 00 00 00 00 00 00 00 BB
C538:00 00 00 00 00 00 00 00 C3
C540:00 00 00 00 00 00 00 00 CB
C548:00 00 00 00 00 00 00 00 D3
C550:00 00 00 00 00 00 00 00 DB
C558:00 00 00 00 00 00 00 00 65
C560:0E F6 04 0A 00 02 10 00 F9
C568:00 48 EB 00 00 00 00 00 83
C570:00 00 00 00 00 00 00 00 FB
C578:00 00 00 00 00 00 00 00 04
C580:00 A9 57 8D 24 03 A9 F1 AC
C588:8D 25 03 A9 00 85 15 A9 09
C590:64 85 14 20 A6 A8 4C AE 53
C598:A7 00 00 00 00 00 00 00 F7
C5A0:00 00 00 00 00 00 00 00 2C
```



```

C5A8:00 00 00 00 00 00 00 00 34
C5B0:00 00 00 00 00 00 00 00 3C
C5B8:00 00 00 00 00 00 00 00 44
C5C0:00 00 00 00 00 00 00 00 4C
C5C8:00 00 00 00 00 00 00 00 54
C5D0:00 00 00 00 00 00 00 00 5C
C5D8:00 00 8B E3 83 A4 7C A5 61
C5E0:1A A7 E4 A7 86 AE CB 00 01
C5E8:00 B0 DA 56 00 9F 04 74 5C
C5F0:6B 8E 53 A2 08 BD EA C5 3D
C5F8:9D F7 07 CA D0 F7 4C DF BD
C600:C1 00 00 00 00 00 00 00 6E

```

```

3FB8:AA AA AA AA 5A 5A 5A C0 E8
3FC0:55 55 55 6A AA AA 6A AA 10
3FC8:AA 6A AA AA 65 55 55 65 C7
3FD0:55 55 65 55 55 65 55 91
3FD8:6B FF FF 6A AA AA 6A AA 33
3FE0:AA 6A AA AA 6A A5 5A 6A 58
3FE8:A5 5E 6A A5 5E 6A A5 5E BF
3FF0:6A AB FE 6A AA AA 6A AA 95
3FF8:AA 6A AA AA 6A A5 5A A5 AB

```

### DEMO

```

FF 20 POKE53280,0:POKE53265,11
      POKE53281,0:PRINT"{CLR}"
      POKE53265,27
BA 30 POKE147,0:SYS57812"POP-UP
      P",8,1:SYS62631
FX 40 POKE147,0:SYS57812"CALCU
      LATOR.SPR",8,1:SYS62631
EH 50 :
EB 60 SYS49752,1020:REM ENABLE
      POP-UP AND SET LINE TO
      {SPACE}BRANCH TO
MJ 70 :
KC 80 A$="{RED}{13 SPACES}COPY
      RIGHT 1992"+CHR$(13)
GE 90 A$=A$+"{4 SPACES}COMPUTE
      PUBLICATIONS, INTL, LTD
      "+CHR$(13)
EC 100 A$=A$+"{10 SPACES}ALL R
      IGHTS RESERVED":FORT=1T
      06:A$=A$+CHR$(13):NEXT
BJ 110 B$="{YEL}{9 SPACES}POP-
      UP DEMO PRESS <F1>":FOR
      T=1T06:B$=B$+CHR$(13):N
      EXT
AX 120 FORT=1TOLN(A$):PRINTMI
      D$(A$,T,1);:FORDL=1T040
      :NEXT:NEXT
GP 130 FORT=1TOLN(B$):PRINTMI
      D$(B$,T,1);:FORDL=1T040
      :NEXT:NEXT
MM 140 GOT0120
PM 150 :
PP 1000 REM POP-UP CALCULATOR
SX 1010 :
DQ 1020 V=53248:POKEV+21,0:S=2
      55:FORT=2040T02047:POK
      ET,S:S=S-1:NEXT
AX 1030 FORT=39T046:POKEV+T,12
      :NEXT:POKEV+37,15:POKE
      V+38,11:POKEV+28,255
DQ 1040 S=0:FORT=0T06STEP2:POK
      EV+T,32+S:S=S+48:NEXT
HK 1050 S=0:FORT=8T014STEP2:PO
      KEV+T,32+S:S=S+48:NEXT
RM 1060 FORT=1T07STEP2:POKEV+T
      ,98:NEXT:FORT=9T015STE
      P2:POKEV+T,140:NEXT
ES 1070 POKEV+29,255:POKEV+23,
      255:POKEV+21,255
GJ 1080 PRINT"{HOME}{5 DOWN}":
      FORT=1T07:PRINT"
      {RIGHT}{23 SPACES}":NE
      XT
QA 1090 POKEV+27,255:PRINT"
      {HOME}{7 DOWN}"TAB(15)
      "{2}C 7 8 9":PRINT
KK 1100 PRINTTAB(4)"{RED}M+ *
      {SPACE}+ %{3 SPACES}

```

### CALCULATOR.SPR

```

3E00:5E 5E B0 5E 5E B0 5E 5E 10
3E08:B0 BE BE B0 AA AA B0 AA 7B
3E10:AA B0 FF FF F0 00 00 00 95
3E18:00 00 00 00 00 00 00 00 94
3E20:00 00 00 00 00 00 00 00 9C
3E28:00 00 00 00 00 00 00 00 A4
3E30:00 00 00 00 00 00 00 00 AC
3E38:00 00 00 00 00 00 00 3F F3
3E40:AA 5E 5E AA 5E 5E AA 5E 40
3E48:5E AA BE BE AA AA AA AA 62
3E50:AA AA FF FF FF 00 00 00 CC
3E58:00 00 00 00 00 00 00 00 D4
3E60:00 00 00 00 00 00 00 00 DC
3E68:00 00 00 00 00 00 00 00 E4
3E70:00 00 00 00 00 00 00 00 EC
3E78:00 00 00 00 00 00 00 5A 4F
3E80:5E 5E 5E 5E 5E 5E 5E 5E FC
3E88:5E BE BE BE AA AA AA AA A7
3E90:AA AA FF FF FF 00 00 00 0D
3E98:00 00 00 00 00 00 00 00 15
3EA0:00 00 00 00 00 00 00 00 1D
3EA8:00 00 00 00 00 00 00 00 25
3EB0:00 00 00 00 00 00 00 00 2D
3EB8:00 00 00 00 00 00 00 5A 8F
3EC0:6A A5 5E 6A A5 5E 6A A5 6F
3EC8:5E 6A AB FE 6A AA AA 6A 32
3ED0:AA AA 7F FF FF 00 00 00 3D
3ED8:00 00 00 00 00 00 00 00 55
3EE0:00 00 00 00 00 00 00 00 5D
3EE8:00 00 00 00 00 00 00 00 65
3EF0:00 00 00 00 00 00 00 00 6D
3EF8:00 00 00 00 00 00 00 00 75
3F00:55 55 50 AA AA B0 AA AA 4B
3F08:B0 AA AA B0 5A 5A B0 5E E5
3F10:5E B0 5E 5E B0 5E 5E B0 08
3F18:BE BE B0 AA AA B0 AA AA 7E
3F20:B0 AA AA B0 5A 5A B0 5E FD
3F28:5E B0 5E 5E B0 5E 5E B0 20
3F30:BE BE B0 AA AA B0 AA AA 96
3F38:B0 AA AA B0 5A 5A B0 A5 5D
3F40:55 55 55 AA AA AA AA 14
3F48:AA AA AA AA 5A 5A EA 25
3F50:5E 5E EA 5E 5E EA 5E 5E 92
3F58:EA BE BE AA AA AA AA 7E
3F60:AA AA AA AA 5A 5A AA FC
3F68:5E 5E AA 5E 5E AA 5E 5E A1
3F70:AA BE BE AA AA AA AA 76
3F78:AA AA AA AA 5A 5A C0 2B
3F80:55 55 55 AA AA AA AA 54
3F88:AA AA AA AA 55 55 55 55 07
3F90:55 55 55 55 55 55 55 0F
3F98:FF FF FF AA AA AA AA C1
3FA0:AA AA AA AA 5A 5A 5A 5E 6E
3FA8:5E 5E 5E 5E 5E 5E 5E 27
3FB0:BE BE BE AA AA AA AA C0

```

```

{2}. 4 5 6":PRINT
DH 1110 PRINTTAB(4)"{RED}MR /
      {SPACE}- = {3 SPACES}
      {2}0 1 2 3"
QX 1120 GOSUB1280
QM 1130 RT=V:O1$=OP$
JC 1140 GOSUB1290:V1=V:O2$=OPS
BK 1150 IF01$="+ THENRT=RT+V1
BE 1160 IF01$="- THENRT=RT-V1
MS 1170 IF01$="* THENRT=RT*V1
CH 1180 IF01$="/ ANDV1=0 THEN12
      10
SR 1190 IF01$="/ THENRT=RT/V1
SP 1200 IFLEN(STR$(RT)) < 12 THEN
      1230
HG 1210 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{6 SPACES}ERR
      OR":GETA$:IFAS<>"
      {HOME}"ANDA$<>"{CLR}"T
      HEN1210
XM 1220 GOT01120
GA 1230 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{11 SPACES}":
      PRINT"{HOME}{7 DOWN}"T
      AB(13-LEN(STR$(RT)))RT
AK 1240 IFO2$<>=" THENO1$=O2$:
      GOT01140
RB 1250 POKE198,0:WAIT198,1:GE
      TA$:IFAS$=" THEN1250
GP 1260 IFAS$="+ ORAS$="- ORAS$="
      * ORAS$="/ THENO1$=A$:G
      OT01140
HF 1270 D$="":C=0:DP=0:Z=0:GOS
      UB1310:GOT01130
XD 1280 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{BLU}
      {10 SPACES}0"
GE 1290 D$="":B$="{11 SPACES}":
      C=0:DP=0:Z=0
MP 1300 POKE198,0:WAIT198,1:GE
      TA$
BM 1310 IFAS$="{HOME}"ORAS$="
      {CLR}" THENCLR:GOT01120
QC 1320 IFZAND(A$="+ ORAS$="- "O
      RA$="* ORAS$="/ ORAS$="
      ") THENOP$=A$:V=VAL(D$)
      :RETURN
ME 1330 IFAS$=" ANDDP=0 THENDP=
      1:GOSUB1370:GOT01360
PK 1340 IFASC(A$) < 48 ORASC(A$) >
      57 ORC > 9 THEN1300
DG 1350 IFAS$="0" ANDDP=0 ANDVAL(
      D$)=0 THENGOSUB1390:GOT
      01300
DE 1360 D$=D$+A$:PRINT"{HOME}
      {7 DOWN}"TAB(2)LEFT$(B
      $,11-LEN(D$))D$:C=C+1:
      Z=1:GOT01300
SD 1370 IFVAL(D$)=0 THEND$="0":
      C=1:Z=1
JG 1380 RETURN
RA 1390 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{10 SPACES}0"
      :Z=1:RETURN

```

Richard Penn is a prolific Commodore programmer who lives in Montreal, Quebec, Canada.

## MIMIC 128

By Joseph Sheppard

I set out to design this diversion just to show my parents that all my hours in front a computer weren't a waste of time. Mimic 128 does a good job of showing off how easy it is to use the 128's sound and graphic commands in BASIC.

Mimic 128 is a simple but entertaining game that's similar to the hand-held electronic game Simon Says. The computer lights one of four colored panels at random and plays a corresponding musical tone. You're to press the joystick up, down, left, or right to light the same panel in response. If you're successful, the computer will repeat the sequence, adding an additional panel each time to the series. The object is to mimic the computer, lighting the same sequence of panels.

### Entering the Program

Mimic 128 is written entirely in BASIC 7. To help avoid typing errors, enter the program with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program to tape or disk before you exit Proofreader.

### High Scores

For those with a competitive nature, Mimic 128 has a high-score sequential file named MM.HS that keeps track of the best player's name, date, and the number of panels he or she has properly responded to. The first time the program is run, MIMIC searches for this file. Since no such file exists, the first player will beat a high score of 0. The first player is guaranteed a spot on the disk for at least one session, no matter how badly he or she plays.

### Tape Support

Players using tape drives should modify the OPEN statements in lines 35 and 30120 to ,1 instead of ,8. Also, tape users should immediately play a game to establish the high-score file directly behind the section of tape where the game file has been saved.

After you finish a game, the computer will check to see if you made the high score. If so, you'll be asked for the appropriate information. After a game, you'll be presented with a menu whose choices consist of Try again,

Continue, and End. Select Continue if you wish to continue with the current game. The computer won't accept a high score based on the continuation of an old game, however. Try again starts a new game, and End returns you to BASIC.

One last note: Be sure to explore the sound capabilities of your machine. Feel free to alter the sound envelopes, producing different tones and sounds for each panel. You can also make the final sound of the game (the one generated when you mess up) a little less dramatic and frightening.

### MIMIC 128

```
MM 5 REM COPYRIGHT 1992 - COMPUTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
CG 10 DIM MD$(60),MC$(60)
QR 20 COLOR0,1:COLOR4,1
EE 30 PRINT "{CLR}":PRINT "DIFFICULTY LEVEL (1-EASIER TO 5-BORING)":GETKEYDL
RE 32 IFDL<ORDL>5 THEN30
FG 35 OPEN2,8,2,"MM.HS,S,R"
RB 36 INPUT#2, ZN$(1),ZZ$(1),ZD$(1)
PG 37 DCLOSE
MB 38 ZZ(1)=VAL(ZZ$(1))
SJ 60 PRINT "{CLR}":FORZ=1TO12:PRINT:NEXTZ:PRINT "{12 SPACES}SETTING UP BOARD":PRINT "{10 SPACES}TEN SECONDS, PLEASE.":SLEEP2
QE 70 FAST
RR 80 GOSUB10000
HP 90 SLOW
QS 100 NT=RND(TI):NT=INT(RND(1)*4+1)
XA 110 NT$=STR$(NT)
RQ 120 IFNT=1THENNN$="C":X=17:Y=9:C=6
QX 130 IFNT=2THENNN$="D":X=26:Y=12:C=7
JK 140 IFNT=3THENNN$="E":X=17:Y=15:C=8
PX 150 IFNT=4THENNN$="F":X=9:Y=12:C=3
EF 160 MS$=MS$+NN$
FK 170 COLOR2,2:FORZ=1TO600:NEXTZ:GOSUB20000
SA 180 A$=""
KS 190 FORT=1TO(LEN(MS$))
MM 200 MC(T)=JOY(2)
MX 202 IFMC(T)=1THENMC$(T)="C":X=17:Y=9:C=6:GOTO210
GD 203 IFMC(T)=3THENMC$(T)="D":X=26:Y=12:C=7:GOTO210
QS 204 IFMC(T)=5THENMC$(T)="E":X=17:Y=15:C=8:GOTO210
JA 205 IFMC(T)=7THENMC$(T)="F":X=9:Y=12:C=3:GOTO210
```

```
HS 206 GOTO200
SS 210 IFMC$(T)<>MD$(T) THEN240
SD 220 CHAR2,X-1,Y,"CORRECT"
KJ 221 PLAYMC$(T)
GA 222 FORZ=1TODL+75:NEXTZ
XK 224 COLOR3,C
KR 226 CHAR3,X-1,Y,"{7 SPACES}",1
CF 234 A$=A$+MC$(T)
JP 236 NEXTT
DA 238 IFAS$=MS$THEN100
XQ 240 SOUND2,2500,60,2,2470,2,1,3048
SH 243 SOUND3,2000,50,2,,3,3
QF 990 PRINT"YOU GOT":LEN(MS$)-1;"CORRECT!":SLEEP3
XK 994 IFQQ=0THENGOSUB30000
GK 995 FORZ=1TO24:PRINT:NEXTZ:INPUT"{BLU}DO YOU WISH {SPACE}TO (T)RY AGAIN,(C)ONTINUE{3 SPACES}OR (E)ND";M$
KJ 996 IFM$="T"THENQQ=0:PRINT:PRINT:PRINT:A$="" :MS$="" :PRINT:PRINT:PRINT:GOTO100
SQ 997 IFM$="C"THENQQ=1:PRINT:PRINT:PRINT:GOTO170
GG 998 GRAPHIC0,1:END
QJ 10000 REM **{2 SPACES}GRAPHIC SETUP{2 SPACES}**
MH 10001 REM **{2 SPACES}PLAYING BOARD{2 SPACES}**
HQ 10005 GRAPHIC4,1,23:COLOR1,2
SH 10100 WIDTH2:DRAW1,28,46TO73,46TO78,53TO83,46TO127,46TO142,75TO142,123TO127,152TO83,152TO78,145TO73,152TO28,152TO14,125TO14,74TO28,46:WIDTH1
FB 10110 DRAW1,51,66TO105,66TO85,90TO71,90TO51,66
AR 10120 DRAW1,72,109TO84,109TO104,132TO51,132TO72,109
EH 10130 DRAW1,95,93TO115,75TO129,75TO129,123TO115,123TO95,105TO95,93
GC 10140 DRAW1,61,105TO61,93TO41,75TO29,75TO29,123TO041,123TO61,105
AQ 10200 COLOR1,16:COLOR2,3:COLOR3,7
GR 10210 PAINT2,50,100,1
ED 10220 PAINT3,101,100,1
DG 10230 COLOR2,6:COLOR3,8
ES 10240 PAINT2,60,75,1
SB 10250 PAINT3,75,120,1
GD 10300 CHAR1,17,12,"MIMIC"
AB 10999 RETURN
FR 20000 REM{2 SPACES}***{2 SPACES}LIGHT UP PANEL{2 SPACES}***
RB 20100 FORT=1TOLEN(MS$)
KK 20110 MD$(T)=MID$(MS$,T,1)
```

```

GH 20120 NEXTT
HD 20130 FORT=1TOLEN(MSS)
JD 20140 PLAYMDS(T)
BD 20142 IFMDS(T)="C"THENX=17:
Y=9:C=6
DD 20144 IFMDS(T)="D"THENX=25:
Y=12:C=7
QH 20146 IFMDS(T)="E"THENX=17:
Y=15:C=8
XC 20148 IFMDS(T)="F"THENX=9:Y
=12:C=3
RQ 20150 CHAR2,X,Y,"PRESS"
KM 20160 FORZ=1TODL*100:NEXTZ
QB 20170 COLOR3,C
AS 20180 CHAR3,X,Y,"{5 SPACES}
",1
ER 20190 NEXTT
FG 20199 RETURN
JP 30000 MS=LEN(MSS)-1
EM 30010 IFMS<ZZ(1) THENRETURN
QD 30020 GRAPHIC0,1
DK 30030 PRINT"{RED}CONGRADULA
TIONS! YOU HAVE JUST
{SPACE}BEAT THE
{2 SPACES}PREVIOUS RE
CORD OF"
BF 30040 PRINT"{GRN} ";ZZ(1);"
{RED} SET BY {GRN}";Z
NS(1);" {RED}ON {GRN}
";ZDS(1);"{RED}"
CX 30050 GETKEYAS
RA 30060 PRINT:INPUT"WHAT IS Y
OUR NAME";ZNS(1)
ER 30070 INPUT"WHAT IS TODAY'S
DATE";ZDS(1)
PA 30080 ZZ(1)=MS:GS=CHRS(13)
JB 30100 PRINT:PRINT"{BLU}ONE
{SPACE}MOMENT; SAVING
SCORES..."
RP 30110 SCRATCH"MM.HS"
RJ 30120 OPEN2,8,2,"MM.HS,S,W"
EE 30130 PRINT#2,ZNS(1)GS ZZ
(1)GS ZDS(1)
QS 30140 DCLOSE
HK 30150 GRAPHIC4,0,23
AD 30160 RETURN

```

Joseph Sheppard lives in West Fork, Arkansas.

## SPEEDPURGE

By Daniel Lightner

SpeedCheck is a popular utility program that checks for misspelled words in any SpeedScript word processing document. It examines text word by word, comparing words in the document with entries in its dictionary. If the program comes across a word it doesn't recognize, it highlights the word on your screen so that you can correct any misspellings immediately. If SpeedCheck comes across a correctly spelled word that isn't in its dictionary, it will also highlight that word. These new words can then be added to

SpeedCheck's dictionary. As you work with SpeedCheck, you can create your own personalized dictionary disks, which may contain thousands of words.

Words on the SpeedCheck dictionary disk are kept in sequential files, with one file for each of the 26 letters of the alphabet. As new words are added, they are tacked onto the end of the appropriate file. This makes adding words to the dictionary fast and simple, but it makes looking up words slower because words are added in random—rather than alphabetical—order. Within the file for Z, for example, *zebra* might be found between *zymurgy* and *zipper*.

The only way to find a particular item in randomly ordered data is to search sequentially from the first item until the desired item is found. Thus, when SpeedCheck looks up a word, it must hunt through all the words with the same initial letter before it can determine whether or not that word is present.

People who use SpeedCheck know how easy it is to have dictionary files containing duplicate words. SpeedCheck's Disk Manager program can help, but it's difficult to find duplicates if there are many words between them. Sometimes there may be three or four duplicate words hogging space on the disk, slowing down SpeedCheck.

Purging files manually for duplicate words can be a tedious task for a human, but it's an ideal chore for a computer. SpeedPurge is just such a utility. It searches SpeedCheck dictionary files for duplicate words and deletes them.

### Entering the Program

SpeedPurge is a fairly short BASIC program. To help avoid typing errors, however, enter the program with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save the program to disk.

### Purging Your Files

SpeedPurge is easy to use; just load and run it. When you're ready to start, place the disk containing the SpeedCheck dictionary files in drive 8. SpeedPurge prompts for a filename, and you enter the letter of the alphabet that represents the file that you wish to check. For example, press A to check the A file and B to check the B file.

SpeedPurge reads the file into an array and converts it to ASCII format. Then it checks the entire file for duplicate words. When SpeedPurge finds a match, it displays the word and the locations in the file where the match was found. Then it deletes one of the pair. It then continues searching until another match is found or until the entire file has been checked. When it has finished checking the file, SpeedPurge asks whether or not you wish to save the corrected file. Obviously, if no matches were found, there would be no need to save the file. Press N if you don't want to save it; press Y if you do.

After it has finished saving the file, SpeedPurge asks if you wish to check another file. Type Y to continue checking files or N to exit SpeedPurge.

## SPEEDPURGE

```

SH 5 REM COPYRIGHT 1992
HK 10 REM COMPUTE PUBLICATIONS
INTL LTD
MP 15 REM ALL RIGHTS RESERVED
RG 20 CLR:DIMAS(500):OPEN15,8,
15
PK 25 PRINT"{CLR}{DOWN}
{12 RIGHT}{7}SPEEDPURGE
{2 DOWN}"
EG 30 POKE53280,0:POKE53281,0
EC 35 INPUT"{BLU}FILE {RED}(A-
Z) {BLU}";F$
XR 40 IFLen(F$)>1THEN25
PD 45 IFASC(F$)<65ORASC(F$)>90
THEN25
PS 50 OPEN2,8,2,"0:"+F$+"",S,R"
:GOSUB225:B$=F$:X=1:POKE
781,2:SYS65478:SYS65487
BG 55 SYS65487:A=PEEK(780)
KA 60 IFA>127THENA=A-64:B$=B$+
CHR$(A):A$(X)=B$:B$=F$:X
=X+1:GOTO80
CR 65 IFA=39THEN75
DH 70 IFA<64THENA=A+64
JM 75 B$=B$+CHR$(A)
QJ 80 IFST=0THEN55
QE 85 CLOSE2:POKE781,0:SYS6547
8:X=X-1
KS 90 Z=1
PQ 95 IT=0:PRINT"{DOWN}{7}":FO
RT=ZTOX:A$=A$(T):PRINT"
{UP}{8 SPACES}{8 LEFT}";
T:"-";X:FORR=1TOX
EQ 100 IFA$=A$(R)THENIFR<>TTHE
NGOSUB220
FS 105 NEXTR,T
KA 110 IFIT=0THEN125
AG 115 IFIT=XTHENX=X-1:GOTO95
RP 120 FORT=ITOX-1:A$(T)=A$(T
+1):NEXTT:X=X-1:GOTO95
FA 125 PRINT"{BLU}":FORT=1TOX:
PRINT;A$(T):A$(T)=RIGH
T$(A$(T),LEN(A$(T))-1)

```

# PROGRAMS

```

EP 130 B$="":FORR=1TOLEN(A$(T)
) -1:A=ASC(MID$(A$(T),R,
1)):IFA>63THENA=A-64
MB 135 B$=B$+CHR$(A):NEXTR:A=A
SC(RIGHT$(A$(T),1)):A=A
+64:B$=B$+CHR$(A)
SJ 140 A$(T)=B$:NEXTT
SR 145 PRINT"{DOWN}{7}SAVE THI
S FILE {RED}Y/N"
RE 150 GETA$:IFA$=""THEN150
GP 155 IFA$="N"THEN190
FG 160 IFA$<"Y"THEN150
AR 165 PRINT#15,"S0:"+F$:GOSUB
230
QS 170 OPEN2,8,2,"0:"+F$+"S,W
":POKE781,2:SYS65481:PO
KE780,13:SYS65490
PK 175 FORT=1TO1:FORR=1TOLEN(A
$(T)):A$=MID$(A$(T),R,1
):A=ASC(A$):POKE780,A
AD 180 SYS65490
JS 185 NEXTR,T:CLOSE2:POKE781,
3:SYS65481:GOSUB230
KG 190 PRINT"{DOWN}{3}FINISHED
!"
RK 195 PRINT"{DOWN}{7}DO ANOTH
ER FILE {RED}Y/N"
CS 200 GETA$:IFA$=""THEN200
KG 205 IFA$="Y"THEN200
XX 210 IFA$="N"THENCLOSE15:END
XX 215 GOTO200
JD 220 PRINT"{DOWN}{BLU}FOUND
{SPACE}A MATCH! {RED}";
CHR$(34);A$(R);CHR$(34)
;" {BLU}";T;"{RED}&
{BLU}";R
GA 225 Z=T:IT=R:T=X:R=X:RETURN
SS 230 INPUT#15,EN,EMS,ET,ES
MF 235 PRINT"{DOWN}{RED}"EN;EM
S;ET;ES:IFEN>1THENCLOSE
15:STOP
MF 240 RETURN

```

Daniel Lightner programs and raises Himalayan cats in Sidney, Montana.

## ALPHABETIZER

By Todd Piltingsrud

As many 64 and 128 programmers know from experience, original and public domain programs can quickly fill up your disk library. Finding a desired file is no problem when there are only a few programs on a disk, but when file after file scrolls by during a directory listing, it can be a hassle. Wouldn't it be easier if all files were in alphabetical order?

Alphabetizer was written as a solution to that problem. It reads a disk directory, reorganizes it, and then saves it back to disk in alphabetical order. The directory stays in alphabetical order until you add additional files or programs.

Alphabetizer consists of two pro-

grams. The main program is in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

This program loads a short machine language program. You'll have to use MLX, our machine language program, to enter it. Save it with the name ALPHA.ML, as this is the name used by the BASIC program. When MLX prompts, respond with the following values.

Starting address: C000

Ending address: C147

### Putting Disks in Order

Using Alphabetizer is simple. After running it, select a disk you want to alphabetize and place it in the drive. Press A to alphabetize it or press D to see its directory. When you have finished, press Q to quit.

### ALPHABETIZER

```

CP 1 REM COPYRIGHT 1992 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
CG 5 IFPEEK(49152)<>160THENLOA
D"ALPHA.ML",8,1
QB 10 PRINT"{CLR}"TAB(11)"
{DOWN}{A}*****
{S}"
HQ 20 PRINTTAB(11)"_A - ALPHAB
ETIZE-" :PRINTTAB(11)"_D
{SPACE}- DIRECTORY
{2 SPACES}_"
HS 25 PRINTTAB(11)"_Q - QUIT
{7 SPACES}_" :PRINTTAB(11)
"_{Z}*****{X}"
RM 27 POKE56,142:CLR:DIMEF$(14
4),SP$(144),SS$(144)
EX 30 GETA$:IFA$="A"THEN80
EA 40 IFA$="D"THENSYS49411:GOT
0680
QP 60 IFA$<"Q"THEN30
CB 70 PRINT"{CLR}";:END
DK 80 PRINT"{DOWN}READING DIRE
CTORY";:OPEN1,8,15,"I":G
OSUB660:CLOSE1
PS 90 SYS49152:I1=PEEK(7):PRIN
T I1"FILES"
KR 230 PRINT"{DOWN}ALPHABETIZI
NG":FORT=1TO1:SP$(T)=S
P$(T)+FP$(T):NEXT
KP 240 N=I1:LI=1:B(LI)=N+1:M=1
DD 250 J=B(LI):I=M-1:IFJ-M<3TH
EN360
JD 260 MI=INT((I+J)/2)
KM 270 I=I+1:IFI=JTHEN320
MB 280 IFSP$(I)<=SP$(MI)THEN27
0
KX 290 J=J-1:IFI=JTHEN320

```

```

RX 300 IFSP$(J)>=SP$(MI)THEN29
0
PX 310 SP$=SP$(I):SP$(I)=SP$(J
):SP$(J)=SP$:GOTO270
EH 320 IFI>MITHENI=I-1
XS 330 IFJ=MITHEN350
QC 340 SP$=SP$(I):SP$(I)=SP$(M
I):SP$(MI)=SP$
KR 350 LI=LI+1:B(LI)=I:GOTO250
BC 360 IFJ-M<2THEN390
EM 370 IFSP$(M)<SP$(M+1)THEN39
0
BC 380 SP$=SP$(M):SP$(M)=SP$(M
+1):SP$(M+1)=SP$
GR 390 M=B(LI)+1:LI=LI-1:IFLI>
0THEN250
QM 400 FORT=1TO1:FP$(T)=RIGHT
$(SP$(T),5):SP$(T)=LEFT
$(SP$(T),27):NEXT
PS 410 OPEN1,8,15,"I":GOSUB660
:OPEN8,8,8,"#":I2=1:PRI
NT"{DOWN}WRITING DIRECT
ORY"
EH 420 PRINT#1,"B-P";8;0
PP 430 C=0:READS:IFI1-I2<8THEN
PRINT#8,CHR$(0)CHR$(255
);:GOTO450
JB 440 PRINT#8,CHR$(18)CHR$(S)
;
DJ 450 PRINT#8,RIGHT$(FP$(I2),
3);:GOTO470
GE 460 PRINT#8,FP$(I2);
XD 470 PRINT#8,SP$(I2);
SA 480 IFI2=I1THEN510
PX 490 I2=I2+1:C=C+1:IFC<8THEN
460
HD 500 READS:PRINT#1,"U2";8;0;
18;S:GOTO420
CG 510 A$="" :FORT=1TO32:A$=A$+
CHR$(0):NEXT
SG 520 C=C+1:IFC=8THEN540
XA 530 PRINT#8,A$;:GOTO520
MR 540 READS:PRINT#1,"U2";8;0;
18;S:CLOSE8:SYS49411:GO
TO680
JH 550 DATA 4,1,7,4,10,7,13,10
,16,13,2,16,5,2,8,5,11,
8,14,11,17,14,3,17,6,3,
9,6
HQ 560 DATA 12,9,15,12,18,15,0
,18
RE 660 INPUT#1,A,B$,C,D:IFA=0T
HENRETURN
PP 670 PRINTA;B$;C;D
GQ 680 CLOSE1:PRINT"{DOWN}PRES
S RETURN"
CQ 690 GETA$:IFA$<">CHR$(13)THE
N690
AM 700 RUN

```

### ALPHA.ML

```

C000:A0 08 20 EC C0 A9 00 85 D8
C008:02 A9 8E 85 03 A0 02 20 DD
C010:CF FF C8 D0 FA A9 00 F0 0F
C018:0E 20 CF FF 91 02 A5 90 13
C020:D0 0E C8 D0 F4 E6 03 91 8E
C028:02 C8 91 02 C8 4C 19 C0 99
C030:20 3B C1 38 A5 03 E9 8D E6
C038:85 03 A2 04 46 03 66 02 DE

```

```

C040:CA 10 F9 4C 9B C0 24 30 87
C048:A5 2F 85 03 A5 30 85 04 46
C050:A0 00 B1 03 DD 97 C0 F0 48
C058:15 A0 02 18 B1 03 65 03 B5
C060:48 C8 B1 03 65 04 85 04 E8
C068:68 85 03 4C 50 C0 C8 B1 6D
C070:03 DD 98 C0 D0 E3 18 A5 F5
C078:03 69 0A 95 03 A5 04 69 90
C080:00 95 04 60 A2 02 2C A2 06
C088:00 A9 03 18 75 03 95 03 3C
C090:A9 00 75 04 95 04 60 46 99
C098:D0 53 D0 A2 02 20 48 C0 7D
C0A0:A2 00 86 07 20 48 C0 A9 02
C0A8:00 85 FB A9 8E 85 FC A0 CA
C0B0:02 B1 FB F0 2B A0 00 A9 B3
C0B8:05 91 03 C8 A5 FB 91 03 51
C0C0:C8 A5 FC 91 03 20 87 C0 31
C0C8:A0 00 A9 1B 91 05 C8 18 CB
C0D0:A5 FB 69 05 91 05 C8 A5 79
C0D8:FC 91 05 20 84 C0 E6 07 DB
C0E0:A2 F8 A9 20 20 8B C0 C6 A0
C0E8:02 D0 C4 60 A9 08 AA 20 21
C0F0:BA FF A9 02 A2 46 A0 C0 55
C0F8:20 BD FF 20 C0 FF A2 08 4F
C100:4C C6 FF A0 00 20 EC C0 80
C108:20 D7 AA A0 04 20 A5 FF DC
C110:88 10 FA 48 20 A5 FF A8 FF
C118:68 AA 98 A4 90 D0 1C A0 78
C120:06 84 D3 20 CD BD E6 D3 4B
C128:20 A5 FF 20 16 E7 D0 F8 12
C130:20 D7 AA A5 C6 D0 04 A0 8B
C138:02 D0 D2 A9 08 20 C3 FF 2E
C140:4C CC FF 00 00 00 00 00 1D

```

Todd Piltingsrud has subscribed to Gazette for three years and has never seen a utility that alphabetizes a directory. So he wrote one. He lives in New Richland, Minnesota.

## DUPLICATE 1541

By Daniel Lightner

When you want to copy files from one disk to another with Commodore BASIC, you must first load a file, swap disks, and then use the SAVE command. This process can become tedious when you copy a disk that contains numerous programs and files.

Unlike some computers, the 64/128 doesn't come with a built-in DISKCOPY command. Using a utility program to do the job for you is one way around this problem. Duplicate 1541 is just such a utility. With it and a 1541 disk drive, you can make exact copies of any floppy disk that isn't copy-protected.

### Typing It In

Duplicate 1541 is written entirely in machine language, but it loads and runs like a BASIC program. To enter it, use MLX, our machine language entry pro-

gram; see "Typing Aids" elsewhere in this section. When MLX asks for starting and ending addresses, respond with the following values.

**Starting address: 0801**

**Ending address: 0DA8**

When you've finished typing in Duplicate 1541, be sure that you save a copy of the program to disk.

### Making Copies

Before attempting to copy a disk, it's a good idea to place a tab over its write-protect notch. This is just a precaution in case an accident occurs during the copy process.

When you run Duplicate, it'll prompt you to place the source disk in drive 8. This is the disk that you wish to copy. After you press the space bar, Duplicate 1541 reads the disk name and ID and starts reading sectors into memory starting at track 1. When the computer's memory is filled, the program will prompt you to place a target disk in the drive. Remove the source disk, place a blank disk in the drive, and press the space bar.

Your blank disk doesn't have to be formatted; Duplicate 1541 automatically formats it for you. To copy an entire disk, this process must be repeated three more times. You'll be prompted when to swap disks.

Duplicate 1541 isn't exactly a speedster, but it'll get the job done. To boost the copying speed a bit, the program blanks the screen and sets the 1541 to 1540 mode. If your disk has only a few files on it, copying them manually may be faster.

Duplicate 1541 will inform you when the copying process is complete. You'll then be asked if you wish to make more copies. If you do, tap the Y key. Press the N key, and Duplicate 1541 will return your computer to BASIC. When it has finished all of its tasks, Duplicate 1541 restores the screen and returns the drive to 1541 mode.

### DUPLICATE 1541

```

0801:0B 08 C8 07 9E 32 30 36 76
0809:31 00 00 00 A9 00 8D 20 3A
0811:D0 8D 21 D0 78 A5 01 29 A3
0819:FE 85 01 58 20 91 0B 20 2D
0821:CC FF A9 20 8D B2 02 20 2A

```

```

0829:EC 0A A9 08 20 B1 FF A9 59
0831:6F 85 B9 20 93 FF A0 00 71
0839:B9 93 0C 20 A8 FF C8 C0 26
0841:0B D0 F5 20 AE FF A9 08 9C
0849:20 B1 FF A9 6F 85 B9 20 95
0851:93 FF A0 00 B9 9E 0C 20 BF
0859:A8 FF C8 C0 09 D0 F5 20 7A
0861:AE FF A2 02 20 C6 FF A0 F9
0869:00 A2 00 20 CF FF C9 A0 D6
0871:F0 04 9D 38 03 E8 C8 C0 40
0879:12 D0 F0 A9 2C 9D 38 03 CA
0881:E8 A0 00 20 CF FF 9D 38 22
0889:03 E8 C8 C0 02 D0 F4 8E 46
0891:34 03 A2 00 20 C6 FF 20 0D
0899:E3 0A A2 00 20 EB 0B 20 59
08A1:43 09 20 06 0B A9 02 20 1D
08A9:C3 FF 20 B4 0B 20 9F 0B 0E
08B1:20 E3 0A A2 00 20 EB 0B 99
08B9:20 A2 09 20 EC 0A 20 E3 59
08C1:0A A2 01 20 EB 0B 20 43 B0
08C9:09 20 06 0B 20 E3 0A A2 1F
08D1:01 20 EB 0B 20 A2 09 20 56
08D9:EC 0A 20 E3 0A A2 02 20 24
08E1:EB 0B 20 43 09 A2 03 20 DB
08E9:EB 0B 20 43 09 A2 04 20 E5
08F1:EB 0B 20 43 09 20 06 0B D2
08F9:20 E3 0A A2 02 20 EB 0B F1
0901:20 A2 09 A2 03 20 EB 0B 92
0909:20 A2 09 A2 04 20 EB 0B A2
0911:20 A2 09 20 EC 0A 20 E3 B2
0919:0A A2 05 20 EB 0B 20 43 8A
0921:09 A2 06 20 EB 0B 20 43 32
0929:09 20 06 0B 20 E3 0A A2 80
0931:05 20 EB 0B 20 A2 09 A2 3C
0939:06 20 EB 0B 20 A2 09 4C 6E
0941:69 0B A9 08 20 B1 FF A9 F1
0949:6F 85 B9 20 93 FF A0 00 8B
0951:B9 A7 0C 20 A8 FF C8 C0 45
0959:07 D0 F5 20 A3 0A 20 AE 18
0961:FF 20 B7 FF C9 00 D0 F9 5C
0969:A2 02 20 C6 FF A0 00 20 60
0971:CF FF 91 FB C8 C0 00 D0 77
0979:F6 A2 00 20 C6 FF 20 3C 64
0981:0A 20 D5 0A AD CF 02 CD 7A
0989:CB 02 D0 0F AD CD 02 CD 83
0991:C7 02 D0 01 60 20 2C 0A 18
0999:4C 43 09 20 22 0A 4C 43 DA
09A1:09 A2 02 20 C6 FF A9 08 B4
09A9:20 B1 FF A9 6F 85 B9 20 F7
09B1:93 FF A0 00 B9 B5 0C 20 7E
09B9:A8 FF C8 C0 07 D0 F5 20 CC
09C1:AE FF A2 02 20 C9 FF A0 68
09C9:00 B1 FB 20 D2 FF C8 C0 B2
09D1:00 D0 F6 A2 03 20 C9 FF 4D
09D9:20 3C 0A A9 08 20 B1 FF 0B
09E1:A9 6F 85 B9 20 93 FF A0 E0
09E9:00 B9 AE 0C 20 A8 FF C8 6D
09F1:C0 07 D0 F5 20 A3 0A 20 63
09F9:AE FF 20 B7 FF C9 00 D0 DA
0A01:F9 20 D5 0A AD CF 02 CD F3
0A09:CB 02 D0 0F AD CD 02 CD 05
0A11:C7 02 D0 01 60 20 2C 0A 99
0A19:4C A2 09 20 22 0A 4C A2 93
0A21:09 18 AD CF 02 69 01 8D B7
0A29:CF 02 60 18 AD CD 02 69 45
0A31:01 8D CD 02 18 A9 00 8D F7
0A39:CF 02 60 A9 08 20 B4 FF 86
0A41:A9 6F 85 B9 20 96 FF 20 CD
0A49:A5 FF 8D E0 02 C9 F0 D0 58
0A51:0D 20 A5 FF 8D E1 02 C9 6A

```

```

0A59:30 D0 09 4C AB FF 20 A5 E2
0A61:FF 8D E1 02 A0 02 20 A5 28
0A69:FF 99 E0 02 C8 C9 0D D0 78
0A71:F5 20 AB FF A9 08 20 C3 6F
0A79:FF 20 40 0B 20 CC FF A9 2C
0A81:0D 20 D2 FF A9 1D 20 D2 53
0A89:FF 20 D2 FF A0 00 B9 E0 59
0A91:02 20 D2 FF C8 C9 0D D0 61
0A99:F5 68 68 68 68 A0 17 4C 96
0AA1:6E 0B AE CD 02 A9 00 20 39
0AA9:0A 0C A0 00 B9 FB 02 20 BB
0AB1:A8 FF C8 CC B0 02 D0 F4 24
0AB9:A9 20 20 A8 FF AE CF 02 95
0AC1:A9 00 20 0A 0C A0 00 B9 EB
0AC9:FB 02 20 A8 FF C8 CC B0 58
0AD1:02 D0 F4 60 18 A5 FB 69 78
0AD9:00 85 FB A5 FC 69 01 85 3E
0AE1:FC 60 A9 A8 85 FB A9 0D C8
0AE9:85 FC 60 20 40 0B A0 00 7D
0AF1:B9 C2 0C 20 D2 FF C8 C0 FF
0AF9:2C D0 F5 20 E4 FF C9 20 F3
0B01:D0 F9 4C 19 0B 20 40 0B 7D
0B09:A0 00 B9 ED 0C 20 D2 FF 0C
0B11:C8 C0 2C D0 F5 4C FC 0A 33
0B19:20 9F 0B AD 11 D0 29 EF 71
0B21:8D 11 D0 A9 08 20 B1 FF 1B
0B29:A9 6F 85 B9 20 93 FF A0 2C
0B31:00 B9 BC 0C 20 A8 FF C8 7A
0B39:C0 03 D0 F5 4C AE FF A9 B0
0B41:02 20 C3 FF AD 11 D0 09 35
0B49:10 8D 11 D0 A9 08 20 B1 59
0B51:FF A9 6F 85 B9 20 93 FF 8D
0B59:A0 00 B9 BF 0C 20 A8 FF 25
0B61:C8 C0 03 D0 F5 4C AE FF B7
0B69:20 40 0B A0 00 B9 18 0D 2F
0B71:20 D2 FF C8 C0 33 D0 F5 43
0B79:20 E4 FF C9 00 F0 F9 C9 F6
0B81:4E F0 07 C9 59 F0 06 4C 5F
0B89:79 0B 4C E2 FC 4C 20 08 38
0B91:A0 00 B9 4B 0D 20 D2 FF 72
0B99:C8 C0 5D D0 F5 60 A9 01 82
0BA1:A2 92 A0 0C 20 BD FF A9 24
0BA9:02 A2 08 A0 02 20 BA FF 7A
0BB1:4C C0 FF A9 4E 8D 35 03 CE
0BB9:A9 30 8D 36 03 A9 3A 8D 86
0BC1:37 03 18 AD 34 03 69 03 95
0BC9:8D 34 03 AD 34 03 A2 35 17
0BD1:A0 03 20 BD FF A9 0F A2 40
0BD9:08 A0 0F 20 BA FF 20 C0 D6
0BE1:FF A9 0F 20 C3 FF 20 3C E0
0BE9:0A 60 BD 76 0C 8D C5 02 60
0BF1:8D CD 02 BD 7D 0C 8D 07 5D
0BF9:02 BD 84 0C 8D C9 02 8D F6
0C01:CF 02 BD 8B 0C 8D CB 02 22
0C09:60 8D B4 02 8E B3 02 A2 55
0C11:00 8E B0 02 A2 09 8E B5 0F
0C19:02 A0 B0 AD B3 02 DD 56 03
0C21:0C AD B4 02 FD 57 0C 90 57
0C29:0F 8D B4 02 AD B3 02 FD 21
0C31:56 0C 8D B3 02 C8 D0 E3 1D
0C39:98 CA F0 11 C9 B0 F0 03 75
0C41:8D B5 02 2C B5 02 30 05 AB
0C49:AD B2 02 F0 05 29 7F 20 20
0C51:61 0C CA 10 C4 60 01 00 21
0C59:0A 00 64 00 E8 03 10 27 9D
0C61:8C B1 02 AC B0 02 99 FB F3
0C69:02 C9 20 F0 04 C8 8C B0 15
0C71:02 AC B1 02 60 01 09 11 36
0C79:12 19 1A 1F 08 10 11 18 D0
0C81:19 1E 23 00 00 00 00 12

```

```

0C89:00 00 14 14 14 12 11 11 81
0C91:10 23 55 31 20 32 20 30 72
0C99:20 31 38 20 30 42 2D 50 4C
0CA1:20 32 20 31 34 34 55 31 BB
0CA9:20 32 20 30 20 55 32 20 40
0CB1:32 20 30 20 42 2D 50 20 7A
0CB9:32 20 30 55 49 2D 55 49 41
0CC1:2B 0D 9A 20 20 50 55 54 49
0CC9:20 1C 53 4F 55 52 43 45 18
0CD1:20 9A 44 49 53 4B 20 49 0F
0CD9:4E 20 44 52 49 56 45 20 1D
0CE1:1C 50 52 45 53 53 20 53 36
0CE9:50 41 43 45 0D 9A 20 20 6A
0CF1:50 55 54 20 1C 54 41 52 1B
0CF9:47 45 54 20 9A 44 49 53 5F
0D01:4B 20 49 4E 20 44 52 49 D6
0D09:56 45 20 1C 50 52 45 53 0F
0D11:53 20 53 50 41 43 45 0D FA
0D19:96 20 20 43 4F 50 59 20 4D
0D21:43 4F 4D 50 4C 45 54 45 C4
0D29:44 20 21 21 21 0D 0D 9A 95
0D31:20 20 4D 41 4B 45 20 41 12
0D39:4E 4F 54 48 45 52 20 43 54
0D41:4F 50 59 3F 20 1C 59 2F 89
0D49:4E 0D 96 93 0D 20 20 44 47
0D51:55 50 4C 49 43 41 54 45 55
0D59:20 31 35 34 31 0D 9A 20 CC
0D61:20 43 4F 50 59 52 49 47 39
0D69:48 54 20 31 39 39 32 0D F3
0D71:20 20 43 4F 4D 50 55 54 AB
0D79:45 20 50 55 42 4C 49 43 B6
0D81:41 54 49 4F 4E 53 20 49 B8
0D89:4E 54 4C 20 4C 54 44 0D B4
0D91:20 20 41 4C 4C 20 52 49 81
0D99:47 48 54 53 20 52 45 53 51
0DA1:45 52 56 45 44 0D 0D EA 6D

```

Daniel Lightner is a regular contributor who lives in Sidney, Montana.

## RAILROAD SOLITAIRE

By Donald G. Klich

Have you ever been caught up in a simple game that's so challenging that you have a hard time turning it off? Railroad Solitaire for the 128 is just such a game.

This card game for one person was originally created to be used as a pastime while traveling by train, since little space was available for conventional games of solitaire. The object of the game is ultimately to discard the entire deck while working with only the four currently dealt cards.

### Typing It In

Railroad Solitaire is written entirely in BASIC 7.0 and works with a 40-column screen. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

## Playing a Hand

You may discard the middle two cards of the set of four that appear onscreen if the bracketing cards are of the same suit or value. If all four cards match in suit or value, then all four can be discarded. If you can't play, you must request another card. This card is placed at the right-hand side of the screen, and the card on the left is moved offscreen and temporarily "lost." When discards occur, lost cards from the left move back to fill the spaces. If you're lucky enough to have insufficient lost cards to fill in from the left, new cards will be dealt to fill in from the right.

Onscreen prompts will tell you which keys to press to discard or request cards. Unlike solitaire played with actual cards, this computerized version won't let you cheat or make an improper move.

When you've gone through the deck, discarding all that you can, the game will end, and you'll be informed of any remaining cards. You'll then have the opportunity to play again and better your score.

Be prepared for long hours of play to beat the odds. It took the author an hour to win, just so he could test all the logic involved.

## RAILROAD SOLITAIRE

```

EQ 10 REM COPYRIGHT 1992 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
PR 20 REM $$ CONTAINS SUIT CHA
      RACTERS
MJ 30 REM $$$ CONTAINS SUIT PI
      XELS
KH 40 REM C CONTAINS SUIT COLO
      RS
CX 50 REM V$ CONTAINS CARD LAY
      OUT DATA
SB 60 REM DN CONTAINS DECK CAR
      D VALUES
FJ 70 REM DS CONTAINS DECK CAR
      D SUITS
BF 80 REM WN CONTAINS WORK CAR
      D VALUES
KB 90 REM WS CONTAINS WORK CAR
      D SUITS
GH 100 REM DP/WP ARE THE DECK/
      WORK POINTERS
CJ 110 DIMS$(4),V$(13),DN(52),
      DS(52),WN(52),WS(52):TS
      =52:Q=0
QH 120 C(0)=11:C(1)=1:C(2)=11:
      C(3)=1:C(4)=2

```

```

GQ 130 SS(0)=CHR$(154):SS(1)=C
HR$(152):SS(2)=CHR$(147
):SS(3)=CHR$(129):SS(4)
=CHR$(64)
GB 140 FORI=0TO51STEP13:FORJ=0
TO12:DN(I+J)=J:DS(I+J)=
I/13:NEXTJ:NEXTI
QG 150 VS(0)="A 03081656563236
"
HE 160 VS(1)="2 04081656563216
3256"
MH 170 VS(2)="3 05081656563216
32563236"
EP 180 VS(3)="4 06081656562416
401624564056"
FQ 190 VS(4)="5 07081656562416
4016245640563236"
AD 200 VS(5)="6 08081656562416
40162456405624364036"
HS 210 VS(6)="7 09081656562416
40162456405624364036324
6"
JG 220 VS(7)="8 10081656562416
40162456405624364036324
63227"
SA 230 VS(8)="9 11081656562416
40162456405624294029244
340433237"
BF 240 VS(9)="1012081656562416
40162456405624294029244
340433223250"
FA 250 VS(10)="J 0208165656"
RK 260 VS(11)="Q 0208165656"
KE 270 VS(12)="K 0208165656"
MJ 280 VS(13)="{2 SHIFT-SPACE}
00"
BE 290 COLOR0,2:COLOR1,1:COLOR
4,2:GOSUB840:WIDTH2:GRA
PHIC2,1,21
SH 300 FORI=0TO3:CHAR1,0,10,SS
(I):DRAW1,3,8TO4,8TO4
,83TO3,83:SSHAPES$(I)
,0,80,7,87:NEXTI:CHAR1,0
,10,""
DB 310 REM ****SHUFFLE DECK
CH 320 PRINT"[BLK]{7 SPACES}I'
M SHUFFLING THE DECK":F
ORI=1TO100:F=INT(RND(1)
*51):T=INT(RND(1)*51):B
N=DN(F):BS=DS(F):DN(F)=
DN(T):DS(F)=DS(T):DN(T)
=BN:DS(T)=BS:NEXTI
HA 330 REM ****INITIAL SETUP
CS 340 FORDP=0TO3:WN(DP)=DN(DP
):WS(DP)=DS(DP):NEXT:WP
=DP:GOSUB770
KK 350 PRINT"[BLK]ENTER {CYN}C
{BLK}TO RECEIVE A CARD
":PRINT"ENTER {CYN}2
{BLK}TO DISCARD THE MID
DLE CARDS":PRINT"ENTER
{SPACE}{CYN}4 {BLK}TO D
ISCARD ALL CARDS":IFDP>
52THEN570
MQ 360 GETKEYS:IFZ$<"C"THEN4
20
QG 370 IFDP=52THEN570:ELSE:GOS
UB400:GRAPHIC2,1,21:GOS
UB770:GOTO350
RB 380 REM ****ROUTINE TO READ
A CARD
EP 390 IFDP>=52THENWN(WP)=13:W
S(WP)=4:WP=WP+1:RETURN
KB 400 WN(WP)=DN(DP):WS(WP)=DS
(DP):DP=DP+1:WP=WP+1:RE
TURN
MD 410 REM ****ROUTINE TO REMO
VE MIDDLE CARDS
MM 420 IFZ$<"2"THEN470
GE 430 IFWN(WP-4)=WN(WP-1)THEN
450
DA 440 IFWS(WP-4)<WS(WP-1)THE
NSOUND1,4000,5:GOTO350
PE 450 WN(WP-3)=WN(WP-1):WS(WP
-3)=WS(WP-1):WP=WP-2
DQ 460 IFWP>3THENGRAHIC2,1,21
:GOSUB770:GOTO350:ELSEG
OSUB390:GOTO460
JR 470 IFZ$<"4"THENSOUND1,400
0,5:GOTO350
RQ 480 REM ****ROUTINE TO REMO
VE ALL FOUR CARDS
KQ 490 IFWN(WP-4)<WN(WP-3)THE
N520
CS 500 IFWN(WP-3)<WN(WP-2)THE
N520
DQ 510 IFWN(WP-2)=WN(WP-1)THEN
WP=WP-4:GOTO460
SS 520 IFWS(WP-4)<WS(WP-3)THE
N550
AX 530 IFWS(WP-3)<WS(WP-2)THE
N550
JF 540 IFWS(WP-2)=WS(WP-1)THEN
WP=WP-4:GOTO460
MX 550 SOUND1,4000,5:GOTO350
FE 560 REM ****SAVE SCORE ROU
TINE
RB 570 SOUND1,8000,5:PRINT"
{BLK}GAME OVER. YOU HAD
";WP-Q;" CARDS REMAINI
NG":IFWP-Q<TSTHENTS=WP-
Q
MX 580 PRINT"YOUR BEST SCORE I
S ";TS
CE 590 Q=0:PRINT"PLAY AGAIN? Y
/N":GETKEYS:IFZ$="Y"TH
ENGRAPHIC2,1,21:GOTO320
XD 600 IFZ$="N"THENEND:ELSE570
QF 610 REM ****DISPLAY A CARD
HH 620 COLOR1,C(S):CHAR1,X+1,Y
+1,MID$(VS(V),1,2):IFV=
9THENCHAR1,X+6,Y+8,MID$
(VS(V),1,2):ELSECHAR1,X
+7,Y+8,MID$(VS(V),1,2)
GP 630 X=X*8:Y=Y*8
KA 640 FORI=0TO((VAL(MID$(VS(V)
),3,2))-1)*4STEP4
KX 650 GSHAPES$(S),X+VAL(MID$
(VS(V),5+I,2)),Y+VAL(MI
D$(VS(V),7+I,2)):NEXTI
DR 660 COLOR1,1:BOX1,4+X,4+Y,6
7+X,75+Y:COLOR1,8:IFV<
10THEN690
BH 670 CIRCLE1,36+X,40+Y,12,16
,90,270:CIRCLE1,36+X,40
+Y,4,8,90,270
GQ 680 DRAW1,40+X,40+YTO40+X,2
4+YTO48+X,24+YTO48+X,40
+Y:DRAW1,24+X,40+YTO32+
X,40+Y:PAINT1,28+X,44+Y
:GOTO750
GR 690 IFV<11THEN720
HM 700 CIRCLE1,36+X,40+Y,12,16
:CIRCLE1,36+X,40+Y,4,8:
PAINT1,28+X,40+Y
HH 710 DRAW1,36+X,54+YTO40+X,6
0+YTO47+X,60+YTO39+X,51
+Y:PAINT1,44+X,58+Y:GOT
O750
CG 720 IFV<12THENRETURN
BP 730 DRAW1,24+X,56+YTO24+X,2
4+YTO32+X,24+YTO32+X,56
+YTO24+X,56+Y:PAINT1,28
+X,28+Y:DRAW1,32+X,36+Y
TO40+X,24+YTO48+X,24+YT
O32+X,44+Y:PAINT1,44+X,
26+Y
DE 740 DRAW1,32+X,36+YTO40+X,5
6+YTO48+X,56+YTO36+X,32
+Y:PAINT1,40+X,48+Y
SX 750 WIDTH1:BOX1,19+X,16+Y,5
2+X,63+Y:WIDTH2:RETURN
BS 760 REM ****DISPLAY THE WIN
DOW
MM 770 FORZ=0TO3:V=WN(WP-4+Z):
S=WS(WP-4+Z):X=10*Z:Y=5
:IFV=13THENQ=Q+1
SG 780 GOSUB620:NEXTZ:IFQ=4THE
N820
DM 790 IFQ<2THENRETURN
BP 800 IFWN(WP-4)=WN(WP-3)THEN
820
FD 810 IFWS(WP-4)=WS(WP-3)THEN
820
XM 820 PRINT"{5 SPACES}YOU WIN
!!!!":SOUND1,10000,5:G
OTO590
FF 830 REM ****GAME INSTRUCTIO
NS
AB 840 GRAPHIC0,1:PRINT"{RED}
{5 DOWN}{11 SPACES}RAIL
ROAD SOLITAIRE":PRINT"
{BLU}{2 DOWN}THIS GAME
{SPACE}WAS INVENTED FOR
PLAYING ON A":PRINT"TR
AIN WHERE SPACE TO SPRE
AD OUT IS RARE."
AB 850 PRINT"{DOWN} THE IDEA O
F THE GAME IS TO DISCAR
D THE":PRINT"CARDS THAT
ARE BETWEEN END CARDS
{SPACE}OF THE":PRINT"SA
ME VALUE OR SUIT.
{2 SPACES}ALL FOUR CARD
S CAN"
FC 860 PRINT" BE DISCARDED IF
{SPACE}THEY ARE OF THE
{SPACE}SAME":PRINT"VALU
E OR THE SAME SUIT.":PR
INT" IF THERE IS NO PLA
Y GET THE NEXT CARD.":P
RINT"{3 DOWN}PRESS ANY
{SPACE}KEY TO START"
EH 870 GETKEYS:RETURN

```

Donald G. Klich lives in Mount Prospect, Illinois.

## 128 GRAPHIC DUMP

Donald G. Klich

Here are two programs similar to the 128 text screen dumps submitted by Bruce Bowden (Screen Dump 128, December 1991). Rather than working with text, however, these programs will dump bitmapped graphic screens to your printer.

While you can't scale the pictures you send to a printer, you may select either of two different-sized printouts. Graphic Small prints a picture that is 40 x 25 characters in size, and Graphic Large prints one 80 x 50 characters. Both of these utilities are easy to install and use. They're also fairly short, so it won't take you long to type them in.

### Typing It In

Graphic Small and Graphic Large are both written in BASIC. To help avoid typing errors, enter the programs with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save copies of your programs before exiting Proofreader.

### Printing Pictures

Load and run either program as you would a normal BASIC program. When you run either program, there will be a slight pause, and then the READY prompt will return. The programs use function keys f1, f2, and f3 and put machine language code in locations \$1300-\$13AS. After you run one of the programs, you can then load and run an application that contains a graphic screen. When you reach the point that you'd like a printout of the screen, press the Stop key. Make sure your printer is turned on and ready.

### Small Pictures

If you're using Graphic Small, proceed by pressing f1. (Be sure your printer is turned on and ready.) The screen will be garbled and then go blank. At this point, press f2. Shortly after that, your picture will start to print. When the printout is complete, the picture onscreen will be ungarbled.

### Large Pictures

To use Graphic Large, load and run the program and then run your graphics program as above. Press f1 and f2 to start the printing process, but press

f3 when the printing is complete to return to the applications program. You can continue with your graphics program by entering a CONT command.

These programs have been tested only on a Seikosha SP1000A and an Epson FX-80 printer, but they should work on other graphics printers, too. Make sure any printer interface you may be using is set for transparent mode.

For those interested in modifying these programs for other printers, two printer-control commands are used in lines 60 and 70 in Graphic Small. The first instructs the printer to suppress the vertical spacing between lines, and the second precedes each print-line set to instruct the printer to print in graphics mode. Note that abbreviated commands (uppercase characters) are used at times so that the required BASIC code will fit in the special area reserved for function key definitions.

### GRAPHIC SMALL

```
EQ 10 REM COPYRIGHT 1992 - COMPUTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED
CG 20 REM GRAPHIC SCREEN PRINTER FOR COMMODORE 128
SK 30 REM THIS PROGRAM, ONCE ACTIVATED WILL DUMP THE CURRENT GRAPHICS SCREEN
JX 40 REM TO THE PRINTER DEVICE 4. {2 SPACES} IT IS ACTIVATED BY THE F1 AND F2 KEYS,
AB 50 REM IN A 40 BY 25 CHARACTER DISPLAY
SM 60 KEY1, "OP1, 4: PR1, CH(27) CH(65) CH(8): SYS4864: FAST"+CHR$(13)
JX 70 KEY2, "FOA=8192TO16191STE 320: PR1, CH(27) CH(42) CH(4) CH(64) CH(1); : F0B=0TO319: PR1, CH(255-PEE(A+B)); : NE: PR1: NE: SLOW: SYS4864: CL01: END"+CHR$(13)
GC 80 KEY3, "": KEY4, "": KEY5, "": KEY6, "": KEY7, "": KEY8, "":
EB 90 FORQ=4864TO4987: READZ$: POKEQ, DEC(Z$): NEXT
GB 100 DATA 18, 90, 13, 00, 00, 00, 00, 00, 00, 18, 18, 18, FF, FF, 18, 18, 18, 00, 00, 00, A9, 00, 85, FB, A9, 20, 85, FC, A0, 00, A2, 00, B1, FB, 99, 03, 13, C8, C0, 08, D0, F6, A0, 00, 18, AD, 15, 13
HP 110 DATA 1E, 03, 13, 69, 00, E8, E0, 08, F0, 07, 0A, 8D, 15, 13, 4C, 2E, 13, 99, 0B, 13, A2, 00, 8E, 15, 13, C8, C0, 08, D0,
```

```
DE, A2, 00, A0, 00, B9, 0B, 13, 91, FB, EA, C8, C0, 08, D0, F5, A0, 00, 18, A9, 08
SM 120 DATA 65, FB, 85, FB, A9, 00, 65, FC, 85, FC, C9, 3F, D0, 07, A5, FB, C9, 40, D0, 01, 60, 4C, 22, 13
```

### GRAPHIC LARGE

```
EQ 10 REM COPYRIGHT 1992 - COMPUTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED
CG 20 REM GRAPHIC SCREEN PRINTER FOR COMMODORE 128
SK 30 REM THIS PROGRAM, ONCE ACTIVATED WILL DUMP THE CURRENT GRAPHICS SCREEN
EA 40 REM TO THE PRINTER DEVICE 4. IT IS ACTIVATED BY {SPACE} THE F1, F2 AND F3 KEYS
RC 50 REM IN A 80 X 50 CHARACTER DISPLAY
FG 60 KEY4, "": KEY5, "": KEY6, "": KEY7, "": KEY8, "":
ES 70 KEY1, "OP1, 4: PR1, CH(27) CH(65) CH(8): SYS4864: FAST: A$=CH(27)+CH(42)+CH(4)+CH(128)+CH(2): D=252: E=251: F=255"+CHR$(13)
KE 80 KEY2, "FOA=8192TO16191STE 320: FOC=1TO2: PR1, CH(13); AS; : F0B=0TO319: POKE, (F-PEE(A+B)): POK253, C: SYS4988: PR1, CH(PEE(D)); CH(PEE(D)); : NEB, C, A"+CHR$(13)
BS 90 KEY3, "SLOW: SYS4864: CL01"+CHR$(13)
JP 100 FORQ=4864TO5029: READZ$: POKEQ, DEC(Z$): NEXT
CG 110 DATA 18, 90, 13, 00, 00, 00, 00, 00, 18, 18, 18, FF, FF, 18, 18, 18, 00, 00, 00, A9, 00, 85, FB, A9, 20, 85, FC, A0, 00, A2, 00, B1, FB, 99, 03, 13, C8, C0, 08, D0, F6, A0, 00, 18, AD, 15, 13
DE 120 DATA 1E, 03, 13, 69, 00, E8, E0, 08, F0, 07, 0A, 8D, 15, 13, 4C, 2E, 13, 99, 0B, 13, A2, 00, 8E, 15, 13, C8, C0, 08, D0, DE, A2, 00, A0, 00, B9, 0B, 13, 91, FB, EA, C8, C0, 08, D0, F5, A0, 00, 18, A9, 08
JP 130 DATA 65, FB, 85, FB, A9, 00, 65, FC, 85, FC, C9, 3F, D0, 07, A5, FB, C9, 40, D0, 01, 60, 4C, 22, 13, A5, FD, C9, 01, F0, 08, 06, FB, 06, FB, 06, FB, 06, FB, A9, 00, 85, FC, A2, 04, 18, 06, FB, 90, 06, A9
FD 140 DATA 03, 05, FC, 85, FC, CA, F0, 07, 06, FC, 06, FC, 18, 90, EB, 60
```

Donald Klich, who lives in Mount Prospect, Illinois, is the 128 programmer who wrote Railroad Solitaire.



## QUIZ WIZ

By Rizwaan Ahmed Khan

Quiz Wiz is a program for creating multiple-choice quizzes on the 64. The program is so easy to use that even a beginner can use it without reading the instructions. Just select the menu options.

Quiz Wiz lets the parent or teacher enter questions and answers on a variety of subjects. The program then creates a quiz in multiple-choice format with the correct answer and three wrong answers for each question. It provides the correct answers and a score when the student finishes the quiz.

When you enter a question and answer, you aren't required to supply three possible answers as alternate choices. The program asks the question and then supplies the correct answer along with three other choices that it selects at random from the other answers you've entered. The correct answer is never in a predictable location.

### Entering the Program

Quiz Wiz is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

### Make New Entries

When you first run the program, select the option to make new entries. You're then prompted to choose a subject. If the subject you want isn't on the screen, press the Up Arrow key and define the subject of your choice.

You may then enter questions and answers. Each question and answer is allowed a maximum of 80 characters. To exit during the input process, press the @ key and then press Return.

### Continue Making Entries

Note the menu. If you wish to continue making entries, select the appropriate choice. If you select the option to make new entries, all work in memory will be erased.

### Correction Mode

You can flip through your entries by pressing the < and > keys. When you find the question you want, press Return, and a small menu will appear.

This menu will allow you to fully edit or delete your entries. In this mode, you can rename the topic chosen by pressing the R key.

In correction mode you cannot enter the main menu by pressing the @ key. In this mode, you can use the cursor keys for more editing potential. After you've made any corrections, press Return to exit to the main menu.

### Saving Files

When you've entered a minimum of four questions and their answers, you may then save your file. Save files by selecting that option from the main menu. If you try to save a file with a name that is already on the disk, the earlier version will first be scratched.

### Loading Files

Load a saved file into memory anytime you want to take a quiz. Any entries that may still be in memory will be erased. After loading, you're automatically quizzed in multiple-choice format. To see a directory at any time, press the D key.

### Scratching Files

Select this option from the main menu to erase any file on disk. You need only enter the filename to have the program erase it.

### Quiz Time

A quiz begins right after loading, but if you've entered at least four questions, you can take a test immediately. Press the Commodore key; then press the letter next to the answer of your choice.

If you answer incorrectly, the correct answer will be displayed for a short time. At the end of the quiz, your mistakes will again be displayed. You can flip through them by pressing Return. This process lets you review your errors for as long as you wish. After reviewing the final mistake, the computer will display your score. You may then exit to the main menu by pressing f1 or take the quiz again by pressing the Commodore key.

### Adding New Entries

You can exit the quiz at any time by pressing f1. To enter more questions, select the option from the menu to continue making entries.

### Tape Support

Users with tape drives can easily alter the program to suit their needs. Change the OPEN commands in lines 390 and 1007 to tape format. Then delete lines 62, 80, 915, 930, 935, 980, 982, 985, 986, 987, 990, 992, 993, 995, and 997. These lines contain the routines for calling the disk directory and for scratching files.

### QUIZ WIZ

```
ME 0 REM COPYRIGHT 1992 COMPUT
E PUBLICATIONS INTL LTD -
ALL RIGHTS RESERVED
PB 1 DIM$ (200):DIME$ (200):DIM
FS (400):PRINTCHR$ (8):PRIN
TCHR$ (14)
MQ 5 PRINT "{CLR}{WHT}{2 DOWN}
{4 SPACES}{RVS}
{11 SPACES}{YEL}QUIZ WIZ
{WHT}{14 SPACES}":PRINT"
{6 SPACES}MENU:"
XD 10 PRINT "{DOWN}{6 SPACES}
{YEL}{RVS}PRESS (1) TO M
AKE NEW ENTRIES.":POKE53
281,2:POKE53280,6
XJ 15 IFES (4) <>""THENPRINT"
{DOWN}{6 SPACES}{RVS}
{YEL}PRESS (2) TO SAVE E
NTRIES."
XD 20 PRINT "{DOWN}{6 SPACES}
{RVS}{YEL}PRESS (3) TO L
OAD ENTRIES.":IFES (1)=""
THEN30
FX 25 PRINT "{DOWN}{6 SPACES}
{RVS}{YEL}PRESS (4) TO C
ONTINUE{OFF}{19 SPACES}
{RVS}MAKING ENTRIES."
CQ 30 IFES (1) <>""THENPRINT"
{DOWN}{6 SPACES}{RVS}
{YEL}PRESS (5) FOR CORRE
CTION MODE."
RK 35 PRINT "{DOWN}{6 SPACES}
{RVS}{YEL}PRESS (6) TO S
CRATCH FILES."
BD 40 PRINT "{DOWN}{6 SPACES}
{RVS}{CYN}PRESS F1 TO RE
TURN TO MENU.{DOWN}"
XG 45 PRINT "{12 SPACES}BY
{2 SPACES}RIZWAAN KHAN"
DF 46 PRINT "{HOME}{2 DOWN}":FO
RI=1TO19:PRINT "{WHT}
{4 RIGHT}{+}{31 RIGHT}
{+}{3 RIGHT}":NEXT
JE 50 PRINT "{4 SPACES}{RVS}
{33 SPACES}{OFF}";
BF 55 GETA$:IFA$="5"THENIFES (1
)<>""THENJ=1:GOTO715
BB 60 IFA$="1"THEN940
HA 62 IFA$="D"THEN980
AG 65 IFA$="2"ANDES (3) <>""THEN
360
MG 70 IFA$="3"THEN435
JX 72 IFA$="L"THEN1000
AF 75 IFA$="4"THENZES="1":GOTO
```

# PROGRAMS

```

175
KP 80 IFAS="6"THEN915
MJ 85 IFPEEK(56321)=223ANDES(4
)<>"THENM=1:W=1:Q=0:GOT
0520
EK 90 GOTO55
XQ 95 PRINT"{OFF}{CLR}{HOME}
{3 DOWN}{10 SPACES}{PUR}
{RVS}DEFINE SUBJECT"
XQ 100 PRINT"{DOWN}{11 SPACES}
{WHT}1)MATH"
PE 105 PRINT"{DOWN}{11 SPACES}
2)ECONOMICS"
HF 110 PRINT"{DOWN}{11 SPACES}
3)SCIENCE"
KS 115 PRINT"{DOWN}{11 SPACES}
4)HISTORY"
MF 120 PRINT"{DOWN}{11 SPACES}
5)GEOGRAPHY"
BA 125 PRINT"{DOWN}{11 SPACES}
6)ENGLISH"
SD 127 PRINT"{DOWN}{11 SPACES}
↑)OTHER{2 SPACES}"
XS 130 GETAS:IFAS="1"THENN$="M
ATH":GOTO175
BE 135 IFAS="2"THENN$="ECONOMI
CS":GOTO175
HG 140 IFAS="3"THENN$="SCIENCE
":GOTO175
BS 145 IFAS="4"THENN$="HISTORY
":GOTO175
QG 150 IFAS="5"THENN$="GEOGRAP
HY":GOTO175
BA 155 IFAS="6"THENN$="ENGLISH
":GOTO175
RS 160 IFAS=CHR$(133)THENDB$="
":GOTO5
XX 165 IFAS="↑"THENINPUT"SUBJE
CT":N$:GOTO175
KR 170 GOTO130
AG 175 PRINT"{CLR}{BLU}{RVS}
{40 SPACES}":IFDB$="1"TH
ENDB$="":GOTO5
ED 180 IFZE$="1"THENX=X+1:ZE$="
"
MD 185 PRINT"{GRN}{HOME}{RVS}
{SPACE}QUESTION NUMBER"
X"{YEL}SUBJECT:"N$""
GJ 190 PRINT"{WHT}{HOME}
{2 DOWN}{5 SPACES}ENTER
QUESTION (@ TO QUIT)"
{3 SPACES}:POKE53280,2
EQ 191 IFDB$="1"THENPRINT"
{YEL}{HOME}{3 DOWN}
{2 RIGHT}"DA$":PRINT"
{HOME}{3 DOWN}";
HS 195 INPUTD$(X):IFD$(X)="@"A
NDDB$="1"THEN190
SD 245 IFD$(X)="@"ANDX<>1THENX
=X-1:ZE$="1":GOTO5
RF 246 IFD$(X)="@"ANDX=1THEN5
RE 247 IFDB$="1"ANDD$(X)<>"TH
END$(X)=LEFT$(D$(X),80)
:GOTO845
PS 250 IFD$(X)<>"THEND$(X)=LE
FT$(D$(X),80):GOTO275
XS 255 PRINT"{CLR}{HOME}{BLU}
{RVS}{40 SPACES}":GOTO1
85
KD 275 PRINT:PRINT"{HOME}
{13 DOWN}{WHT}{DOWN}
{4 SPACES}ENTER ANSWER"
HH 276 IFDB$="1"THENPRINT"
{YEL}{HOME}{15 DOWN}
{2 RIGHT}"EA$":PRINT"
{HOME}{15 DOWN}";
XX 280 INPUTE$(X):IFE$(X)="@"A
NDDB$="1"THEN275
XQ 285 IFDB$="1"ANDES(X)<>"TH
ENE$(X)=LEFT$(E$(X),80)
:GOTO845
RA 290 IFES(X)="@"THEN5
XX 335 IFES(X)<>"THENE$(X)=LE
FT$(E$(X),80):X=X+1:GOT
0175
GR 340 GOTO275
PR 360 NAM$="":PRINT"{CLR}
{DOWN}TYPE IN FILE NAM
E TO SAVE":INPUTNAM$:IF
NAM$=""THEN5
KJ 390 K$="":OPEN7,8,0,NAM$:IN
PUT#7,K$:IFK$=""THENCLO
SE7:GOTO405
JS 395 CLOSE7:PRINT"{2 DOWN}S
CRATCHING OLD FILE.":FT
$="S0":FT$=FT$+NAM$
FM 400 OPEN15,8,15,FT$:CLOSE15
SG 405 OPEN7,8,1,NAM$:PRINT"
{CLR}{HOME}{6 DOWN}
{6 SPACES}{WHT}SAVING :
NAM$":PRINT#7,N$:PRI
NT#7,X
BQ 410 FORJ=1TOX:PRINT#7,D$(J)
:NEXTJ:ZE$="1"
MP 415 FORJ=1TOX:PRINT#7,E$(J)
:NEXTJ:CLOSE7:M=1:FX=0:
Q=0
EH 430 PRINT"{CLR}{HOME}
{11 DOWN}{6 SPACES}***
{SPACE}DATA HAS BEEN SA
VED ***"
KF 431 FORI=1TO2000:NEXTI:GOTO
520
PR 435 PRINT"{CLR}{RVS}{WHT}
{DOWN}LOAD ERASES ANY
{SPACE}WORK IN MEMORY.
{4 SPACES}ARE YOU SURE
{SPACE}(Y/N)"
DD 440 GETAS:IFAS="N"THEN5
PA 445 IFAS="Y"THEN1000
DA 450 GOTO440
DP 520 ZX=X:PRINT"{CLR}{HOME}
{SPACE}SCORE={RVS}"Q"
{OFF}{4 SPACES}QUESTION
NUMBER={RVS}"W"{OFF}"
EB 525 PRINT"TOTAL NUMBER OF Q
UESTIONS="X":POKE53280
,6:POKE53281,6
HK 530 PRINT"{YEL}{RVS}
{40 SPACES}";
JG 535 PRINT"{UP}{3 SPACES}
{RVS}SUBJECT : "N$""
CR 540 PRINT"{WHT}QUESTION:
{GRN}{RVS}"D$(M)"{OFF}
{DOWN}":FS
KB 545 Y=INT(4*RND(1))+1
RA 550 T=INT((X+1-1)*RND(1))+1
:U=INT((X+1-1)*RND(1))+
1:V=INT((X+1-1)*RND(1))
+1
FQ 555 IFES(M)=ES(T)ORES(M)=ES
(U)ORES(U)=ES(T)THEN550
EM 556 IFES(V)=ES(M)ORES(V)=ES
(T)ORES(V)=ES(U)THEN550
RH 560 IFY=1THEN575
MA 562 IFY=3THEN570
QB 565 IFY=2THEN580
GJ 567 PRINT"{RVS}{WHT}A {8}"E
$(T)"{DOWN}":PRINT"
{RVS}{WHT}B {8}"E$(U)"
{DOWN}":PRINT"{RVS}
{WHT}C {8}"E$(V)"{DOWN}
"
BG 568 PRINT"{RVS}{WHT}D {8}"E
$(M)"{DOWN}":L$="D":GOT
0585
MH 570 PRINT"{RVS}{WHT}A {8}"E
$(T)"{DOWN}"
RF 571 PRINT"{RVS}{WHT}B {8}"E
$(U)"{DOWN}"
JD 572 PRINT"{RVS}{WHT}C {8}"E
$(M)"{DOWN}":L$="C":PRI
NT"{RVS}{WHT}D {8}"E$(V
)"{DOWN}":GOTO585
KS 575 PRINT"{WHT}{RVS}A {8}"E
$(M)"{DOWN}"
SF 576 PRINT"{RVS}{WHT}B {8}"E
$(T)"{DOWN}"
KM 577 PRINT"{RVS}{WHT}C {8}"E
$(U)"{DOWN}":L$="A":PRI
NT"{RVS}{WHT}D {8}"E$(V
)"{DOWN}":GOTO585
GF 580 PRINT"{WHT}{RVS}A {8}"E
$(U)"{DOWN}"
SS 581 PRINT"{RVS}{WHT}B {8}"E
$(M)"{DOWN}"
HP 582 PRINT"{RVS}{WHT}C {8}"E
$(T)"{DOWN}":L$="B":PRI
NT"{RVS}{WHT}D {8}"E$(V
)"{DOWN}":GOTO585
AM 585 GETAS:IFAS="N"THEN585
XJ 590 IFAS=CHR$(133)THENFX=0:
Q=0:GOTO5
SQ 595 IFAS<>"A"ANDAS<>"B"ANDA
S<>"C"ANDAS<>"D"THEN585
CS 600 IFAS=L$THENQ=Q+1:PRINT"
{WHT}{2 SPACES}{RVS}COR
RECT!!":FORJ=1TO500:NE
XTJ:GOTO610
GX 605 GOTO655
AD 610 M=M+1:IFW=ZXTHENAD=FX-1
:FX=0:GOTO880
FQ 615 W=W+1:GOTO520
BP 620 PRINT"{CLR}{HOME}
{2 DOWN}{OFF}{WHT}YOU
{SPACE}SCORED{WHT}{RVS}
"Q"{OFF}OUT OF{WHT}
{RVS}"X"{OFF}QUESTIONS
":POKE53281,3
BR 625 IFX/2<=QTHENPRINT"
{2 DOWN}{2 SPACES}{RVS}
YOU PASSED!":GOTO632
GP 630 PRINT"{DOWN}{RVS}SHAME
ON YOU, YOU FAILED!!!"

```

```

HR 632 PRINT" {DOWN}{RVS}PRESS
      'F1' TO EXIT."
HF 635 PRINT"{DOWN}{RVS}PRESS
      {SPACE}COMMODORE KEY TO
      DO THE TEST AGAIN":GOT
      0640
DS 640 GETAS:IFAS=CHR$(133)THE
      N5
GP 645 IFPEEK(56321)=223THENM=
      1:W=1:Q=0:GOTO520
KS 650 GOTO640
EP 655 PRINT"{RVS}INCORRECT!
      {OFF} THE ANSWER IS":FS
      (FX)=DS(M):FX=FX+1:FS(F
      X)=ES(M):FX=FX+1
FD 660 IFY=1THENPRINT"{RVS}A
      {OFF}"ES(M)"";FS:GOTO67
      5
ES 665 IFY=2THENPRINT"{RVS}B
      {OFF}"ES(M)"";FS:GOTO67
      5
BE 670 PRINT"{RVS}C {OFF}"ES(M
      )"";FS:GOTO675
AH 675 FORJ=1TO2:POKE54276,0:P
      OKE54277,0:POKE54272,0:
      POKE54296,15
JX 680 POKE54277,129:POKE54276
      ,23
RG 685 POKE54273,137:POKE54272
      ,43:NEXTJ:FORI=1TO1500:
      NEXTI:GOTO610
EB 690 POKE1024,82:POKE1025,65
      :POKE1026,75:POKE1027,7
      2:POKE1028,65:POKE1029,
      78
JH 691 GOTO585
HR 715 PRINT"{YEL}{CLR}{HOME}
      {RVS}{11 SPACES}CORRECT
      ION MODE{14 SPACES}";
BF 720 PRINT" {RVS}{WHT} TOTAL
      QUESTIONS ENTERED="X""
      :POKE53281,6:POKE53280,
      2
DK 725 PRINT" {RVS}{CYN}QUESTI
      ON NO."J"{GRN}SUBJECT:"
      N$"{DOWN}";
DB 730 PRINT"{YEL}{RVS}QUESTIO
      N:{8}"DS(J)"":PRINT
XS 735 PRINT"{YEL}{RVS}ANSWER:
      {8}"ES(J)""
SB 740 PRINT"{DOWN} {RVS}{YEL}
      PRESS<>'TO FLIP THROUG
      H ENTRIES."
EP 741 PRINT" {RVS}{WHT}PRESS'
      RETURN'FOR CORRECTION."
FA 743 PRINT" {RVS}{WHT}PRESS'
      R'TO RENAME SUBJECT."
GE 745 GETAS:IFAS=CHR$(13)THEN
      VB=X:X=J:DB$="1":GOTO78
      8
BD 750 IFAS="."THEN782
HD 755 IFAS=CHR$(133)THENDB$="
      ":GOTO775
MG 760 IFAS="R"THENAS="":DB$="
      1":GOTO95
HH 765 IFAS=","THEN785
RJ 770 GOTO745
DM 775 IFVB>0THENX=VB:GOTO5
XP 780 GOTO5
QF 782 IFJ=XTHENJ=1:GOTO715
GF 783 J=J+1:GOTO715
JH 785 IFJ=1THENJ=X:GOTO715
JM 786 J=J-1:GOTO715
BX 788 PRINT"{DOWN} {6}{RVS}PL
      EASE SELECT --
      {3 SPACES}"
EG 790 PRINT" {RVS}(1) ALTER Q
      UESTION."
GR 795 PRINT" {RVS}(2) ALTER A
      NSWER.{2 SPACES}"
JD 800 PRINT" {RVS}(3) ALTER B
      OTH.{4 SPACES}"
DB 805 PRINT" {RVS}(4) DELETE
      {SPACE}BOTH.{3 SPACES}"
      :DA$=DS(X):EA$=ES(X)
AD 815 GETAS:IFAS="1"THENS=1:P
      RINT"{CLR}":GOTO190
GC 820 IFAS="2"THENS=2:PRINT"
      {CLR}":GOTO275
MK 825 IFAS="3"THENS=3:PRINT"
      {CLR}":GOTO190
AP 830 IFAS="4"THENMK=VB-J:DB$
      ="":GOTO860
BD 836 IFAS=CHR$(133)THENDB$="
      ":X=VB:GOTO5
PR 840 GOTO815
QF 845 IFS=1ORS=2THENX=VB:DB$=
      "" :GOTO5
KM 850 IFS=3THENS=S+1:GOTO275
KJ 855 X=VB:DB$="" :GOTO5
FF 860 IFJ=1ANDES(J+1)=""THENR
      UN
ER 865 IFES(J+1)=""THENDS(J)="
      ":ES(J)="" :VB=VB-1:X=VB
      :GOTO5
SD 870 PRINT" {2 DOWN}
      {2 SPACES}{WHT}DELETING
      ...":FORI=1TOMK:AD$=DS
      (J+1):AV$=ES(J+1)
XK 875 DS(J)=AD$:ES(J)=AV$:J=J
      +1:NEXTI:VB=VB-1:X=VB:E
      S(J)="" :DS(J)="" :GOTO5
EE 880 IFFS(FX)=""THEN620
PM 885 PRINT" {CLR}{OFF}{HOME}
      {2 DOWN} {BLK}THE ONES
      {SPACE}YOU GOT WRONG AR
      E-{DOWN}":POKE53281,1
CS 890 PRINT" {RED}QUESTION -
      {SPACE}"FS(FX)"";FS:FS(F
      X)="" :FX=FX+1
FP 895 PRINT" ANSWER - "FS(FX)
      "";FS:FS(FX)="" :PRINT"
      {2 DOWN} {RVS}{CYN}PRES
      S RETURN"
AR 900 GETAS:IFAS<>CHR$(13)THE
      N900
QS 905 IFAD=FXTHENFX=0:GOTO620
MK 910 FX=FX+1:GOTO880
RK 915 PRINT" {CLR}{DOWN} NAME
      {SPACE}OF FILE TO SCRAT
      CH":INPUTFS:IFFRS=""TH
      EN5
XF 920 PRINT"{DOWN} INSERT DIS
      K CONTAINING FILE AND P
      RES{3 SPACES}{RVS}RETU
      RN"
PQ 925 GETAS:IFAS<>CHR$(13)THE
      N925
AE 930 FT$="S0":FT$=FT$+FR$:O
      PEN15,8,15,FT$:CLOSE15
RS 935 PRINT" {2 DOWN}
      {2 SPACES}{RVS}{WHT}FIL
      E HAS BEEN SCRATCHED":F
      ORI=1TO3000:NEXTI:GOTO5
XX 940 PRINT" {CLR}{DOWN}{WHT}
      {SPACE}{RVS}MAKING NEW
      {SPACE}ENTRIES WILL ERA
      SE ANY OLD{OFF}
      {3 SPACES}{RVS}ENTRIES
      {SPACE}IN MEMORY"
AQ 945 PRINT" {RVS}{WHT}ARE YO
      U SURE (Y/N)"
AF 950 GETAS:IFAS="N"THEN5
HX 955 IFAS="Y"THEN965
DF 960 GOTO950
DS 965 CLR:DIMDS(500):DIMES(50
      0):X=1:GOTO95
KK 970 PRINT" {DOWN}{2 SPACES}
      {RVS}FILE NOT FOUND":OP
      EN15,8,15,"UJ":FORI=1TO
      2000:NEXTI:CLOSE15:RUN
MB 980 I=1:PRINT" {WHT}{CLR}":O
      PEN2,8,0,"$":GET#2,AS:G
      ET#2,AS
CM 982 IFI=2THENI=1:GOTO992
DD 985 GET#2,LS:GET#2,LS:IFST=
      64THENCLOSE2:GOTO992
XJ 986 GET#2,LB$:GET#2,HB$:LN=
      ASC(LB$+CHR$(0))+256*AS
      C(HB$+CHR$(0))
MM 987 PRINT LN;
DD 988 GET#2,AS:IFAS=""THENI=I
      +1:PRINTCHR$(13);:GOTO9
      82
CD 990 PRINTAS;:GOTO988
KD 992 PRINT" {DOWN} {RVS}PRESS
      ANY KEY"
CX 993 GETAS:IFAS=""THEN993
QJ 995 IFST<>64THENPRINT" {CLR}
      ":GOTO985
JM 997 GOTO5
FH 1000 CLR:DIMDS(200):DIMES(2
      00):DIMES(400):PRINTCH
      RS(8):PRINTCHRS(14)
MH 1005 PRINT" {CLR} {RVS}{WHT}
      TYPE IN FILENAME TO LO
      AD":INPUTNAM$:IFNAM$="
      "THENRUN
EK 1007 N$="" :OPEN7,8,0,NAM$:I
      NPUT#7,N$
EK 1008 INPUT#7,X:IFN$=""THENC
      LOSE7:GOTO970
BR 1009 PRINT" {CLR}{HOME}
      {5 DOWN}{4 SPACES}LOAD
      ING : {RVS}"NAM$""
HB 1010 FORJ=1TOX:INPUT#7,DS(J
      ):NEXTJ:ZE$="1"
JC 1012 FORJ=1TOX:INPUT#7,ES(J
      ):NEXTJ:CLOSE7:M=1:FX=
      0:Q=0:W=1:GOTO520

```

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## Machine Language Entry Program MLX for Commodore 64

Ottis R. Cowper

Type in and save some copies of MLX—you'll want to use it to enter future ML programs from Gazette. When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But even if you know nothing about ML or hex, you should have no trouble using MLX.

After you've entered the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option. A functions menu will appear. The first option in the menu is Enter Data. If you're just starting to type in a program, pick this. Press the E key and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you stopped typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing Return alone when asked for the address. (You can get back to the menu from most options in the program by pressing Return with no other input.)

### Entering a Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an

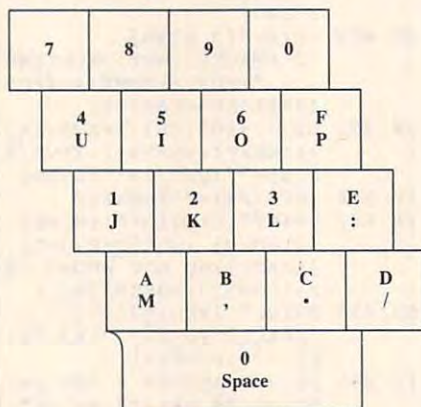
MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing.

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

### Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press Return after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

### 64 MLX Keypad



Only the numerals 0–9 and the letters A–F can be entered. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, a numeric keypad function is included. The keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figure below shows the keypad configuration.

MLX checks for transposed characters. If you're supposed to type in A0

and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take care while entering data.

### Editing Features

To correct typing mistakes before finishing a line, use the Inst/Del key to delete the character to the left of the cursor. If you mess up a line badly, press Ctr/Home to start the line over. The Return key is also active, but only before any data is typed on a line. Pressing Return at this point returns you to the command menu. After you type a character, MLX disables Return until the cursor returns to the start of a line. Remember, press Ctr/Home to quickly get to a line-number prompt. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing and then move the cursor to the mistake and type the correct key. The cursor-left and -right keys provide the normal cursor controls. (The Inst/Del key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, Return is active; pressing it tells MLX to recheck the line. You can press the Ctr/Home key to clear the entire line if you want to start from scratch or if you want to get to a line-number prompt to use Return to get back to the menu.

### Display Data

The second menu choice, Display Data, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at

which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press the space bar again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press Return.

### Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are Save File and Load File. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save. This is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands. Also note that the drive prefix 0: is added to the filename (line 750), so this should *not* be included when entering the name. This also precludes the use of @ for save-with-replace, so be sure to give each version saved a different name.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When you're saving a partially completed listing, make sure to note the address where you stopped typing.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. It also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT address, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct start-

ing and ending addresses.

The Quit menu option has the obvious effect—it stops MLX and enters BASIC. The Run/Stop key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, Run/Stop-Restore also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or press any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the Clear Workspace option.

### The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready for the results. Refer to the corresponding article for details on loading and running the program.

### An Ounce of Prevention

Don't take chances—use The Automatic Proofreader to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the display option to verify that the data has been entered correctly. Test the save and load options to ensure that you can recall your work from disk.

### 64 MLX

```
SS 10 REM VERSION 1.1: LINES 8
    30,950 MODIFIED, LINES 4
    85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
    I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
    4=254:Z5=255:Z6=256:Z7=
    127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
    :BS=PEEK(55)+Z6*PEEK(56)
    :H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
    :S$=" ":D$=CHR$(20):Z$=
    CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
    +23:POKE I,0:NEXT:POKE
    {SPACE}SD+24,15:POKE 78
    8,52
FC 150 PRINT "{CLR}"CHR$(142)CH
    R$(8):POKE 53280,15:POK
    E 53281,15
EJ 160 PRINT T$ "{RED}{RVS}
    {2 SPACES}{8 @}
```

```
{2 SPACES}"SPC(28)"
{2 SPACES}{OFF}{BLU} ML
X II {RED}{RVS}
{2 SPACES}"SPC(28)"
{12 SPACES}{BLU}"
FR 170 PRINT "{3 DOWN}
    {3 SPACES}COMPUTE!'S MA
    CHINE LANGUAGE EDITOR
    {3 DOWN}"
JB 180 PRINT "{BLK}STARTING ADD
    RESS{4}";:GOSUB300:SA=A
    D:GOSUB1040:IF F THEN18
    0
GF 190 PRINT "{BLK}{2 SPACES}EN
    DING ADDRESS{4}";:GOSUB
    300:EA=AD:GOSUB1030:IF
    {SPACE}F THEN190
KR 200 INPUT "{3 DOWN}{BLK}CLEA
    R WORKSPACE [Y/N]{4}";A
    $:IF LEFT$(A$,1)<>"Y"TH
    EN220
PG 210 PRINT "{2 DOWN}{BLU}WORK
    ING...";:FORI=BS TO BS+
    EA-SA+7:POKE I,0:NEXT:P
    RINT"DONE"
DR 220 PRINTTAB(10)" {2 DOWN}
    {BLK}{RVS} MLX COMMAND
    {SPACE}MENU {DOWN}{4}":
    PRINT T$ "{RVS}E{OFF}NTE
    R DATA"
BD 230 PRINT T$ "{RVS}D{OFF}ISP
    LAY DATA":PRINT T$ "
    {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$ "{RVS}S{OFF}AVE
    FILE":PRINT T$ "{RVS}Q
    {OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
    MID$( "EDLSQ",I,1)THEN A
    =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
    90,700,280:GOSUB1060:GO
    TO250
EJ 280 PRINT "{RVS} QUIT ":INPU
    T "{DOWN}{4}ARE YOU SURE
    [Y/N]";A$:IF LEFT$(A$,
    1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
    LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
    =MID$(IN$,3):GOSUB320:A
    D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
    $(B$,J,1):B=ASC(A$)-C4+
    (A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
    0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
    H$,B+1,1);:B=A-B*C6:PRI
    NT MID$(H$,B+1,1);:RETU
    RN
RR 360 A=INT(AD/Z6):GOSUB350:A
    =AD-A*Z6:GOSUB350:PRINT
    ": ";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
    CK+Z5*(CK>Z7):GOTO390
```

# PROGRAMS

```

PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"[DOWN]STARTING AT
      {4}";:GOSUB300:IF IN$<>
      N$ THEN GOSUB1030:IF F
      {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"[RVS] ENTER DATA
      {SPACE}":GOSUB400:IF IN
      $=N$ THEN200
JK 430 OPEN3,3:PRINT
SK 440 POKEL98,0:GOSUB360:IF F
      THEN PRINT IN$:PRINT"
      {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
      =S$:FOR J=1 TO 2:IF F T
      HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"[RVS]"B$LS$;:IF I<
      24THEN PRINT"{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF (A$>" / "ANDA$<"")OR(A
      $>"@ "ANDA$<"G") THEN540
GS 485 A=- (A$="M") -2*(A$="," )-
      3*(A$="." ) -4*(A$="/") -5
      *(A$="J") -6*(A$="K")
FX 486 A=A-7*(A$="L") -8*(A$=":
      ") -9*(A$="U") -10*(A$="I
      ") -11*(A$="O") -12*(A$="
      P")
CM 487 A=A-13*(A$=S$):IF A THE
      N A$=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
      =1)OR F) THEN PRINT B$;:
      J=2:NEXT I=24:GOTO550
KC 500 IF A$="HOME" THEN PRI
      NT B$:J=2:NEXT I=24:NEX
      T:F=0:GOTO440
MX 510 IF (A$="RIGHT") ANDF TH
      ENPRINT B$LS$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
      ((I=0)AND(J=1)) THEN GOS
      UBL060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$LS$;
      :J=2-J:IF J THEN PRINT
      {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
      {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}
      {5 RIGHT}";:INPUT#3,IN$
      :IF IN$=N$ THEN CLOSE3:
      GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
      MID$(IN$,I):GOSUB320:IF
      I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
      B1060:PRINT"{BLK}{RVS}
      {SPACE}ERROR: REENTER L
      INE {4}":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT"{DOWN}{BLU}
      ** END OF ENTRY **{BLK}
      {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}
      {SPACE}DISPLAY DATA ":G
      OSUB400:IF IN$=N$ THEN2
      00
RJ 620 PRINT"{DOWN}{BLU}PRESS:
      {RVS}SPACE{OFF} TO PAU
      SE, {RVS}RETURN{OFF} TO
      BREAK{4}{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
      I=BT0 B+7:A=PEEK(I):GOS
      UB350:GOSUB380:PRINT S$
      ;
CC 640 NEXT:PRINT"[RVS]";:A=CK
      :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
      ENPRINT"{DOWN}{BLU}** E
      ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
      SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
      UBL080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD
      {SPACE}DATA ":OP=1:GOTO
      710
PC 700 PRINT"{DOWN}{RVS} SAVE
      {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
      NAME{4}";IN$:IF IN$=N$
      {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}
      {RVS}T{OFF}APE OR {RVS}
      D{OFF}ISK: {4}";
FP 730 GET A$:IF A$="T" THEN PR
      INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D" THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
      ,15,"I0":B=EA-SA:IN$="
      0":+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+" ,P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHR$(AL)
      ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      R$(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT"{DOWN}
      {BLK}ERROR DURING SAVE:
      {4}":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+" ,P,R":G
      OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
      $)+256*ASC(B$+Z$):IF AD
      <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
      OKE BS+I,ASC(A$+Z$):IF(
      I<>B) AND ST THEN F=2:AD
      =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
      >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
      CLOSE1:CLOSE15:GOSUB10
      60:PRINT"{RVS}ERROR: "A
      $
GQ 870 RETURN
EJ 880 POKEL83,PEEK(FA+2):POKE
      187,PEEK(FA+3):POKEL88,
      PEEK(FA+4):IFOP=0 THEN92
      0
HJ 890 SYS 63466:IF(PEEK(783)A
      ND1) THEN GOSUB1060:PRIN
      T"{DOWN}{RVS} FILE NOT
      {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
      30):IF AD<>SA THEN F=1:
      GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
      2)-1:F=F-2*(A<EA)-3*(A>
      EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
      OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
      UBL010:ON OP GOTO950:SY
      S 63591
AE 940 GOSUB1080:PRINT"{BLU}**
      SAVE COMPLETED **":GOT
      O220
XP 950 POKEL47,0:SYS 63562:IF
      {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}**
      LOAD COMPLETED **":GOT
      O220
DP 970 GOSUB1060:PRINT"{BLK}
      {RVS}ERROR DURING LOAD:
      {DOWN}{4}":ON F GOSUB98
      0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
      G ADDRESS (";:GOSUB360:
      PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
      AD=SA+AD:GOSUB360:PRINT
      D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
      ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
      *256):POKEL93,AL:POKEL
      94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
      *256):POKEL74,AL:POKEL
      75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
      1050
CR 1040 IF (AD>511 AND AD<6528
      0) THEN GOSUB1080: F=0
      : RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
      {SPACE}INVALID ADDRESS
      {DOWN}{BLK}":F=1:RETU
      RN
AR 1060 POKE SD+5,31:POKE SD+6
      ,208:POKE SD,240:POKE
      {SPACE}SD+1,4:POKE SD+
      4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
      TOL090
PF 1080 POKE SD+5,8:POKE SD+6,
      240:POKE SD,0:POKE SD+
      1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
      KE SD+4,0:POKE SD,0:PO
      KE SD+1,0:RETURN

```

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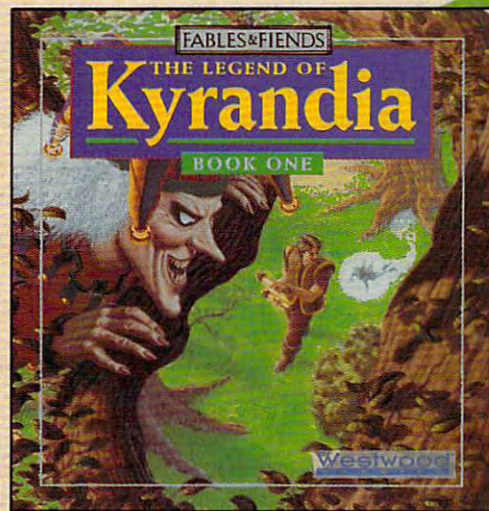
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## TANDY 4825 SX TANDY 4850 EP

What if I told you that you could get the performance of a 486 computer, service from a local computer retailer, and state-of-the-art video and hard disk performance—all for about \$2,000? If you're in the market to upgrade your computer to a high-end business system for graphics processing, you'd probably ask for a telephone number. And what if I told you that the system I just described is a Tandy? You'd probably say, "The folks who brought us the RL 1000?"

That's right. The company that wants to put a computer in every kitchen also wants to put a 486 screamer on your desktop. And with the price and performance of its new 486-based series, Tandy just might do it.

Starting with the 4825 SX, computer users in small businesses who need leading-edge performance from their computers are finally within reach of that kind of power. An Intel 486SX processor supplies true 32-bit performance. If you've been working with a 386SX-based computer, the difference in performance is absolutely radical, especially with Windows applications.

The 4825 SX compares favorably to a 33-MHz 386 system, and it has one special feature: It's completely upgradable to a 50-MHz 486 system. Now you're talking power. But what does this performance mean in real terms? For most home offices, 486 power is overkill. But the biannual question posed by Intel continues: With prices this good, what are you waiting for?

In my own home office, I use an Insight 386SX run-

ning at 16 MHz, with 4MB of RAM and 1MB of video memory. Not state-of-the-art, but so far it's been good to me. In my evaluation of these two new Tandy systems, I did some testing and came up with some numbers that made my pride and joy look like a mere rookie at Darling-



*With Tandy's new 4825 SX and 4850 EP, you can get the power of a 486 system at less than the usual 486 price.*

ton Motor Speedway.

With character-based applications such as spreadsheets, word processors, and databases, the results are predictable. Compared to my 386SX, the 4825 SX and the 4850 EP crunched numbers about 312 percent and 335 percent faster, respectively. In word processing, the improvements rang up 297 percent and 316 percent. And when it came to database performance, the 4825 SX outperformed my home machine by 298 percent, while its bigger cousin boasted an improvement of 300 percent. The Overall Norton Performance Index placed the 4825 SX at 64.3 and the 4850 EP at 93.3. By comparison, my 386SX rates a 7.2. Whoa! Eat my silicon!

The numbers weren't quite as impressive when it came to Windows perform-

ance, but the Tandy machines still ran circles around my home computer. For graphical computing, you can expect performance improvements from 100 percent (4825 SX) to 180 percent (4850 EP) over a 16-MHz 386SX system. This just goes to show that

chips rated at 80 ns).

Video memory is also easily enhanced by adding four video memory chips that mount directly into sockets on the main board. As it ships, the video controller is capable of 640 x 480 resolution in 256 colors. If you're planning to turn one of these systems into a dedicated graphics workstation, you may want to upgrade to Super VGA (SVGA). Tandy doesn't sell the video memory chips, although a Radio Shack dealer can order them for you from another vendor.

This much power demands equal amounts of storage space, and Tandy delivers with a 120MB IDE hard disk governed by an internal controller that can support a maximum of two drives. A single 1.44MB floppy drive also comes standard with either unit. There's room for another 5¼-inch drive device, which can be a floppy drive, a second hard disk, or a CD-ROM drive.

Outside, both systems use a high-profile 101-key keyboard that provides ample tactile feedback and comfort. Both systems also ship with a Tandy two-button mouse that plugs into a PS/2-style connector in the back of the system unit. The mouse is the most disappointing element in the entire system—if I spend more than \$2,000 on a computer (monitor not included), I want something more than a \$10 mouse. Many clone manufacturers offer a Logitech or Microsoft mouse with their systems; Tandy should, too.

I reviewed these systems with a Tandy VGM-440 VGA monitor, which is capable of 1024 x 768 resolution in 256 colors (SVGA), provided you upgrade the video memory to 1MB. Other less

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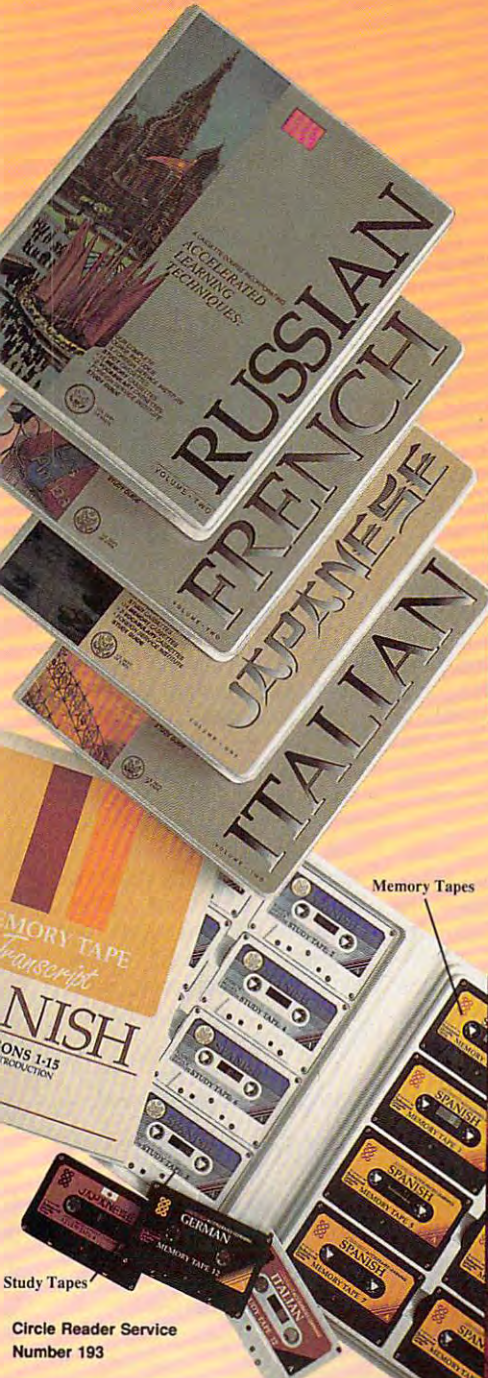
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expensive Tandy VGA monitors are available, but they don't support the Super VGA mode. Alternatively, you could use a non-Tandy VGA monitor.

According to Intel, the customer can perform the processor upgrade from the 4825 SX to the 4850 EP, which is fine for large businesses with a dedicated MIS staff. But for small businesses and home offices, Tandy recommends taking the system into a Radio Shack store and having a dealer perform the upgrade, which involves removing the 486SX chip and replacing it with a 50-MHz chip—no other modifications are required.

Overall, these are very capable systems at competitive retail prices. You can probably do better with mail-order shopping, perhaps saving enough to buy a monitor or finding a 25-MHz 486SX system that includes a monitor for around \$2,000. Even so, risking capital on mystery components isn't always the best solution for home office entrepreneurs and small businesses. When compared to those of mainline direct sellers like Dell and ZEOS, the Tandy systems aren't that much more expensive. And with the upgrade path to full 50-MHz performance, these machines aren't likely to be obsolete for years to come.

But isn't that what they said about the 386?

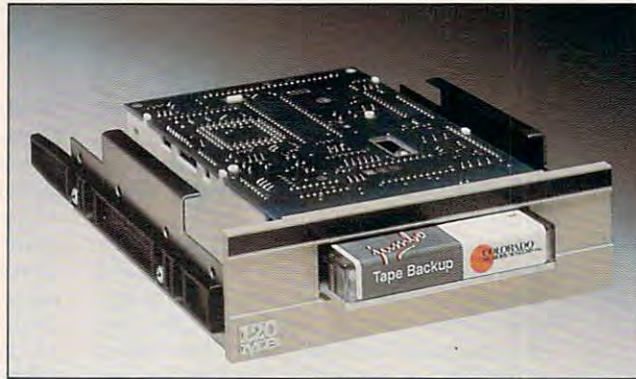
PETER SCISCO

Tandy 4825 SX—\$1,699 (with floppy drive), \$1,999 (with 120MB hard disk), \$2,799 (with MPC upgrade)  
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102 COMPUTE JULY 1992



Throw away your floppies and quit worrying about a hard drive crash: The Jumbo Tape Backup System is here!

## JUMBO TAPE BACKUP SYSTEM

When it comes to backing up information on floppies, my philosophy isn't exactly mainstream. I've found myself in a defensive position when discussing the subject. You see, I hate backing up my hard drives because I already have hundreds of floppies in storage. Adding 50 more would compound my organizational difficulties. I only back up the few directories in which my current work is found.

This system works, even when I trash one of my work files—until the dreaded hard drive crash, that is. (And recently I've had more than my share, since I just wrote a disk utility that includes an optimizer.) At these catastrophic junctures, I realize everyone else was right: I should've backed up the entire drive. Rectifying things takes me hours—and reminds me how much I hate application-installation programs. Until recently, I continued my insane approach to data backups.

Enter the hero, Colorado Memory Systems' JUMBO Tape Backup System 120. Since it's been installed, I haven't had a single disaster

that took more than 15 minutes to fix. And I haven't lost any data—just the small amount of time it took to restore things from tape.

How easy is it? Extremely. Once it's installed, the software is on your hard drive. For extra safety I copied the software to floppy in case the absolute worst happened. It never has, but it would've been easy enough to run the restore software from floppy.

To start the software, you just type TAPE. Just about everything you do is with function key-controlled menus. They're plain and simple in appearance but perfectly functional. When you're restoring your life's work, you don't really care what the menus look like.

The backup options cover all bases. You can back up an entire drive, an entire directory, selected directories, and selected files in directories. What's great is the unattended backup feature. If you enable this, your computer will automatically back itself up at the designated time. It's smart enough to know when the computer is in use and beeps at you if it's time to do the backup and you're in the way. I set mine for Saturday morning at 4:00, and it provided safety while I slept.

Restoring is just as easy as backing up. You can select which files and directories you want or restore the entire drive. The JUMBO system isn't lightning fast, though. An entire 65MB hard drive takes about 25 minutes to back up and about the same amount of time to restore.

Although complete instructions for installation are included, I wouldn't recommend doing it yourself unless you're totally at home inside your PC. I installed the JUMBO system in two different computers and experienced the same difficulties both times. The mounting hardware wasn't what my two systems expected. That meant I had to scrounge around among spare pieces to find what I needed. And the instructions for connecting the cables, while complete, didn't go the extra mile for beginners. I had no trouble installing the hardware, but it's easy to see that some people would. Don't let that discourage you from buying the device; just plan on getting a professional to install it.

If you hate backing up your hard drive, get one of these babies. It'll save you time, trouble, floppy disks, and hassles when your co-workers debate the merits of backing up your entire drive. I've seen the system advertised in the \$200 range. Not bad, considering what it'll save you in the long run.

RICK LEINECKER

JUMBO Tape Backup System 120—\$250  
JUMBO Tape Backup System 250—\$350

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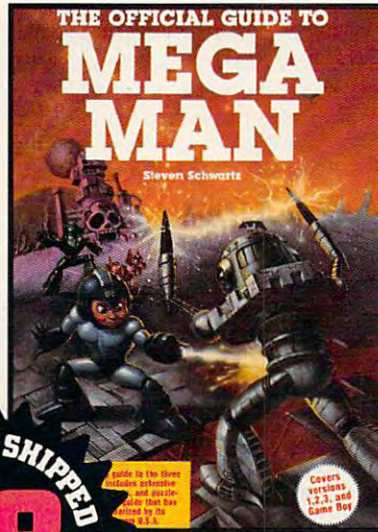
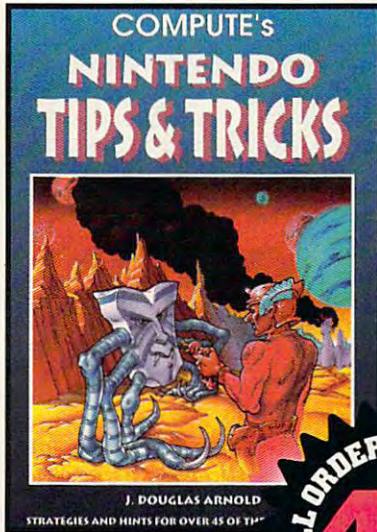
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# BUST THE MOST DIFFICULT NINTENDO PUZZLES WITH THESE BOOKS FROM COMPUTE

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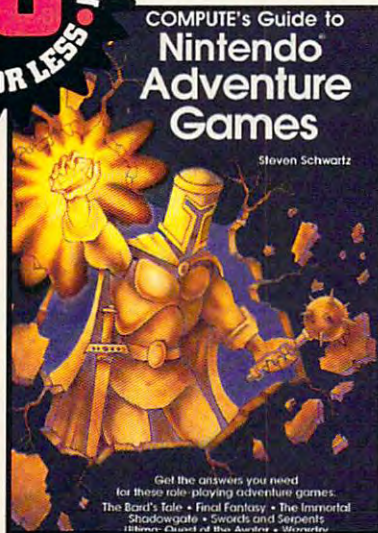
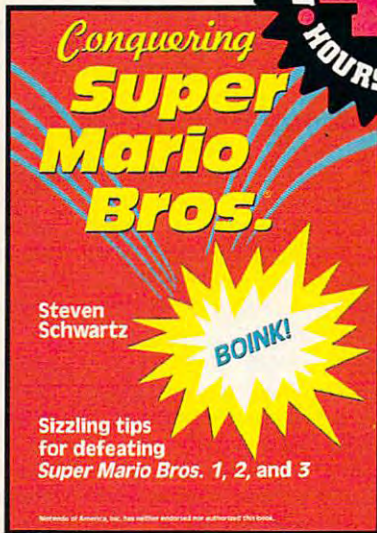
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## MAGNAVOX HEADSTART 386SX-20CD

The decision about which computer to purchase often boils down to what's included in the package. And this package—the Magnavox Headstart 386SX-20CD with a 3½-inch floppy drive, a CD-ROM player, and a Microsoft-compatible mouse—has some pretty neat stuff. It's bundled with the easy-to-use graphical interface GeoWorks Ensemble, Lotus 1-2-3 Version 2.2, and plenty of CD-ROM software for the whole family.

You can use the system almost straight out of the box. Since the setup guide is a mere seven diagramed pages, you can pretty much unwrap the computer, put it on your desk, and plug it in. The slimline case is well laid out and should fit easily even on small tables.

The Magnavox has an all-in-one motherboard, which means that all of your peripheral ports are built into the motherboard. The downside to this is that if one of the ports goes bad, you'll have to replace the whole motherboard. Also, since a CD-ROM drive is included with this system, you have only three expansion slots in the back. However, this kind of system tends to cost less than one with the traditional add-on type of motherboard—a plus if you're on a strict budget.

The Maxtor 80MB IDE hard drive should give most home users all the storage space they'll need for quite a while. Two megabytes of RAM are standard. One possible drawback, however, is how the Magnavox handles memory expansion. While

the computer can take up to 16MB of RAM, you can install only an additional 8MB on board by adding SIMMs. You'll have to buy an expansion card for additional memory above that, which means using up another slot. If memory expansion is a priority on your list when you're computer shopping, you probably should consider a more expandable machine.

The monitor you get with this system is a Super VGA with 800 × 600 resolution and 16 colors. Again, because the video-adaptor card is built in, you're limited in your ability to upgrade. If you disable the on-board video controller, you'll have to use yet another expansion slot in the back of the computer.

Despite its expansion limitations, this Magnavox becomes a very friendly machine when bundled with GeoWorks Ensemble. Ensemble—similar to Windows 3.0 in that it's an icon-oriented, point-and-click interface—provides you with an easy means of accessing your other applications, along with some convenient desktop tools and a couple of games. One nice aspect of Ensemble is that a simple Ctrl-Esc allows you to listen to your audio CDs on the CD-ROM player (with the included headphones) while working in another application. When not listening to music, you'll want to take advantage of the software included for the CD-ROM player.

Supporting a variety of the most popular word processors, Microsoft Bookshelf offers up a nice collection of writing resources: *The American Heritage Dictionary*, *Bartlett's Familiar Quotations*, *The Chicago Manual*

*of Style*, and more. The program loads in as memory resident, so it's easily accessed from your favorite word processor. Unfortunately, GeoWrite, the word processor included with Ensemble, doesn't support this part of Bookshelf; in order to use the memory-resident feature, you'll have to use another word processor.

The New Grolier Electronic Encyclopedia contains all 21 volumes of the current *Academic American Encyclopedia*. This easy-to-use program makes looking up topics a snap, and the graphics are superb. An IBM-compatible version is also included on the CD-setup disk.

For learning world geography, PC Globe PAK is a gold mine. The extensive databases of PC Globe and PC USA are definitely this software's shining stars, with information on more than 190 countries ranging from population statistics to tourist attractions. You can even listen to 177 national anthems from around the world. GeoJigsaw, also included, is an onscreen geography puzzle.

For children, The Manhole is an easy-to-use audiovisual fantasy exploration program. Point the mouse and click, and you're headed in a new direction. Every cubbyhole you prod hides a surprise.

Microsoft Small Business Consultant and Stat Pak offer a world of information at your fingertips. They support most popular word processors, but, once again, GeoWrite isn't supported. You'll find an array of useful information—from books to government publications—for any type of business professional.

For most home computer buyers, the Magnavox Head-

start 386SX-20CD with a CD-ROM drive is a turnkey system with enough software to keep you happy for a long time. New computer buyers should find this package worth a close look.

JILL CHAMPION

Magnavox Headstart 386SX-20CD with 2MB RAM, 80MB hard drive, 3½-inch floppy drive, CD-ROM drive, mouse, software, and Super VGA monitor—\$2,099

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## OBJECTVISION 2.0

There are database programs. There are development systems. There are forms designers. And lately, hybrid products that claim to be all three have come along. ObjectVision 2.0 for Windows is one program that makes such a claim.

It is, in fact, a very powerful database toolkit that makes formerly difficult Windows jobs childishly simple.

Borland coyly refuses to offer a one-line description of ObjectVision, so I'll follow Borland's lead and instead summarize what you can do with the program. ObjectVision can be used to create databases in dBASE, Paradox, ASCII, and Btrieve formats. You can create filters for these databases using a simple forms approach. You can design forms for these databases visually, with full control over fonts and color support as well. The design tools mimic those of a rudimentary-but-capable draw program (but ObjectVision can import bitmaps via the Windows Clipboard). Most onscreen objects, such as fields, database tables, and buttons,

can perform user-defined actions using visual "event trees" that do many of the same things a simple programming language could do, without forcing you to program.

Borland originally downplayed the ability of ObjectVision 1.0 to create databases, instead touting it as a front end for other database systems, notably dBASE and Paradox. But as often happens with software, those pesky users insisted on doing their own thing with it—and that turned out to be custom application development. Users were also unwilling to part with \$495 (the original price for ObjectVision 1.0) for a database program that didn't have a traditional programming environment.

Borland sensibly paid attention to their needs, soon tilting the development of 2.0 toward the creation of sophisticated data-management systems under Windows. The company went one step further and allowed the free distribution of ObjectVision runtime modules. The result is that people who were formerly not identified as database experts (the same people who are willing to take a crack at macros in 1-2-3 or WordPerfect but who don't identify themselves as programmers) are suddenly able to quickly create seamless, freely distributable database applications that run under Windows.

And while ObjectVision 2.0 does lack the scripting language it so richly deserves, it's able to perform many of the kinds of tasks that would be enormously complicated using languages such as SQL or dBASE. One of ObjectVision's unsung features is the ability

of a single onscreen form to update many different databases using many different formats at once. For example, your innocent-looking order entry form can automatically update your dBASE customer file, a Paradox inventory table, and an ASCII mailing list file, all without requir-

Is ObjectVision for you? See if any of the following apply: Do you need to develop Windows database applications of elementary-to-medium complexity? Are you fairly sure that you can get by without a programming language to back you up (or do you not know any pro-

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6/22/91	Paycheck		592.34	1,677.02
6/24/91	Savings	200.00		1,477.02
6/29/91	Paycheck		592.34	2,069.36
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Microsoft Money looks and sounds so much like Quicken you may forget which one you're using, but Money is the simpler of the two.

ing a single line of programming and all without the knowledge of the user. ObjectVision is so adept at managing multiple relations that I'm sure many users are already creating applications that would be regarded as quite advanced by database theorists, even though the very same users might not know a thing about set theory.

Network users should note that even at its surprisingly low price, ObjectVision supports a half-dozen networks if the database files are in Paradox format. On the other hand, owners of small businesses or prospective personal users should also pay close attention, because there's no faster way I know of to get a high-performance database written than with ObjectVision 2.0.

gramming languages)? Are you a consultant who wants to distribute turnkey applications with record turn-around? Do you need to whip together a slick forms package for an existing database in dBASE, Paradox, ASCII, or Btrieve format?

If you answered yes to any of the above, ObjectVision is a no-brainer. There's no better deal for a hundred and fifty bucks.

TOM CAMPBELL

IBM PC and compatibles (80286 or faster); 1MB RAM (2MB recommended); EGA, VGA, 8514/A, or Hercules; 2.5MB hard disk space; Windows 3.0; mouse recommended—\$149.95 (\$49.95 for upgrade)

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Circle Reader Service Number 364

## MICROSOFT MONEY

It's never been easy to keep track of finances. If you think keeping your own records is difficult, just remember the Romans. It took them ten times the time and personnel to keep records in Roman numerals than it would have if they had used the Arabic number system. Venetian merchants used a secret system of Arabic number-based recordkeeping that has been refined over the centuries to the system of recordkeeping widely used today. The advent of the computer has made some recordkeeping easier, but you still need to learn how to use a computer. Microsoft Money helps.

Microsoft Money combines an easy-to-use interface, Windows 3.0, with a checkbook ledger that has been expanded to incorporate two special accounting journals: the cash payments and cash receipts journals. For accounting aficionados, Money is a cash-basis accounting system that may require an accountant to do end-of-year adjustments to convert it to an accrual basis for certain types of businesses. Other end-of-year adjustments may be required to convert the information to the needed format for certain financial statements and income tax returns. Money comes with a variety of foolproof, easy-to-use features that will make the task of recordkeeping less painful.

Money, which was released shortly before Intuit's Quicken 5.0 for Windows, looks very similar to Quicken and has many similar features. Its manual even has a

chapter especially written for Quicken users, and the program has a feature which converts Quicken data files to Money's format. Even many of Money's command keystroke combinations are borrowed directly from Quicken. Money uses the same check forms developed for Quicken by Deluxe Business Systems, which are available for dot-matrix and laser printers. Money is so similar to Quicken that they even sound alike. Both have the same data entry-confirmation beep. With Quicken's user base of more than 2 million, imitation is not just the sincerest form of flattery. This type of imitation is an attempt at 100-percent compatibility with the industry standard.

Money has some very useful innovations that go beyond its status as a Quicken look-alike. Smart Fill is a feature that, on the second and subsequent entries of a payee or payer, will complete the entry of a transaction after the first few letters of the name are entered. Money can also use aliases and codes to simplify data entry. By using a code for a repetitive transaction, the entire transaction will fill in without any further input. In making data entry significantly easier, Smart Fill helps encourage the user to enter all transactions in the system. (An incomplete set of records can be worse than no records at all.)

Also included with Smart Fill is Smart Reconcile, which takes you step by step through the process of reconciling your bank statement. Errors in reconciliation are searched for intelligently, automating the otherwise manual techniques for checking accounting errors and providing hints of what to

look for. Transactions involved in the reconciliation are marked with the word *reconciled* for future reference. Money's Smart Fill and Smart Reconcile features give you intelligent ways to use the computer to make the tedious job of record-



*This island governor's unique method of food consumption is only one of many wonders in Monkey Island 2: LeChuck's Revenge.*

keeping significantly easier.

To Money's detriment, Quicken is still the leader in available features. Quicken can track investments, link up to the Checkfree electronic check-paying network, and manage assets. But wait—there's more! Quicken has links to tax categories, more intelligent data entry, two check-printing formats, loan amortization, percentage allocations, hot-key access to reports and the check register, a payroll module, memorized and customizable reports, two-level password security, a more detailed and useful toolbar, and many more categories and classes than Money's two of each. In many ways, Quicken is more versatile than Money. And there are even more versatile programs than Quicken on the market—for a higher price.

Both Money and Quicken

use the check-register format and provide for multiple files for multiple businesses, properties, and accounts. Both programs are versatile enough to handle all of the business and personal financial situations of the average individual, small busi-

## MONKEY ISLAND 2: LECHUCK'S REVENGE

Consult your recipe for Peg Leg Rot and swig a hearty mug of grog. Guybrush Threepwood, goofball hero of Lucasfilm Games' *The Secret of Monkey Island*, has returned in *Monkey Island 2: LeChuck's Revenge* to do battle yet again with his decomposing nemesis, the ghost pirate LeChuck.

The games in the *Monkey Island* series are brightly animated adventures with a pirate-era setting and a warped sense of humor. You wear the paltry beard of Guybrush Threepwood, a pirate wannabe at the beginning of *The Secret of Monkey Island* and a LeChuck-conquering hero as *Monkey Island 2* begins. I couldn't get far enough in the first game to lay eyes on LeChuck, however, much less defeat him.

Fortunately, *Monkey Island 2* features an optional Easy mode "for beginners and magazine reviewers." (Ahem.) Unfortunately, even when playing "Monkey 2 Lite," I still couldn't figure out a way for Guybrush to vanquish LeChuck in round 2 of their ongoing enmity. My Guybrush remains lost under Dinky Island, getting zapped from room to room whenever LeChuck puts the pins to his Guybrush voodoo doll.

Whether you have better luck playing this game or not, you'll enjoy yourself. Unlike many other adventure games, Lucasfilm games actually encourage you to take chances—and to take it easy. As Guybrush, you can spout rude putdowns at unfriendly guards without

ness entrepreneur, or property owner. Although neither Money nor Quicken is the be-all and end-all of accounting systems, both are good programs. Each may require some intelligent setup and some analysis at the end of the year to make it useful. If you need the expanded versatility of Quicken, Money may not be the way to go. But if it's a simple, attractive, easy-to-use, foolproof system that you need, then Money beats Quicken hands down.

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fear of reprisal, and you can venture into unfamiliar places—a skull-shaped voodoo hut hidden in a swamp, the bedroom of an unconscious island governor who awakens only long enough to open his mouth for a spray of food from bedside tubes—without having to worry about sudden death.

Along with this easygoing approach, you'll find engaging animated scenes, from closeups of navigational maps detailing peril-fraught seas (avoid the Forbidden Rhombus and the Forbidden Right Circular Conic Cross-Section) to topographical macro views of the islands Guybrush wanders. Before he even encounters the newly reanimated LeChuck, Guybrush must search for clues to lead him to the lost treasure that's every pirate's dream: Big Whoop. The animated game has a cinematic feel, from the lovely opening shot of Scabb Island to the mood-setting music.

Monkey Island 2 is worth playing for the sounds alone. I first tried it using only my computer's internal speaker, then ran it through a Covox Sound Master II. The difference was astounding. A game of adequate, squawking sound effects quickly became something akin to a movie, with impressive flourishes of sound to accompany every tumble and capture. The music was even more impressive, with clattering Caribbean rhythms enlivening the opening credits, jaunty pirate music accompanying the opening scene, and springy reggae sounds emanating from the speakers every time Guybrush boarded the ship of the dreadlocked Captain Dead.

Combine that music with fine animation and abun-



*It may have more power than you need, but the Practical Peripherals PM9600 is an excellent 9600-bps modem.*

dant humor, and you have as enjoyable an adventure game as anyone could hope for—even if you never do vanquish LeChuck.

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## PRACTICAL PERIPHERALS PM9600

Macros and programming make telecommunications faster, but how about getting the information across the telephone lines more quickly—say, four times faster than the standard 2400-bps modem? I had a chance to try out the Practical Peripherals PM9600 modem and liked it so much I bought one for myself. I've installed a variety of modems for COMPUTE's staff, but this one really grabbed my at-

tention. It was easy to install and configure, and it worked perfectly the first time I used it.

Before you consider buying the PM9600, ask yourself if you need a 9600-bps modem. Although theoretically it's four times faster than a 2400-bps modem, that's true only when your computer is talking directly to another computer or when you're on a bulletin board system. When you're connected to online services, delays introduced at every stage of the connection will reduce your effective transmission rate to something less than four times the rate of a 2400-bps modem.

Here's how 2400 bps and 9600 bps compare on my computer when I download files from GENIE. At 2400 bps, the transfer rate is around 138 characters per second (cps); at 9600 bps, it's about 340 cps. That's roughly 2½ times as fast.

Bear in mind, too, that 9600-bps connect charges are greater. You pay a higher hourly rate when connected at the faster speed. However, you'll still end up saving if you're downloading many files. And it's an even greater savings if you're pay-

ing long-distance charges.

Another good point: This internal modem is incredibly simple to install and run. I opened up my computer and removed the old modem; then I looked at the back of the Practical Peripherals modem where the COM port switches are located (and thoughtfully marked) to make sure it was set to COM 1. After inserting the card in a slot, I closed the computer and turned it on. I ran my telecommunications software, set it for 9600 bps, and took off. I experienced no interrupt or IRQ conflicts, had no oddball initialization strings to deal with, and faced nothing incompatible or out of the ordinary.

How did the modem work? Great. You might expect line noise and extraneous garbage to enter the data stream, since the transfer speed is much greater, but I didn't find that to be true. In fact, I experienced less line noise with this modem than with some 2400-bps modems I've used. It seems that Practical Peripherals' system of noise filtering is up to the task of the extra speed.

These modems are great for remote-control computing, too. For regular system use like reading messages, though, a 9600-bps probably isn't worth the money unless you're impatient and willing to pay for fast menu and text-file updates.

If you're thinking about buying a modem or upgrading the one you have, though, consider the PM9600. It's an excellent choice.

RICHARD C. LEINECKER

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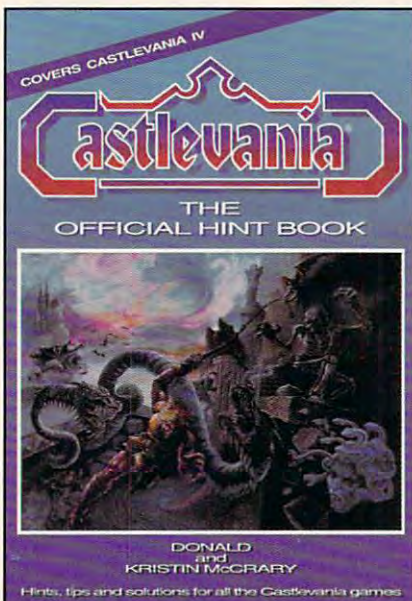
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## REVIEWS

### NFL

Couch coaches looking for the ultimate football computer game might end their search with Konami's NFL, a football simulation program that lets the player compete in both statistical and hands-on, arcade-style football. With a huge selection of options, there's little in the game that can't be manipulated in some fashion or another, yielding a sports contest that will please any type of player.



*Frustrated with pro football? Run the league yourself with NFL.*

Before the game begins, you can choose from several keyboard and joystick configurations, as well as set either player as a computer-run opponent. In addition, you determine whether you'll be playing a statistical game (coach only) and whether you'll choose player substitutions and drafts or leave these chores to the computer. You also have the ability to toggle such options as penalties, weather conditions, player fatigue, and player injuries.

After configuring NFL, you're offered three game modes: Training Camp, Pre-season Game, and Road to the Super Bowl. In the training camp, you edit teams, players, and your playbook, as well as run through your plays on the practice field. In a preseason game, you choose two teams to battle it out in a single game. Finally, on the road to the Super Bowl, you create your own league and set off for the ultimate football victory. In this game mode, you'll not only play football but also scout out your opponents, review your weekly schedule, analyze player and game statistics, trace your progress on the play-off tree, and participate in drafts and trades.

Once on the field, if you've chosen the coach-only option, you need do little more than select your team's plays and watch the computer run them. However, if you've decided on the hands-on approach, you must control your players on the field after you've given them their plays. Since NFL is a fairly complete simulation, controlling

your players well takes practice. You can choose from many plays, including passing, receiving, diving, straight-arming a defender, punting, and tackling.

After a play is completed, the instant-replay option offers a chance to analyze your team's efforts. With the VCR-type controller, you can view the play at different speeds or even frame by frame, as well as change the viewing angle. Other controls include rewind and stop.

NFL features digitized voices and effects throughout, and although you'll get the best audio results by using a sound card like Sound Blaster, the program wrings some surprising sound even from your PC's lowly built-in speaker. In addition, the graphics and animation are all top quality, providing a realistic and fun sports simulation.

Because it can be configured for different depths of gameplay, NFL is a great choice for any football fan. Those who like to get their hands dirty with the details of handling a league have plenty to keep them busy, whereas players who just want to grunt and sweat can march right out onto the field, ignoring the editing options. For either type of football fan, NFL comes highly recommended.

CLAYTON WALNUM

IBM PC and compatibles; 640K RAM; EGA, MCGA, or VGA; supports Ad Lib, Sound Blaster, and Roland sound; joystick and hard drive recommended—\$49.95

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(708) 215-5111

Circle Reader Service Number 368

### QUICKVERSE 2.0

Students of the Bible sometimes need serious tools to further their studies. QuickVerse 2.0 delivers an onscreen Bible that practically invites serious study. With several popular translations of the Bible available, along with Hebrew and Greek Transliterated Bible, this Parsons Technology product can give scriptural scholars some welcome assistance.

The QuickVerse screen remains neat and uncluttered, even when simultaneously displaying multiple translations. A function bar along the top provides access to pop-up menus detailing specific program functions (easy-to-remember keyboard shortcuts are also available). But most of the screen is devoted to the text area, which displays up to four windows of single-spaced text. With all four active, your computer presents two rows of two windows each. No side-by-side arrangement is available, making parallel stud-

ies slightly more tiresome than with other packages.

One text window is always designated as the active window, and you navigate therein using the Home, End, Page Up, Page Down, and cursor keys. Text in the active window can scroll independently or in synchronization with identical references in other windows. Synchronization, however, is an all-or-nothing prospect. If you want to sync any windows, you'll have to sync them all.

It's fascinating to read a passage while there are multiple translations on-screen for easy comparison, and most users will spend much time doing just that. But QuickVerse's search features make the program really notable. Say a particular word catches your interest—*forgiveness*, for instance. QuickVerse can search out and identify every occurrence within the text, listing them all on your screen. You can then look at individual occurrences or step through them one at a time. QuickVerse ignores case but not punctuation—a trait that you can use to add precision to your searches.

What if you don't know how to spell the word you want to find? If you want to find *Nebuchadnezzar*, for example, just check the alphabetical listing of all words occurring in the current translation. Alternately, use QuickVerse's wildcard feature. Type the first few letters followed by an asterisk (in this case, *neb\**), and you'll find all passages containing words beginning with the letters *neb*. Unfortunately, the wildcard feature works only at the end of a word, so an educated guess at the first few letters can prove crucial.

Looking for related words? Boolean search capabilities allow you to pinpoint verses containing specific combinations of words or any of several given words. There is no way to search for words occurring a given distance apart (for example, the word *forgiveness* when it's located within five words of the word *neighbor*), but the Boolean approach actually seems to be more useful.

How about phrases? QuickVerse searches for phrases of up to ten words or 127 characters, whichever comes first. Punctuation need not be included, so there's no need to worry about all those commas. Phrase searches stop at verse boundaries, however. In fact, if you try looking for a phrase that crosses verse boundaries, the program will tell you that it's not in the Bible.

In any case, you can easily set search limits. You can search a range of verses, a single book, a range of books, or a group of books. If you

don't specify a limit, the search will cover the entire Bible.

Once you've found your word or phrase, QuickVerse allows you to write your own comments on that particular word or phrase. It's like writing in the margins of a printed Bible—a genuinely handy way to record your thoughts as you study. The package offers a wide range of printing features, of course, including the ability to print those notes with the text.

Is QuickVerse really quick? Indeed it is, despite what sometimes seems like a lot of hard disk accessing. Even on a turtle-slow 16-MHz machine, locating a phrase never took more than a few seconds—much faster than any text search using traditional reference-book techniques, as page-weary Sunday school teachers will attest. The result: less time spent looking things up and much more time to spend looking them over.

What's missing? An autoscrolling feature would aid casual reading. Some might wish for the Apocrypha, and those with a bent toward comparative studies might wish the text windows were side by side instead of stacked two over two. But for many pastors, Sunday school teachers, and other students of the Bible, QuickVerse 2.0 may take Bible study to a more comfortable level.

STEVE HUDSON •

IBM PC and compatibles, 512K RAM, two floppy drives or a hard drive, 2.5MB per translation installed—\$69, Hebrew and Greek Transliterated Bible (requires 4.5MB)—\$39, additional Bible translations—\$39 each

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## DESTINATION: MARS!

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W8

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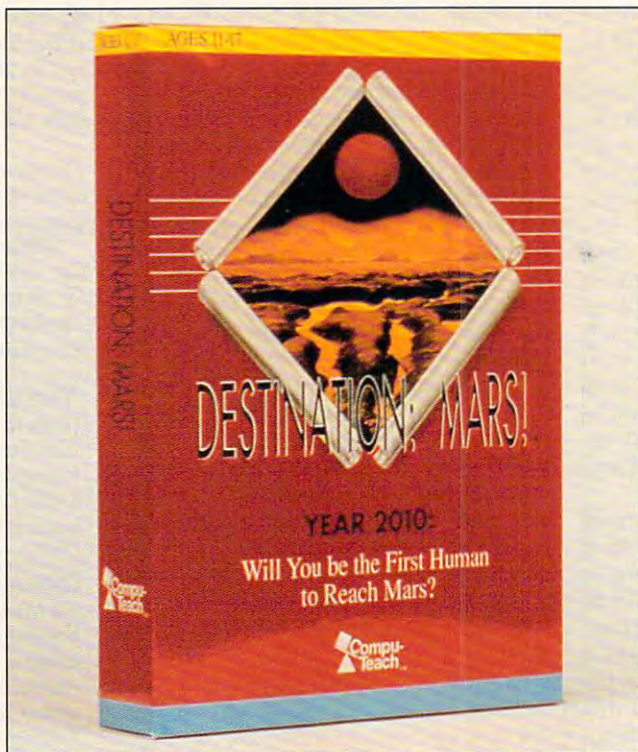
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rover you complete experiments, carry out activities at several bases, and finally match wits against your competitors as you race to find their secret resource areas.

Many of the tasks you have to accomplish are fun, and it's a thrill when you finally get to Mars after many missions. VanDam Publishers' *Mars Atlas*, which comes with the program, is an informative resource with great maps. Compu-Teach's own user's manual contains detailed instructions on program operation and lots of information about astronomy, biology, chemistry, geology, and physics.

Although some of the challenges will be satisfying to complete, parts of the program are really annoying. For example, to finish each experiment, you're given a multiple-choice question. Assuming you're able to figure out the question itself, you should be all right. If you choose incorrectly, the program responds with *Wrong!* and jumps you right into another situation. I was left in the dark many times. Why couldn't the program have said *Let's look at this problem again or You should have chosen . . . ?* I ended up learning absolutely nothing from my mistakes.

You'll need your good judgment to survive emergency situations which come about as you navigate through the game. Although I normally trust mine, I was often frustrated when choosing what I thought to be the best solution, only to have the computer respond with *Wrong!* A crew member compensated—or something to that effect. I'm still puzzled as to why some of my answers were wrong. I also doubt the educational—and moral—soundness of a pro-



*In many ways Destination: Mars! is a great adventure game, but some of its educational aspects leave a lot to be desired.*

gram that (1) ignores such an opportunity to build research skills and promote good planning, (2) gives only negative feedback and doesn't explain why your response isn't good, and (3) glosses over your mistakes by implying that they're OK because someone else will cover for you.

My other beefs are relatively minor. I think it's overly optimistic to recommend the age level as 11–17, considering some of the chemistry and physics problems you have to swim through. Younger players may find themselves over their heads. Also, although the user's manual attempts to bring each scene in the game to life by including details about your living conditions, computer equipment, and fellow travelers, it would be more effective if this were put right in-

to the program. Even the most studious kids are likely to skip over the manual and miss all these special touches.

The program's technical operation is perfect, the graphics are great, and the supplemental materials are thorough. I give these areas the highest rating. However, while *Destination: Mars!* may be built on a sound premise, there's a lot of room for improvement before this program can truly be called educational.

KRISTEN STERNBERG

IBM PC and compatibles; 384K RAM; CGA, EGA, or VGA; Sound Blaster-compatible—\$59.95

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Circle Reader Service Number 370

## SOUND MASTER II

Settling for the internal speaker that comes in your computer makes about as much sense as settling for an AM radio in a new car. Both get the job done up to a point, but by settling for them, you're missing out on a lot. Besides, like an AM radio in a car, a computer's internal speaker sounds terrible.

So you decide to upgrade. But which custom sound system will you choose for your computer? AdLib? Sound Blaster? Well, how about a sound card that covers those bases and more at a list price only slightly higher than its competitors? The Covox Sound Master II emulates the most popular sound cards and offers several other worthwhile features. It comes packaged with hardware and software that allows you to channel your internal speaker's sounds through the sound card, issue voice commands, and link your MIDI keyboard directly to the card for compositional interaction.

All of these features won't appeal to everyone, of course, and not all are accessible to everyone. For instance, you have to have an 80386 or higher processor to take advantage of both the Sound Blaster compatibility and the SMulator technology, which makes Sound Master II work with software that requires other sound cards. Beyond such limitations, though, lies dramatic sound improvement.

Simply running the internal speaker through the Sound Master II smooths out a lot of aggravating squawks and bleats. The dramatic difference comes with games and other sound-intensive software. Once plugged into an expansion

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Circle Reader Service Number 246

slot, the card and its pair of blue mini-speakers transformed tinkly music and ragged jet whooshes (as heard through my internal speaker) into a majestic wall of sound. Both arcade games like Thunderstrike and adventure games like The Secret of Monkey Island benefited greatly from the upgrade.

And while digitized computer speech still leaves a lot to be desired compared to the real thing, Sound Master II told me everything I needed to hear, both when using its test programs and when using software like Super Solvers Spellbound!

But why stop at digitized speech? Speak yourself, and tell your computer what to do. The software accompanying the Sound Master II allows you to issue voice commands to run macros. Say, "Give me a directory," and you'll get one, or you can use your imagination. I issued a James Brown-style "Hah!" to start my word processor.

Sound Master II also comes packaged with PC-LYRA, a basic music-composition program. In addition, you can record sounds to RAM or a hard disk and sample at a rate of 100 to 25,000 samples per second using the software that comes with the card, most of which is relatively easy to learn and use.

For all its positive attributes, Sound



Get the Covox Sound Master II and end weak internal speaker sound.

Master II isn't without its flaws. The cord for the speakers allows them to be placed only about a foot apart, a distance I found to be insufficient. Some of the software comes without a printed manual, requiring you to print one from a text file. And the printed manual you do get—a dual edition covering both the Sound Master II hardware/software package and the PC-LYRA program—is woefully inadequate. It has only a few vague illustrations, no clear overview of the features available, no index for the Sound Master II section, and no troubleshooting guide. I found it easier to put the software through its paces using trial and error than to plow through the book. When a company makes a product this good, I wish it would go all the way

and give it a comparable manual.

Hardware and software both delivered, however, which matters more. My irritating internal speaker has now been tamed, and Sound Master II has opened a window to a broad world of sound. It's an excellent package, whether for games and music or for bossing your computer around.

EDDIE HUFFMAN

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## OPTIONS

Does the dreaded DOS command line interface get you down? Do your typing skills give rise to a *File Not Found* response more than you care to admit? Do you have difficulty remembering obscure nested directory paths? Then replace the infamous DOS prompt with the Options point-and-click interface.

Options typically installs in the C drive and modifies your AUTOEXEC.BAT file to execute automatically at startup. Or you could access the system by entering MENU at the DOS prompt. Menu options execute DOS commands, launch programs, or run batch files.

The program features timesaving macro capabilities, password protection to limit access to designated users or particular directories, plus a screen saver that blanks the screen after a user-specified length of time. You also get tracking control to keep records of computer usage, a stopwatch function for time tracking (great for keeping time records on client phone calls), and pop-up calendar, calculator, and memory map accessories.

Options automatically loads functions into extended memory to lessen the amount of conventional memory required to run it. Pull-down menus in the Edit mode and context-sensitive online help assist with program operation. Users get several convenient features in one handy location. Isn't it time you considered your options to maximize productivity, guarantee system security, and minimize operator error?

CAROL HOLZBERG

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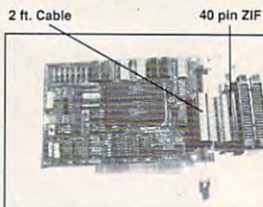
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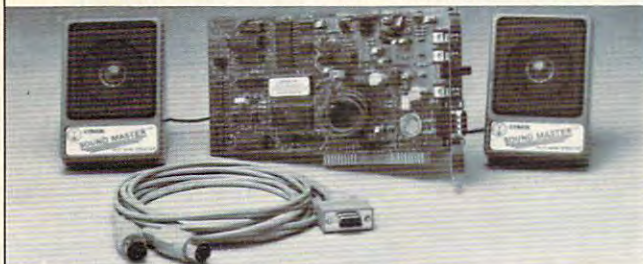
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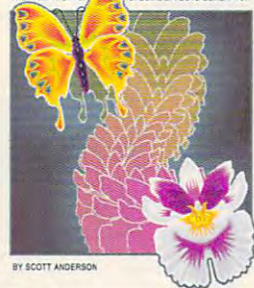
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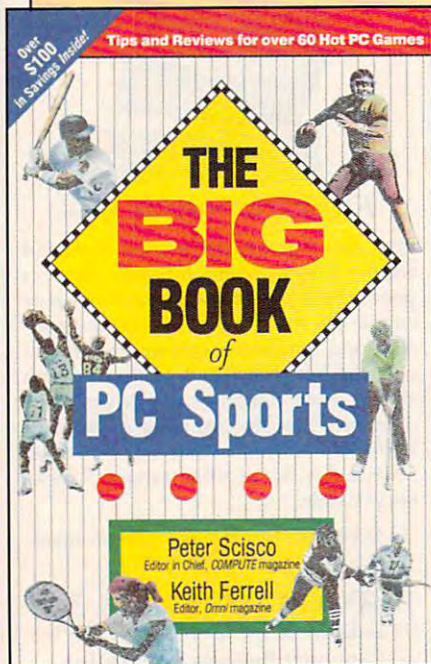
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## Will Hard Drives Be History?

Irvine Sensors, developers of ultrahigh-density chip-packaging technology, recently entered into a contract with NASA to develop what would be in essence a solid-state replacement for hard drives. Irvine's current technology stacks 80 layers of chips to create the highest-density memory, with the closest proximity between chips, for the greatest processing speed. Heat, which has been a problem with chip-stacking technology in the past, is dissipated through a patented bonding process, and there's enough redundancy to keep the units functioning even if one or more of the chips fail.

Irvine says this type of innovation could revolutionize the laptop/palmtop computer field. Laptops could be downsized even more and made lighter, since the hard drive and bulky battery packs that now limit downsizing would be eliminated. The "solid-state" technology would significantly extend the life of much smaller batteries, and computer functions could be greatly enhanced to include every function now performed by much larger systems.

## Software Rental

Software rental by computer and video stores, although illegal since passage of the Software Rental Act of 1990, is a growing trend, according to the March 1992 issue of *AdWeek's Marketing Computers*. However, this trend, says the journal, is one the Software Publishers Association should be applauding rather than fighting. Instead of encouraging software piracy, such stores are actually pointing the way to a new type of software channel into which software makers could deliberately introduce second-string, for-rent software.

Since software companies make so much of their money from upgrades, that strategy could continue, along with selling 900-number support, manuals, and training tapes.

## Beast on a Lease

Along the same lines, leasing computer *hardware* is also a growing (but *legal*) trend in the business world, according to Computer Service & Rental Centers (484 Wrightwood Avenue, Elmhurst, Illinois 60126; 708-291-1616). Even the best-equipped businesses have periodic short-term needs for supplemental PCs and peripherals; for instance, when a computer goes down, businesses may not be able to afford the downtime while it's being repaired. Renting or leasing is also a good option when companies need additional computers for training classes, peak work periods, out-of-town trade shows, and other temporary situations. Cost efficiency, no maintenance, and access to the latest equipment are cited as the biggest advantages of renting over buying.

## Curtis Goes Green

Curtis Manufacturing (30 Fitzgerald Drive, Jaffrey, New Hampshire 03452; 603-532-4123), maker of computer-related equipment, recently joined the growing list of environmentally conscious companies with its new "minimalist packaging" for selected product lines. The new design cuts down on the amount of paper needed to produce packaging and "only uses what is required to bring the product safely to the consumer," according to product literature. Curtis's first products to use downsized packaging are economy-line printer legs and surge protectors. The company's planned new product lines will follow suit.

## Sunblock for Your PC

Computer users concerned with the radiation emitted from computer terminals may want to try Alpha Block, a spray-on coating for computer screens that (the distributors claim) filters "harmful rays" emitted by monitors. The product literature makes no specific claim that the product blocks electromagnetic radiation sometimes blamed for miscarriages and other health problems among heavy users of computers. Rather, it states that the product works on the screen the way sunblock works on your skin to filter the sun's rays, which means that it blocks ultraviolet radiation. If you would like further information, contact Westwind Traders, P.O. Box 433, Louisville, Colorado 80027; (303) 937-9512.

## Top Early Childhood Software

High/Scope Educational Research Foundation, a nonprofit research and development organization based in Ypsilanti, Michigan, bestowed its 1992 Best Early Childhood Software award on four software products: Kid Works (Davidson & Associates), KidPix (Brøderbund), The Playroom (Brøderbund), and The Treehouse (Brøderbund). High/Scope Foundation, which receives no fees or monetary consideration from software publishers or distributors for software reviews, publishes an annual *High/Scope Buyer's Guide to Children's Software: Annual Survey of Computer Programs for Children Aged 3 to 7*. Parents and educators who purchase High/Scope's detailed *Buyer's Guide* will find more than 500 reviews of children's software inside. The guide costs \$19.95 from High/Scope Press, 600 North River Street, Ypsilanti, Michigan 48198-2898; (313) 485-0704. □

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(PC Games: The Complete PC Gamer's Guide, Spring/Summer 1992)



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