



head accesses the spinning disk.

The head contains a piece of iron with a coil of wire wrapped around it. In order to write information to a disk, a small current is passed through the coil, turning it into an electromagnet. The resulting magnetism changes the polarity of the particles on the area of the disk below the head. The direction of the current and its duration determine how the particles are aligned. All data on a disk is represented by the positions of these particles.

As the magnetic particles on the disk spin beneath the drive's read head at 300 rpm, they generate a small electric current. This current is analyzed by the drive and is converted into data which then is sent to the computer.

Disk Format

As mentioned previously, all Commodore drives have a similar disk format. Figure 1 represents a disk formatted on a 1541. On this 5 1/4-inch disk, there are 35 concentric circles called tracks. Track 1 is the outermost, and track 35 the innermost. The disk's directory is located on track 18.

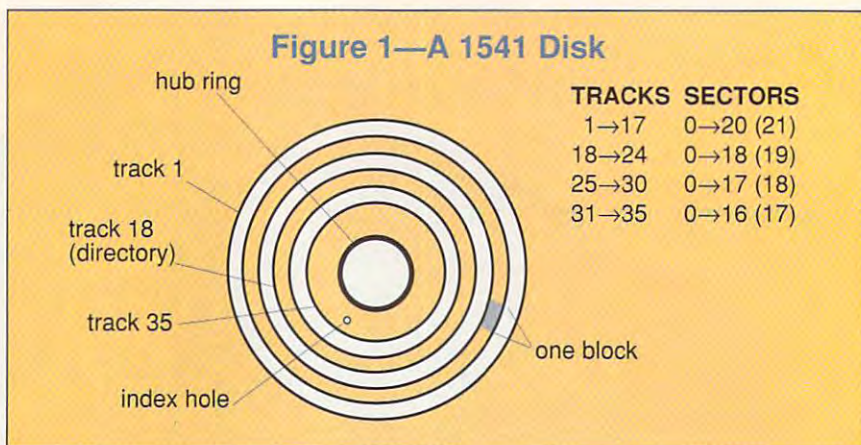
Each track is composed of a varying number of 256-byte sectors. The actual number depends on the track's circumference. The larger outer tracks contain 21 sectors, while the number drops to 17 for the inner tracks. See figure 1 again.

The 1541 has one read/write head, so it uses just one side of a disk. The 1571 has two heads, so it utilizes both sides of a disk. Side 0 contains tracks 1-35, and side 1 has tracks 36-70. The index or timing hole tells a drive where each sector is by timing how long it takes for a disk to revolve. This hole is not used on Commodore disks.

Something Different

A 1581 3 1/2-inch disk is somewhat unusual compared to its 5 1/4-inch siblings. The 1581, which was developed from the Amiga disk drive, uses an Amiga-style MFM (Modified Frequency Modulation) format rather than Commodore's GCR. MFM sees the disk as double sided with 80 tracks per side with ten 512-byte sectors per track.

In order to make the 1581 compatible with the other drives, Commodore



altered the MFM physical format by creating a logical disk format that is single sided with 80 tracks and 40 256-byte sectors per track. Track 40 contains the directory. You don't have to worry about the physical format since all DOS operations use the logical one. Conversion between them is performed automatically during every disk access.

**Table 1
Disk Drive Genealogy**

Drive	Year Introduced	DOS Version
4040	1979	2.1
1540	1982	2.5
1541	1983	2.6
1571	1985	3.0
1541C	1986	2.6
1581	1987	10.0
1571	1987	3.1
1541II	1988	2.6

There are other MFM formats, however, including MS-DOS and numerous versions of CP/M. The 1571 can recognize and read some of these formats. With the proper program, you can write to MFM disks with a 1571 drive.

The Directory

Every disk requires a way to keep track of filenames, their locations, their sizes, and so on. The directory handles these chores and more, making it easy for users to deal with files. The

directory is so important that it has its own track: 18 on a 1541 and 1571 and 40 on a 1581.

On a 1541 or 1571 disk, sector 0 of track 18 contains the BAM (Block Allocation Map) and all general disk information, while sectors 1-18 contain the filenames and related file information. The 1581 uses sectors 0-2 for disk information and sectors 3-39 for the filenames and their attributes. Each file sector can have up to eight file entries, which explains why there is a 144-file limit on 1541 and 1571 disks and a 296-file limit on 1581 disks.

The reference manual that comes with a disk drive explains the layout of a file entry, so I won't cover it here. It also details the disk information in the first few sectors of the directory track. The one thing not clearly explained is how the BAM is organized.

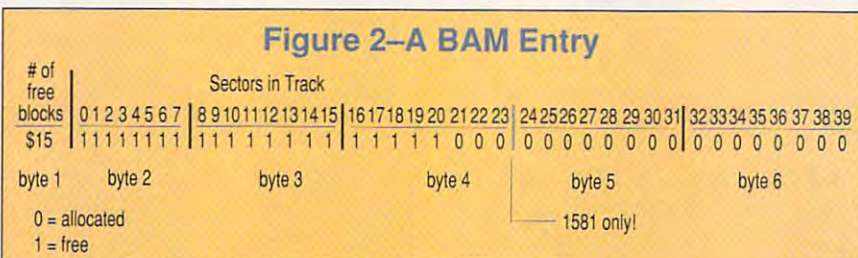
The BAM is a table that shows the drive which sectors on the disk are free and which have been allocated. This is necessary to prevent data already on the disk from being overwritten.

Figure 2 shows a typical BAM entry. With a 1541 or 1571 disk, four bytes represent the sector allocation of a track; a 1581 BAM entry uses six bytes. Each track is represented in the table by one entry, with the first byte indicating the number of free sectors in that track.

The remaining bytes are broken down into bits, with each bit representing a sector. If the bit is 0, then that sector is allocated; if it's 1, the sector is free. On a 1541 or 1571 disk, the last three bits of byte 4 are always 0, and they can be disregarded since the largest number of possible sectors is 20.

Blocks

Block and sector are two terms used interchangeably by most Commodore users to refer to the 256 bytes of data that comprise the fundamental unit of storage on a disk. For all practical



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purposes, they are the same. To be precise, however, there are some academic differences.

The term *sector* explicitly means those 256 bytes, the ones a user can examine with a sector editor. The term *block* also refers to those 256 bytes plus some additional information that is used by the drive only. A track actually consists of a sequence of blocks, not sectors. Average users needn't make this distinction, however.

Figure 3 shows a typical disk block. Basically, a block is composed of two distinct parts: the header and data sections. The header section contains general information about the block, while the data section contains the actual bytes of information. Note the disk ID in the header. All blocks receive a copy of the two-character ID that you specify when formatting the disk.

Both the header and data sections begin with synchronization marks to help the drive locate information. Next are the field identifier bytes, which indicate whether a header or data section follows. A header is identified by \$08 in hex in this byte, and data is indicated by \$07. Each section also has a checksum made up of the track number, sector number, and the two IDs. If the checksum is wrong, the drive recognizes an error in that block.

Next come two Off bytes. These bytes are used as padding by DOS when the disk is formatted. The header block uses two \$0F bytes, and the data block uses two \$00 bytes. Both are called Off bytes and are not used after formatting.

The first two bytes in the data block's 256-byte storage area are called the forward pointers. These bytes point to the track and sector of the next block in this file.

Finally, both blocks end with a gap, which is more unused space. The size of gap 1 is constant. This header gap is filled with eight \$55 bytes and provides breathing room between the header and the data. The size of the intersector gap or tail gap varies, depending on the size of the track. This prevents your drive from accidentally overwriting the start of the next sector.

GCR Simplified

The GCR (Group Code Reading) format of the 1541 and 1571 that I touched upon earlier is undoubtedly one of the least understood terms in the Commodore vocabulary. GCR, a broad term encompassing the track/sector layout as well as the actual method by which data is read and written, dates back to the pioneer days of home computing. It was developed around 1978 for use with the 2030,

Table 2
Commodore GCR Table

Decimal	Binary	GCR Codes
0	0000	01010
1	0001	01011
2	0010	10010
3	0011	10011
4	0100	01110
5	0101	01111
6	0110	10110
7	0111	10111
8	1000	01001
9	1001	11001
10	1010	11010
11	1011	11011
12	1100	01101
13	1101	11101
14	1110	11110
15	1111	10101

Example: 30 decimal equals 0001 1110 binary and 011011 11110 GCR

Commodore's first disk drive.

By the GCR process, an 8-bit data byte is split into two 4-bit nybbles. Each of these nybbles is then assigned a 5-bit GCR code. Commodore calls this binary to GCR converting. A binary nybble can be converted into any one of 16 different values, ranging from all 0s to all 1s. The GCR table contains 16 combinations. See table 2.

When writing, the resulting 10-bit sequence is stored to disk and represents a data byte. When reading, the process is reversed, and the 10-bit GCR byte is transformed into an 8-bit data byte which is then sent to the computer. All

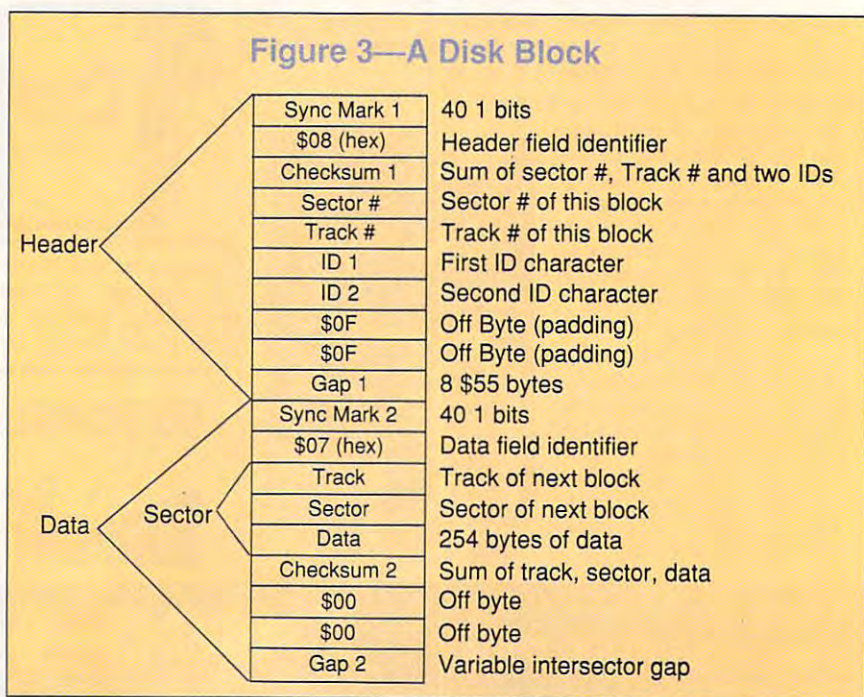
16 GCR codes are stored as a table in the drive's ROM. Every time the disk is accessed, DOS performs one of these GCR conversions.

The GCR process may seem tedious and does slow down the drive, but the conversion does have a purpose. If five unconverted data bytes of value 255 (40 1 bits) were written directly to disk, DOS could confuse them with sync marks, creating chaos. GCR prevents this, since no combination of the codes can produce a sequence of 1 bits longer than eight.

Wrapping Up

This article has touched on many aspects of Commodore disks and drives that are seldom covered. As you can see, without your being aware of it, there's a complex series of events taking place when you format and maintain a disk. While much of this information is of little practical use to the average user, understanding how much the humble disk drive actually does can give you a better appreciation of its value.

If you're interested in exploring this topic further, you'll need a good sector editor and GCR editor. I'd also recommend a disk utility system called The Maverick V5 produced by Kracker Jax and available from Tenex, Software Support International, and elsewhere. It has both of these hacker tools and a host of other powerful ones. For further information, you might also check out books such as *The Anatomy of the 1541* by Abacus Software and *Inside Commodore DOS* by Reston Publishing. □



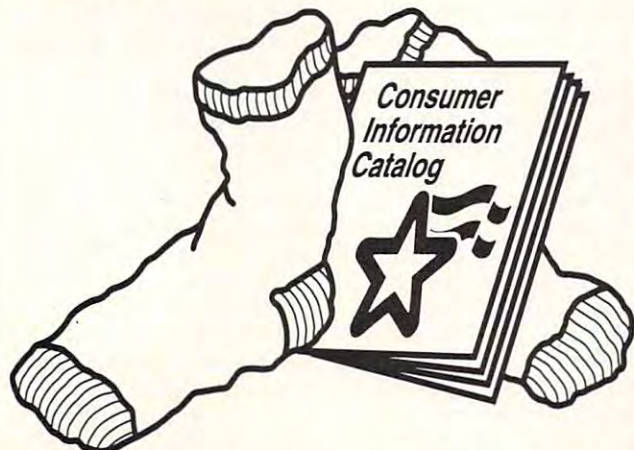
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GEOSHELL

If you're a typical GEOS user, you probably don't need geoShell. If you use GEOS because it lets you manage your files and disks with such intuitive ease, then geoShell is not the interface for you.

Oh, it will manage your disks and files, but this interface isn't going to hold your hand through the process. The whole desktop metaphor is missing from geoShell. Gone is the easy-to-understand logic that gives a visual sense to your computing tasks. For example, you no longer pick up a file icon and drop it on the drive icon to copy it to that drive. There are no icons in geoShell; there's only a blinking cursor awaiting your typed commands. A lot of you should probably turn the page right now and forget about this review.

Still with me? Then brace yourself. Once you get the hang of using geoShell, you may never think of GEOS in the same way again. There are plenty of differences between this interface and the deskTop. You have to memorize some commands or do as I do and keep the manual handy. There are no pretty little icons; geoShell uses a CLI or Command Line Interface. This means you control what the computer does by typing in text commands.

These commands give you unprecedented access to the workings of your GEOS system. It's kind of like the difference between driving a nice solid family station wagon or a sports car with a manual transmission. With geoShell, you can really feel the road and control what's going on. The power lies with the fact that geoShell doesn't limit you to

a set of choices on a menu. Instead, geoShell gives you the tools and the access point to affect your equipment directly.

Here's an example of what I'm talking about. When you want to print a document with deskTop, you simply select Print from the file menu or drop the document's icon on the printer icon. The system takes over and does whatever it needs to do to print that document as GEOS is programmed to do it.

With geoShell, you can do the same thing by typing *PRINT* followed by the name of the file you want to print out. But you don't have to stop there. You can add various parameters to directly address the printer and print out text using whatever settings you care to include. There's no way to do this gracefully under the deskTop.

When you start up geoShell, your usual GEOS screen is replaced by a small 12-line window in the middle of the screen. You are also presented with a blinking cursor awaiting your input. That's it (unless you spice up your screen with the *BACKPATT* command, which lets you set the background pattern to any of 32 GEOS patterns).

If you want to take a look at the files on a disk, you have to type the directory command, *DIR*. If you want to run a file, you either type the filename and hit Return or list the directory, cursor back to the file, and press Return after the name. File copying, deleting, renaming, and so on are also accomplished by typing the appropriate command, followed by the name of the file. You can use the standard wildcards to save a

good deal of typing.

In addition to letting you add parameters when accessing your printer, geoShell lets you use various parameters with the *DIR* command. You can list only those files which fit certain limitations, such as a range of file dates or a specific file type. There are several variations on the *TYPE* command, which displays text files on the screen without opening an application.

You can define the function keys (which GEOS itself pretty much ignores altogether) to fire off any commands you specify. On top of that, you can define hot keys, two-key combinations that load and run any application or desk accessory you program into a combination. For example, the hot-key sequence *W-R* can be programmed to load and run *geoWrite*. Some combinations are already programmed, but you can define up to 128 of them to make running your own system as quick and painless as possible. I found this to be a lifesaver when I had trouble remembering the correct program name. Since geoShell is case sensitive, I couldn't remember if the spelling for *geoWrite* 128 was *geoWrite* 128, *GeoWrite* 128, or what.

Compatibility is no problem since geoShell supports every kind of Commodore drive and RAM device—from the 1541 to CMD's FD-4000 and from a 1764 REU to a multimegabyte RAM-Link. If you run geoShell from Gateway with its drivers set for native mode partitions on CMD devices, geoShell will also support the native mode partitions. You can install and use a fourth drive and use Jif-fyDOS to control all of those

devices.

For using partitioned RAM devices, FD drives, and hard drives, geoShell includes a path command. This nifty feature lets you place geoShell itself in only one of the partitions and then specify the path to it for the system to use. From then on, no matter where you are, geoShell will be accessible as long as you place a very small loader file called *GETSHELL* in every partition. The arrow keys access the last ten commands you've typed. Pressing the Shift key and the Run key simultaneously loads and runs the first executable file on the active drive. You can also type more than one command on a line.

Now I won't say that using geoShell is simple, even with its extra features. The problem I experience most often is not knowing how a filename is spelled exactly or whether there are uppercase letters in the name. I had a lot of trouble in remembering which letters had to be capitalized while trying to install *ImageWriterDS*.

Another minor inconvenience is that geoShell won't let you run a 40-column program when you're using the 128 in 80-column mode. Other interfaces ask if you'd like to switch and then go ahead and do it if you say so. With geoShell, you must manually change screen modes (which in my case required a scramble for the manual again to find the command to type) and then run the file again.

To be fair, I'm sure that each of these frustrations would vanish if I would start to use geoShell regularly. After all, the only reason I had to check where the uppercase letters were was be-

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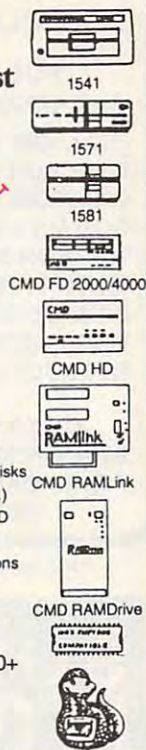
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REVIEWS

cause I had forgotten that there was a hot-key command. After I switched screen modes a few times, I got used to the commands S40 and S80 and didn't have to look them up. As a matter of fact, while I was browsing around the manual for those commands, I discovered that the Alt key on my 128 will switch screen modes even faster. The documentation is excellent, by the way, although there is no index, which makes it a little harder to find what you need.

Oh, I know memorizing things like file types isn't for everyone. But if you're the kind of user who likes to have complete control over your system, geoShell is the GEOS interface you've been waiting for.

STEVE VANDER ARK

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HELP MASTER 64

If you're a seasoned programmer who can use PEEK, POKE, VAL, FN, and other BASIC commands as well as you can English, then this program isn't for you. If you're learning BASIC, however, and stumble occasionally over the proper syntax of a command, then check out Help Master 64.

Help Master 64 offers instant on-screen help for 69 BASIC commands—everything from ABS to WAIT. What makes this program especially helpful is that it's at your fingertips even while you're programming. If you're in the middle of a programming session and get stuck on a command, you can call up Help Master, get the information you need, and then return to your programming. Help Master doesn't interfere with BASIC or any program that you may have in memory.

To get help on any command, simply type a quotation mark (") and the command. Press Return, the top half of the screen clears and fills with helpful information about that command. Press f1, and the help screen disappears, returning you to your original screen. Some commands have more than one screen of information available. In this case, press f7 to advance to the next screen.

When Help Master is activated, you can enter a quotation mark only and press Return to get a list of all commands for which help is available. This index screen also explains how to

get specific information about any of these commands.

When you call up a command's help screen, you get a variety of information. The screen presents the command and its abbreviation, which usually is the command's first letter and its shifted second letter. Next on the screen is the command's syntax, with an example of how you might enter it in a program. Some portions of the syntax are set off in square brackets to indicate that they are optional.

Beneath the command's syntax is a short explanation of what the command does. Some screens are linked to additional screens if the explanation is too long to fit in the space provided. If that's the case, simply press F7 to call up the next page.

Finally, at the bottom of the window, you'll see four page numbers. These are the pages in various reference books where you can find additional information about the command in question. These books include *Commodore 64 Programmer's Reference Guide*, *Handbook for BASIC for the Commodore 64*, and the two versions of *Commodore 64 User's Guide*.

Since Help Master resides in RAM under the BASIC 8K ROM (40960-49151) and in most of the 4K block that starts at 49152, it won't interfere with the DOS Wedge, which is located at 52224-43247. Machine language programs that operate within this range will not work with Help Master.

If you're in the middle of a programming session and realize that you need Help Master but it isn't loaded, that's not a problem. You don't have to quit the first program. There's an alternative method for loading and running Help Master after you have another program in memory. A simple SYS call then lets you activate Help Master.

When you run Help Master, you'll probably notice its 1985 copyright notice. This little program has been around for a while. For any program to be in production this long, you know it must be doing something right.

As I said at the beginning, Help Master 64 is not something an experienced programmer will need. It's designed for the person who is learning BASIC and still needs to consult reference material frequently. It's also a boon to those who program infrequently and need to brush up on BASIC syntax and usage.

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Corrections to previous articles, the jiffy clock explained, a SpeedScript modification, and more

Bug-Swatter

There seems to be some text missing from John Elliott's "Upgrading Without Changing Platforms" in the June issue.

JOHN KOESTNER
HAZELWOOD, MO

The printer inadvertently repeated the line at the bottom of page 5 on the top of page 6. This extra line pushed the final line of the article off the bottom of the page. We apologize for the error. The last sentence of the article should read as follows.

"The investment of time, energy, and money by the software and hardware developers is an indication of their conviction that our Commodore computers will be productively used and enhanced by products for many years to come."

Time of Day

I was trying to figure out how to use TI\$ as a timer. Can this clock be reset to 0 (or any number) without turning off the 64? Also, I thought that all numeric variables were used without a dollar sign on the variable name. Since TI\$ holds a number, why isn't it displayed as TI?

Evidently TIME is another clock, because when I type PRINT TIME, it displays a progressively larger number. After some experimentation, I figured that this number advances approximately 60 times per second. Can you please explain about this also?

RICK MONTOYA
MIAMI, FL

The variables TI\$ and TI stand for TIME\$ and TIME, but only the first two letters of the variable name are significant. These two variables tell you the value in the jiffy clock, but they put the time in slightly different formats. As you've discovered, the clock ticks 60 times a second. The

1/60-second unit of time is referred to as a jiffy.

The clock is set to 0 whenever you turn on a 64 or 128. To reset it from BASIC, include the line TI\$ = "000000". Note that TI = 0 won't work. You can read the value of TI, but you can't set it (except indirectly through TI\$). You may set TI\$ to other values; for example, to set a time of 1:35 you would use TI\$="013500". The time uses a 24-hour format: After 23:59:59, TI\$ wraps around to 00:00:00.

The variable TI tells you the total number of jiffies that have passed since the clock was reset. Divide TI by 60 to convert this value to seconds. TI\$ is just another way of looking at the jiffy clock—it changes the number of jiffies to hours, minutes, and seconds. One reason to make TI\$ a string variable (with a \$ after the variable name) is that it prints the time in a consistent format with leading zeros. Because TI\$ is a string, you can use the MID\$ function to extract the hours, minutes, and seconds. To convert a string to a numeric value, use the VAL function. For example, PRINT VAL(TI\$) would print 120 for a time of 000120.

Tape or Disk?

A friend of mine uses SpeedScript, and his version of your word processor does not use the prompt TAPE OR DISK? like mine does. I don't know of anyone who still uses a tape drive, and I'd love to delete this prompt. He said it took only a few POKEs, but he can't remember where he saw them. Can you help?

ALEX PARKS
ALEXANDRIA, VA

It has been a few years since we published this tip, but it is a helpful one if you never use a Datasette or tape drive with our word processor. Load but

don't run a copy of SpeedScript. Then type POKE 4904,162: POKE 4905,8: POKE 4906,76: POKE 4907,61: POKE 4908,19. After you press Return, be sure to save this modified version of SpeedScript with a new filename. From then on when you load and run SpeedScript, it assumes that you'll be using a disk drive.

Mass Deletions

Is there a way I can delete a whole section of numbers from a BASIC program on my 64? For example, can I delete lines 200-300 without typing each number and then pressing Return?

ROGER HOWARD
LOS ANGELES, CA

The 128 has a DELETE command, but it's not available on the 64. There is one simple way that will save you some time and typing. If your lines are numbered by 10s, in immediate mode enter the following line with your program loaded. Change the STEP value if your program is numbered differently.

**FORT=200 TO 300 STEP 10:
PRINT T: NEXT**

When you press Return, numbers 200, 210, and so on will print to the screen. Cursor to the first number and press Return. Keep pressing Return until you run out of numbers. If you need more lines, just enter the line again, covering the desired range. Be careful that you don't print more than 20 lines to the screen at one time, or they will scroll off.

Do you have a question or comment? Write to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

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WORLD VIEW

Edwin P. Krisch Stark

VIEW FROM VENEZUELA

¡Hola, amigos! Greetings from Caracas, Venezuela, to all 64 owners! I hope to give you a deep, although short, view of the Commodore world in the land of El Dorado and dense jungles.

First of all, let me tell you that owning any computer is seen around here as a snobbish gesture. Very few people have them. In this world, understanding these machines means social catastrophe. There seems to be an exception, however, among 64 enthusiasts, who have formed an undeclared brotherhood or hackers.

A 64 without disk drive would cost you two complete months of salary in local terms, which is about \$100 per month. And that's if you're lucky enough to find a dealer who will sell it to you. Most of us Commodore owners get equipment by ordering it directly from the United States or by asking friends visiting there to purchase it. To make matters worse, the economical crisis here has made local governments inhibit imports, so many computers reach their owners only after being smuggled through customs.

The local computer market consists of dealers selling a myriad of PC clones; tons of them are brought in from Asia, most with strange and unknown names. Only a brave soul would be interested in marketing Commodore products, yet the night is not as dark as it may seem. A couple of dealers struggle but receive popular support from the 64 and Amiga owners. These owners love computers that work right out of the box, without the hassles of cards, video incompatibility, and cheap sound.

Most 64s stay with their owners until the computers fail com-

pletely or until the owners upgrade. Many of these are promptly replaced by Amigas because of an impressive loyalty to Commodore and its products.

There never has been any regular way of obtaining software for 64s, and I doubt that this will change since the interest is shifting to the MS-DOS market. It's a strange sight to find an original disk in anyone's software collection. This is a pirate's haven, and some even joke about the Colombian Connection: guys in Colombia who bring in pirated software from Europe.

Since the source of new programs for the 64 is drying up, many users have started what's become an intense craze that we call shared modeming. A group of desperate users started browsing popular BBSs, sharing the expenses of long distance telephone calls. The most irksome thing about this is that many sysops see that we're calling from Venezuela and think it's a joke. Most sysops are too lazy or cheap to make the long distance call to validate the guys who just called in such an unusual fashion, so they flush us out of their systems. This is also true with the commercial online systems.

Those sysops who don't pay much attention to validation usually trust their callers. In return, we provide a nice attitude inside the system and a valid credit card number when ordering products. BBSs with 800 numbers are troublesome to use from here. Some modeming sharers have gone to the extreme of taking their computers and modems to Miami just to get inside some online services.

Want to know something funny? The 64s were considered game machines—not even a notch above toys—but now the PC clones are the most tar-

geted market for games. Yet they still keep their status as serious machines. Anyway, I have found an advantage to this switched situation. I play games on clones, but I've started writing clue books for them on my 64. Many of these books are just for my own use, but some I sell. I just turn on the computer, load SpeedScript, and start typing. For embellishment, such as maps and graphics, I resort to GEOS and its power. And when I need extra assistance, I just transfer my files to my Amiga with a null modem. It works fine and keeps my pocket full for buying original software.

Right now I am considering the idea of creating a BBS dedicated to adventure games, where you can browse around to find the clues needed. The only thing stopping me is the final choice of the right program to handle my needs.

Here are some final comments. Programmers, don't underestimate the 64. There are nearly 15 million of these great machines out there, and most of them are still in use. Users, don't trash your 64. It's like Pandora's box in that it's full of grief, but it's also filled with lots of surprises. If you ever do upgrade, make it an Amiga, so Commodore will keep these great machines coming.

Millions of 64s and 128s are in use around the world, so how about telling our readers about the Commodore activities in your country? You might mention user group activities, software and BBS availability, system costs, or anything of interest 64 and 128 users. Send a 1000-word article on disk to COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We pay \$150 for each "World View" that we publish. □

You won't find many Commodore dealers in Venezuela. What you will find is a loyal group of Commodore owners.

PD PICKS

Steve Vander Ark

SOUND SELECTIONS

Before I bring out my picks for this month, let me talk a little about formats. I'm not talking about disk formats, but about the method used to store data on disk.

Many drawing or paint programs have their own particular way of storing the pictures that you create with them. Many of them use some kind of code attached to the name of the file to identify what that format is. If you are a fan of computer graphics, you probably know the kind of format I'm referring to.

Over time, certain of these various formats tend to become more common as users decide that they like one particular program. One format will often become something of an unofficial standard, and its method of data storage is copied by other programs.

Sometimes, though, a program appears that sets the standard right off the bat, but in this case I'm not talking about graphics. That's pretty much what happened with Craig Chamberlain's excellent music editor called the Enhanced Music System, originally from COMPUTE Books, but now distributed by Parsec.

Chamberlain's format for music files ended with the extension MUS. Due in part to the quality of his program and to the lack of serious competition at the time, this type of music file has become the standard for Commodore SID music.

As the years went by, additional extensions showed up: WDS for lyrics files, PIC for use with graphics screens, and so on. Those other types of files became an important part of the standard, thanks to a program called Stereo SID Player written by Mark Dickenson.

Dickenson wrote DigiPlay-

er, one of my featured selections this month. DigiPlayer is a digitized sound player that has its own particular format. This format, the RAW file, has become the standard for digitized sound on the Commodore. OK, so RAW is the *only* digitized sound format for the Commodore, but that makes it the standard, right?

Anyway, since MUS and RAW files are common, it's fairly easy to find enough of them to keep SID Player and DigiPlayer cheerfully singing and talking for hours on end. QuantumLink has more SID music files than any other type of file, everything from rock-'n'-roll to Broadway tunes (my favorites). There are also quite a few RAW files on Q-Link, including sound bites from Star Trek and Looney Tunes.

But anyway, here's a closer look at both programs.

Stereo SID Player 10.3 by Mark A. Dickenson. QuantumLink filename: STEREO10.3A and STEREO10DOC (documentation) uploaded by Mark AD I. Public domain.

The original SID Player was part of the SID Music System, but Stereo SID is definitely a new and improved version! For one thing (and this is a biggie), this program plays six-voice stereo SID files. If you've never heard your Commodore play in stereo with the SID Symphony cartridge from Creative Micro Designs, you've missed a treat! Of course, it plays regular three-voice SIDs as well.

Remember what I was saying last month about really good utilities doing the mundane with flair and elegance? That's precisely what makes this program stand out above other SID players. Stereo SID Player doesn't just sit there while the music plays. The screen is alive with wriggling shapes and flashing colors. There's even a tiny band up in the corner (on three-voice

SIDs) playing its collective heart out. More useful is a display—both on a keyboard and by note names—of the notes each voice is playing as the song progresses.

On top of that, the program makes it a cinch to find and load any song you want from a disk and offers plenty of options for playing it. The words to the song will scroll past if a WDS file is included. If there's a PIC file, a graphic image in Doodle or Koala format will fill the screen except for two lines of lyrics scrolling by at the bottom. But if nothing else, this program is worth getting just for the opening sequence, a rock version of the theme from *2001: A Space Odyssey* with a snazzy bunch of screen effects to go with it.

DigiPlayer By Mark A. Dickenson. QuantumLink filename: DIGIPLAYER31.SDA uploaded by Mark AD I. GENie file number 8685. This program is shareware; the suggested donation is \$5-\$10.

The first time someone suggested to me that the Commodore could play digitized sounds, I figured he was nuts. Everyone knows that recognizable digitized sound requires vast amounts of memory, and memory is one thing the good old 64 is short of. But Mark Dickenson has pulled it off and makes this player shine. Not only does DigiPlayer play the sound files, but it also lets you import digitized files from Amiga, Apple II/GS, Mac, Atari ST, and Digitalker 128. It supports the REU and will play digitized files of up to 400K in size.

If you want more RAW files from Q-Link, your best bet is to browse that library directly because the search function tends to ignore them. You'll find them tucked away in the software libraries under Music: MIDI and General/Digitized Sound & DigiPlayer Files. □

The screen is alive with wriggling shapes and flashing colors. There's even a tiny band up in the corner playing its collective heart out.

BEGINNER BASIC

Larry Cotton

WHERE'S THE DATA? PART 2

Any information that you store within a BASIC program as DATA statements will be loaded or saved with the program whenever you load it from or save it to a disk. If the data is supplied by the program's user as INPUT or GET statements, however, then it's not part of the BASIC program. If the computer is turned off, the data will be lost. Therefore, if you want to save any data supplied by a user, it'll have to be saved as a separate program.

Prepare a list of things to do and then save the information to disk.

Let's start by writing a simple program which generates some data: a list of things to do. Without using a menu or other fancy features (I'll leave that to your own creativity), we'll ask for a to-do list, one item at a time, and then save the list to disk as data in the form of a PRG (PRoGram) file. A complete to-do program might include features such as saving and loading the list; adding, deleting, or rearranging items; and printing the list.

Here's a simple program for just getting the list and printing it to the screen.

```
10 PRINTCHR$(147)
20 DIMI$(100):PRINT" NO
  MORE THAN 100 ITEMS!":
  PRINT"[DOWN] PRESS
  ANY KEY TO BEGIN."
30 GETA$: IFA$=""THEN30
40 PRINTCHR$(147)
50 X=X+1: INPUT" TO
  DO";I$(X)
60 IFI$(X)=""THENX=X-1:
  GOTO 80
70 GOTO 40
80 PRINT
90 FORT=1TOX: PRINT
  I$(T): NEXT
```

When you run the program, enter a few tasks, item by item, such as *WASH HOUSE*, *PAINT CLOTHES*, *IRON DOG*, and so on. Press Re-

turn after you enter each item. When you've entered the last item, press Return on an empty line. Your complete list, silly though it may seem, will print on your TV or monitor screen. It's also neatly tucked away in your computer's memory, but it'll disappear when you turn off your machine. Now let's add a routine that will save the information to disk.

```
100 INPUT"[DOWN] NAME OF
  LIST TO SAVE";L$:
  IFL$=""THEN END
110 OPEN1,8,1,L$
120 PRINT#1,X
130 FORT=1TOX: PRINT#1,
  I$(T): NEXT
140 CLOSE1
```

Because you've modified the program, you'll need to reenter a to-do list. (You might want to make this one sensible.) When you press Return on a blank line this time, your list will print onscreen and you'll be prompted to give it a name. After you name the list, it will be saved to disk in the order that you entered it.

Here's how lines 100-140 work. Line 100 is a normal INPUT statement which asks for the name of your list so that the disk drive can retrieve it later. The most important line in the program is line 110. Its syntax is critical.

When you communicate with peripheral equipment such as disk drives and printers, you need to open and close channels. Like the computer itself, the peripheral expects to communicate in a syntax it recognizes.

In line 110, the OPEN command opens a channel for communication. The first 1 in the command is an arbitrary file number, which can be any number from 1 to 127. (Think of opening a Manila file folder with the number 1 on it.) Once that file is opened, da-

ta can be sent to it by referring to its number.

The next number, 8, sends information to the disk drive. (If you use a second drive, refer to it as device 9.)

The next parameter, 1, tells the disk drive to save (as opposed to load) this information. L\$ is the name of the file, which is the to-do list.

In line 120, we use another BASIC statement, PRINT#, which sends information to the disk drive. PRINT# is similar to PRINT, except that it prints information to disk instead of to the screen. The first piece of information we send to the disk is the number of items in the to-do list—the value of the counter X.

Line 130 uses a FOR-NEXT loop and PRINT# to send the array I\$(X)—the items in your to-do list—to the disk.

After all the necessary information is sent to the disk, you must close your file in line 140. You can now turn off the computer, knowing that your information is safely stored on disk, ready to retrieve when we look at that next month.

Here's a complete listing of the program with The Automatic Proofreader checksums.

```
AM 10 PRINTCHR$(147)
GQ 20 DIMI$(100):PRINT"
  {SPACE}NO MORE THA
  N 100 ITEMS!":PRIN
  T"{DOWN} PRESS ANY
  KEY TO BEGIN."
GR 30 GETA$: IFA$=""THEN3
  0
BQ 40 PRINTCHR$(147)
CQ 50 X=X+1:INPUT" TO DO
  ";I$(X)
PF 60 IFI$(X)=""THENX=X-
  1:GOTO80
BF 70 GOTO40
FM 80 PRINT
KK 90 FORT=1TOX:PRINTI$(
  T):NEXT
GC 100 INPUT"[DOWN]NAME
  {SPACE}OF LIST TO
  SAVE";L$:IFL$=""
  THENEND
PA 110 OPEN1,8,1,L$
QA 120 PRINT#1,X
FR 130 FORT=1TOX:PRINT#1
  ,I$(T):NEXT
BD 140 CLOSE1
```

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MACHINE LANGUAGE

Jim Butterfield

ASSEMBLER TRICKS

Most machine language monitor programs contain tiny assemblers that will help you to write machine language code. As you try more ambitious coding projects, you'll move along to a full-scale, symbolic assembler.

The big assembler packages give you more help in coding. Perhaps more important, they allow you to save source code that you have written. As the project develops, you can recall this source code and edit it—adding, subtracting, or changing text as appropriate.

In this column, I'll talk about one aspect of a symbolic assembler: the asterisk (*) character. Most programmers will tell you that the asterisk means "here" or, more specifically, "the assembler's work-address pointer."

As the assembler works through your source code, it assigns the data it is building to some location in memory. As more data is generated, the location moves along to a higher address. The asterisk signals the current working address. Often, the asterisk is used in BASIC-like assignment statements.

You can set the working address to a specific value. Thus, the command `*=$2000` means "assign data starting at address hexadecimal 2000." Such a command is often seen at the start of a source listing, and it causes the assembled program to be placed at the named address. Some assemblers prefer to do this using the keyword `EQU` for (equate).

If you wanted to skip over a number of bytes of memory, you might code something like `*=+8`. This works much like BASIC's `X=X+8`. As the assembler does its work, it obe-

diently hops ahead. We are saying to the assembler that we don't care what the contents of these bytes are but to just make room for them. Some assemblers prefer to do this using the keyword `BSS` (Block Sequential Storage).

One of the benefits of a symbolic assembler, as the name suggests, is that certain parts of the program may be identified with symbolic names, or labels. A large number of labels, however, can slow down an assembly. Programmers sometimes like to reduce the number of labels by means of asterisk addresses. A quick loop might be coded as seen in the following example.

```
LDA MESSAGE,X
INX
CMP #50D
BNE *-6
```

The branch will go back to the `LDA` instruction. You must be careful here because not all assemblers do precisely the same calculation. Know your assembler, and test it if you're not sure.

A label can be attached to a point within a program by simply placing it at the left side of the line, such as `LOOP LDA MESSAGE,X`.

But some programmers don't want to glue the label and the instruction together. They reason that they might want to add another instruction at the top of this loop. If so, they'd need to do some awkward editing. They would prefer to use the asterisk and code as in the following lines.

```
LOOP =*
LDA MESSAGE,X
```

The effect is the same as the previous single line, but the asterisk makes things much more flexible.

Perhaps the most elegant use of the asterisk is to allow

the length of a string or data area to be calculated automatically. Here's the source code for a small program.

```
120 *=$2000
130 LDX #0
140 LP1 LDA MSG1,X
150 JSR $FFD2
160 INX
170 CPX #M1LEN
180 BNE LP1
190 LDX #0
200 LP2 LDA MSG2,X
210 JSR $FFD2
220 INX
230 CPX #M2LEN
240 BNE LP2
250 RTS
300 MSG1 .ASC "HELLO"
310 .BYTE $0D
320 M1LEN = *-MSG1
330 MSG2 .ASC "GOODBYE"
340 .BYTE $0D
350 M2LEN = *-MSG2
```

Lines 320 and 350 show the length-calculation trick. Effectively, they say to calculate the difference between here and the start of the message. The assembler will obediently calculate values of 6 and 8 for the two string lengths. Later, if you wanted to change `HELLO` to `GREETINGS`—or `BON JOUR` or `GUTEN TAG`—just type it in, and the assembler will figure out the revised numbers for you.

The above program, which outputs `HELLO` and `GOODBYE`, isn't too exciting as a type-in project, but I won't include a BASIC version with `POKEs` this time. If you want to try entering the above code and have only a simple (nonsymbolic) assembler, you'll find the following symbol values useful.

```
2002 LP1
2004 LP2
2006 MSG1
2008 M1LEN
2012 MSG2
2014 M2LEN
```

The asterisk signals the current working address as the assembler works through your source code.

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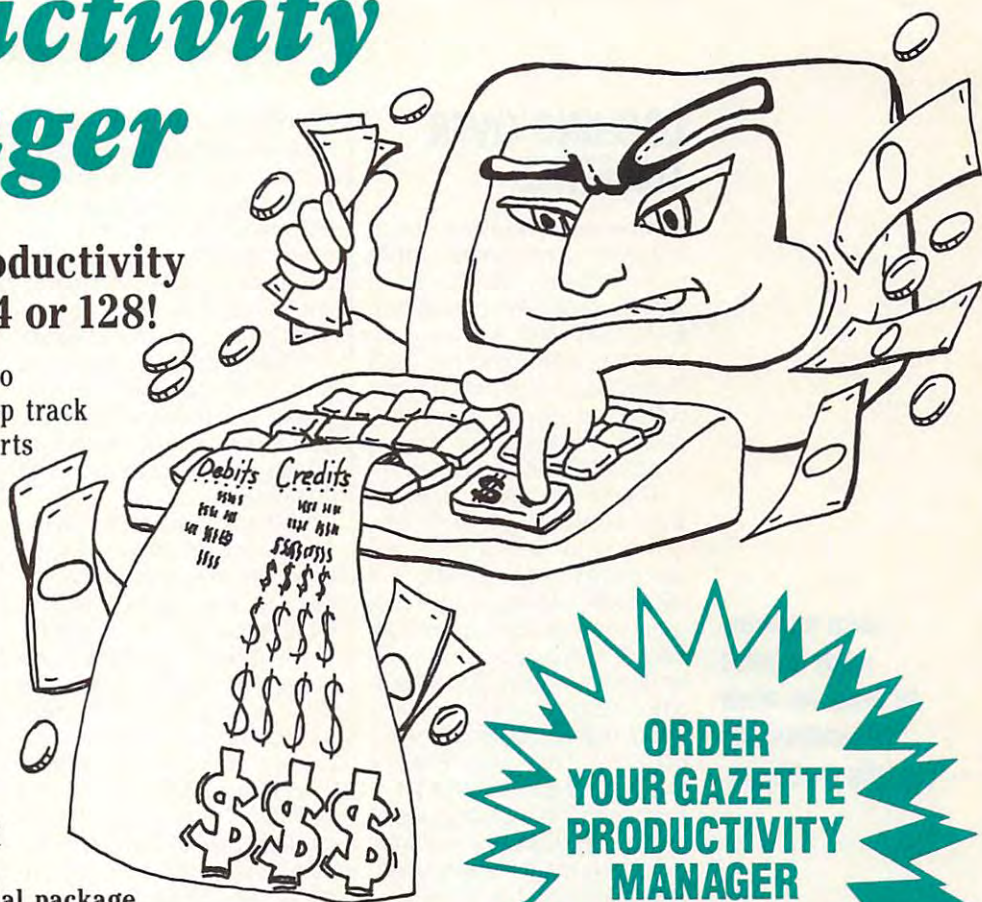
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PROGRAMMER'S PAGE

Randy Thompson

LOOKING OVER THE FENCE

Ever wonder what it's like to program computers other than the 64 or 128? For starters, your machine comes with BASIC installed, but the Amiga, Macintosh, and MS-DOS clones don't. If you want to run BASIC on any of these machines, you must purchase a separate BASIC compiler.

The Amiga has several versions of BASIC available. Early machines came with versions of Microsoft BASIC, but Microsoft used some poor programming practices, and its BASIC interpreter won't work on current Amigas. Fortunately, other Amiga BASIC compilers are of higher quality. More importantly, these other BASICs are not interpreters; they are compilers. This means your programs are compiled into fast-executing machine language. The Amiga also has some specialized versions of BASIC for programming games.

Many PCs are still sold with a BASIC interpreter that loads from disk, such as GW-BASIC. There's even a language called True BASIC that's available for the Amiga, Macintosh, and PC. Any program written in True BASIC can be run on any computer equipped with True BASIC. However, BASIC is rarely the programming language of choice these days.

The most popular language now is C, and this includes its object-oriented offspring, C++. Pascal and its close relative Modula-2 are also popular. None of these languages come free with a computer.

The one language that all computers must support in one fashion or another is machine language. Programming in machine language on a 64 or 128 requires an assembler (unless you prefer coding directly to memory through

POKE statements or using a machine language monitor).

You need an assembler to write Amiga, Macintosh, and PC machine language programs as well. Because BASIC is the operating system for the 64 and 128, many assemblers let you use your computer's built-in BASIC editor to write machine language programs. You must use a text editor to create machine language source code on other computers.

Both the Macintosh and the Amiga use Motorola's 68000 family of CPUs. This family consists of the 68000, 68010, 68020, 68030, and 68040. The higher the number, the newer and more powerful the CPU. All of these CPUs have basically the same instruction set, and all support the instructions of their lower-numbered siblings. These chips are incredibly powerful when compared to the 6502. For example, a lowly 68000 has 16 registers, each of which can hold a 32-bit value (any number up through 4,294,967,295). The 6502's 8-bit A, X, and Y registers, on the other hand, can hold a number from 0 to 255 only—and think what you can do with that!

The Intel chips found in PCs are a diverse bunch. The original 8088 is actually less powerful than the lower-numbered 8086 because it uses an 8-bit data bus while the 8086 has a 16-bit data bus.

The 80286, 80386, and 80486—often referred to as simply the 286, 386, and 486—quickly replaced the older 8088 and 8086. The 386 was the first of the group to have 32-bit registers like the 68000. The main advantage of these chips is raw speed. The 486, for example, can run at an amazing 66 MHz. In contrast, the 6510 in a 64 runs at a mere 1 MHz.

Did you know that game ma-

chines are really computers? SEGA Genesis, for example, uses the same 68000 processor as the Amiga 500.

The old 8-bit Nintendo uses a 6502, of sorts. It's a modified version of that chip that's faster but contains fewer instructions. The SNES uses a 65816 CPU that's closely related to the 6502. It is, in fact, a 16-bit version of that chip. So, if you've got 64 or 128 machine language experience, you're in a good position to become a Nintendo programmer.

Nintendo's Game Boy uses a Z80 CPU. That's the same microprocessor found in old CP/M computers and the discontinued Timex-Sinclair computers. The SEGA Genesis has a Z80 in it as well, but it's mainly used to control the machine's FM sound chip.

Since they don't have keyboards and disk drives, you might wonder how these game machines are programmed. The answer? They use other computers.

Most development systems (as they are called) are based around MS-DOS computers, and you use what's called a cross compiler to write your code. A cross compiler is a compiler or assembler that generates code for a machine that is different from the computer you are using. For example, you might use a PC to write and assemble 68000 code for a SEGA Genesis. (Some companies have even been known to develop 64 code on the PC.) You then use a special hardware interface to download the code to the game machine where you can run it and test your game.

With such expensive and specialized equipment, it's no wonder you don't see very many hobbyists hacking out games for the SNES or SEGA Genesis. Fortunately, all you need to program the 64 or 128 is to own one. □

Let's examine what it takes to program other computers and game machines.

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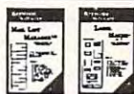
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Steve Vander Ark

INTO THE BREACH

What's all this talk about GEOS users throwing in the towel and giving up their 64s and 128s? It's not time for that.

True, there are fewer and fewer magazines devoted to the Commodore, but that's no reason to call it quits. Besides, users just recently have started a new magazine specifically for GEOS. It's a very nice publication called *geoVISION*.

While Berkeley (now called GEOWORKS) no longer writes software for 8-bit GEOS, users again have leaped into the breach and are turning out all kinds of great programs. Of course there are still a number of companies such as Creative Micro Designs, RIO Computers, The Soft Group, and others that are still coming out with surprisingly high-tech hardware for lowly 64s and 128s.

OK, I hear you asking me what the GEOS universe will look like in a year or two. What is there still to look forward to? Here are a few things I think might be waiting for us not too far down the line.

Gateway NT. If you follow the wacky world of Microsoft and its choke hold on the IBM-clone world, you will recognize that *NT* means "new technology." I think that if Jim Collette ever sits down with Gateway and pushes it to the limits, we could see a whole new level of sophistication in a basic system manager program.

The concept of pseudo multitasking has already been given life with Gateway's Switcher and the task switcher in *geoWizard*. Theoretically, you can store as many "contexts" as you have room for in your RAM device. Maybe those little-used function keys could be dragged into the act to let you choose any of up to eight jobs in progress.

Along with that, we should see the development of a print spooler, a system which feeds document information to the printer to free your computer for other uses. This spooler uses a RAM device to store the data temporarily before it trickles out for printing on your 9-pin printer.

Screen savers. Yeah, yeah, I know screen savers are frivolous. I know that simple blanking can protect your monitor screen perfectly well. I know that I don't actually need to see little fish or fireworks brightening up my monitor, but—and I hate to admit it—I love a good screen saver. It's a lot of fun to mess with them, to give them just the right pizzazz. This miracle of modern computer science would almost certainly require a RAM device to store the information it needs.

Programmers. More programs from people like Irv Cobb and Paul Murdaugh (I could list a whole lot more people here), truly clever and dedicated GEOS programmers who just keep going on doing things once thought impossible or never even dreamed of at all. They never seem to run out of good ideas for GEOS utilities, from Irv's program to alter the system font to Paul's outstanding *DualTop*. These people are the cutting edge, folks.

GeoPublish 128. No, it won't be called that, and it won't be coming from California. No, this eagerly awaited program is being developed by Maurice Randall, who lives an hour away from me here in Michigan. He's the guy who wrote *geoSHELL*. If he ever gets this project finished, Maurice will have made an awful lot of people very happy. As of this writing, the project was still a long way from completion, though, and who knows?

Online services. I really hate to say it, but I get the impression that America Online (Quantum-Link's parent company) would be just as happy to see Q-Link die. The death blow could have been announced by the freezing of the libraries—which occurred in February. This problem, according to an inside source, could have been fixed quickly and easily had certain data been made available to those who could make the repairs.

As the months went by, no one could find the time to pass that information along, and the problem remained. A lot of users have decided the solution isn't worth waiting for and have left Q-Link.

For me, the very thought of that treasure house of files disappearing is enough to make me cry. Heck, there is so much in those libraries that it will be a long time before I run out of things to download.

Of course, all these avid Commodore users will have to go somewhere, and it looks like *GENie* is where many of them are ending up. The *Flagship* (that's *GENie*'s Commodore support area) has rapidly growing libraries of GEOS files, and many of the best programmers have already switched to *GENie* to upload their work. Next month's column will be a GEOS user's guide to *GENie*; I'll give you a better idea of what the *Flagship* is like at that time.

There are a lot of exciting things still happening in this wonderful corner of the computer universe. I'm sure that I'm not seeing everything dead on as I peer into the future here. Hey, I'm just guessing by what I've been hearing lately. What I certainly don't see, however, is the end of GEOS on the 64/128. This system is just too good and we users are just too devoted for GEOS to die anytime soon! □

A handful of companies and a lot of devoted users are not about to let GEOS and the 64 slip away.

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D'IVERSIONS

Fred D'Ignazio

INTO A DIGITAL BLACK HOLE

Black holes are collapsed stars whose gravitational pull is so strong that anything nearby gets sucked into them. You may never visit one of these holes in outer space, but you're about to be pulled into what I call a digital black hole.

Every day on the news we hear about industries switching from traditional means of producing products (nondigital) to a high-tech (digital) format. Boundary lines between products are disappearing as articles race toward this digital black hole and begin blending and fusing. Here are some examples of what I mean.

TCI and Warner Cable Companies are working together to fashion a new standard for digitizing and compressing TV signals. The companies envision a marriage of computers and cable TV that will offer subscribers all the TV shows and movies ever produced, online access to electronic shopping malls, video games, electronic newspapers, online university courses, and the ability to attend meetings via TV.

US West will invest \$2.5 billion in Time Warner's cable and film operations, including Warner Brothers' movie studio, HBO, and cable franchises. This follows a pattern of convergence between the telephone and cable industries that has been developing in Great Britain for a decade and is now picking up steam in the U.S. The phone companies' powerful digital switching devices will soon connect to cable companies' wide-band video pipelines and make "compu-TV-phones" a reality.

Microsoft is teaming up with Hewlett-Packard, Ricoh, Compaq Computer, Minolta, McCaw Cellular, Canon, NEC, and Northern Telecom to link

all office machines via Microsoft at Work software. This paperless office would allow workers on-site and off-site to create and send work anywhere on the globe—or beyond.

Newsweek magazine now publishes an interactive *Newsweek* edition on tiny CD-ROM discs which fit inside a handheld Sony player. Cox Enterprises, publisher of the *Atlanta Journal* and the *Atlanta Constitution*, is joining BellSouth to create instant electronic classified ads, news updates, stock quotes, sports results, and weather reports via telephone voice mail and modems. Electronic newspapers, delivered via telephone at the breakfast table, are just around the corner.

The proponents of these new technologies claim that fusing and linking all of our machines into a single digital megamachine will make our lives much easier. In the 1950s, we were told that technology would make our lives easier, simpler, and more fun. We dreamed of more leisure time as laborsaving devices in glossy white enamel took over the menial household chores.

Bong! It's 1993, and our lives have never been more complex. The machines that promised to become our willing slaves have become a new breed of round-the-clock taskmasters. Soon we'll enter the era of the "go-anywhere office." Digital fax machines, cellular telephones, subnotebook computers, programmable digital assistants, and other laborsaving devices will see to it that we're on the clock, seven days a week. Anyone who wants us will be able to dial us up and even do a "geodata fix" on us. The digital black hole will start by sucking up all the world's machines, but it can suck up you and me, too!

Can you imagine the world in a few years when today's

standard appliances have ceased to exist? This is a world in which the digital black hole has sucked everything into the floors, the walls, and the furniture. TVs will have become wallpaper, except that they will also be our telephones, our computers, and our newspapers and books.

Much of family life will consist of people talking to and arguing over their electronic walls, using voice-zappers to split the surfaces into tiny pixelated tiles of pictures inside pictures: sports channels, electronic-mall channels, crime channels, real estate channels, reality street channels, evangelical channels, wellness channels, and so on.

Video wallpaper will be so inexpensive that people will buy it for all four walls in order to keep the zapper arguments subhomicidal. Four people might each face a different wall of a room's four walls.

If there are more than four people in the room, they could wear permanently mounted miniature earphones and minimikes in their mouths. This way, they could whisper commands to the magic screen on the wall and listen to its babble while remaining polite, inaudible, and insulated from all social contact with family members and friends. A perfect evening at home will be spent in front of infinitely divisible electronic hearths.

This is an inevitable market just waiting to be digested by the technological juggernaut and the digital black hole. The real question is, Will this be progress?

The digital black hole is out there, folks. It's waiting for us. So, if you feel your feet start to slide or your ears start popping, grab onto something heavy and hang on. It's going to be one heck of a steep and slippery slope, folks! □

If you start to feel your feet slide from under you, hang on! You could be slipping into a digital black hole.

PROGRAMS

COINS

By Maurice Yanney

Everyone enjoys finding money on a street; it's like getting something for nothing. Of course, practically everything has its price, and this single-player arcade game for the 64 is no exception. As you maneuver about the screen picking up coins, four tanks will be shooting at you.

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

Starting address: 0801

Ending address: 19D8

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

Playing the Game

After you load and run Coins, press the space bar or the joystick fire button to start the game. Use a joystick in port 2.

The object of the game is to move about the screen gathering coins while doing your best to avoid the bullets fired by the tanks on each side of the screen. To collect a coin, just move over it. If you don't have a joystick, you can control the figure on the screen by using the I, J, K, and M keys to move up, left, right, and down, respectively.

There are three different coins that appear: pennies, nickels, and dimes. To complete the first level, you need to gather 25 coins of any denomination. Five additional coins are needed to complete each subsequent level. To advance beyond level 5, you'll have to collect 50 coins. The sum that you collect doesn't matter as far as advancing to a new level, but you do get points for each dime, nickel, or penny. More about scoring later.

In addition to the randomly appearing coins, watch for an infrequent smart bomb. Smart bombs clear the screen of bullets and temporarily stun the tanks, preventing them from firing. When you maneuver over a smart bomb, you'll receive a bonus bomb that appears at the top of the screen. Smart bombs are fired by pressing the

space bar or the fire button. At the start of each game you have six smart bombs. An extra smart bomb is awarded upon successful completion of a level. Use the smart bombs sparingly in the opening levels. Once you reach level 5, the action picks up, and smart bombs will be very helpful.

As the tanks fire, bullets move from one end of the screen to the other. If a bullet hits you, you lose a player. If a bullet hits a coin, the coin disappears.

As if dodging bullets weren't hard enough, you must also race the clock. A time bar appears at the bottom of the screen. If time expires, you lose a player. When you lose all your players, the game is over.

You start the game with one player onscreen and three extras. The players remaining are displayed at the bottom of the screen. For each 10,000 points reached, you receive an extra player. For each penny you gather, you get 100 points. A nickel will earn you 500 points, and a dime is worth 1000 points. You also get bonus points at the end of each level based on how much time is remaining.

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

COINS

```
0801:0B 0B 0A 00 9E 20 32 30 A4
0809:36 32 00 00 00 A9 80 A0 09
0811:19 20 1E AB A9 80 8D 91 30
0819:02 A9 06 8D 20 D0 A9 00 C5
0821:8D 21 D0 20 09 0C 20 2E 43
0829:0C 20 B8 0A 20 8B 16 20 7A
0831:37 11 20 8B 16 A0 03 8C A3
0839:EF 19 20 30 18 20 07 18 F5
0841:20 07 18 AC EF 19 88 D0 B6
0849:EE 20 BE 17 AD 8D 02 C9 93
0851:01 D0 06 20 44 16 4C 4D 39
0859:08 AD DF 19 D0 06 20 7A BF
0861:15 4C 84 08 AE DF 19 E0 28
0869:01 F0 14 AD DD 19 C9 05 7F
0871:B0 05 A9 C0 4C 7A 08 A9 62
0879:EE 8D D8 19 20 06 17 CA 23
0881:8E DF 19 AC E2 19 C8 8C 58
0889:E2 19 AE DD 19 E0 05 90 EB
0891:05 98 29 01 F0 03 20 95 E8
0899:0D AD E2 19 29 07 D0 1E AE
08A1:AD DD 19 C9 05 90 07 AD E5
08A9:E2 19 29 0F D0 10 20 DE 6D
08B1:17 AD F7 19 C9 05 D0 06 53
08B9:20 BB 10 4C D9 08 AD 1F F8
08C1:D0 29 01 C9 01 D0 1E 20 E8
08C9:31 10 AD 06 1A D0 06 20 CC
08D1:08 12 4C 4D 08 20 04 11 A2
08D9:AD DE 19 C9 FF D0 06 20 A7
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08E1:37 11 4C 33 08 20 B0 16 C6
08E9:A9 01 20 75 0F 4C 4D 08 B6
08F1:8C EF 19 8E F5 19 20 97 3C
08F9:E0 A5 8F AA 29 1F 18 69 DF
0901:03 AC EF 19 99 FA 19 8A C4
0909:4A 4A 4A 4A AA 29 01 F0 AD
0911:09 B9 FA 19 18 69 01 99 09
0919:FA 19 8A 4A 8D D8 19 29 10
0921:02 F0 09 B9 FA 19 18 69 03
0929:01 99 FA 19 20 97 E0 A5 D9
0931:8F 29 0F C9 0F D0 03 AD 43
0939:D8 19 18 69 05 AC EF 19 6B
0941:99 FB 19 20 97 E0 A5 8F 5F
0949:29 07 AE F5 19 9D 0E 1A 5C
0951:FE 0E 1A 60 20 9C 09 20 55
0959:AE 09 20 C0 09 20 D2 09 8C
0961:60 A2 00 A0 00 8C EF 19 81
0969:8E F5 19 BD 0E 1A D0 20 D9
0971:B9 FA 19 AA B9 FB 19 A8 85
0979:20 D5 16 AE F5 19 A0 00 14
0981:BD 02 1A 91 FB A5 FC 18 D7
0989:69 D4 85 FC A9 0C 91 FB A2
0991:AC EF 19 C8 C8 E8 E0 04 55
0999:D0 CB 60 A0 00 A2 00 20 C7
09A1:F1 08 A9 03 8D FB 19 A9 4C
09A9:FF 8D 02 1A 60 A0 02 A2 2D
09B1:01 20 F1 08 A9 15 8D FD C5
09B9:19 A9 FC 8D 03 1A 60 A0 1D
09C1:04 A2 02 20 F1 08 A9 01 C4
09C9:8D FE 19 A9 FB 8D 04 1A 58
09D1:60 A0 06 A2 03 20 F1 08 AB
09D9:A9 26 8D 00 1A A9 F8 8D F2
09E1:05 1A 60 AD 0E 1A F0 05 A3
09E9:A0 00 4C AE 14 AD 02 1A 36
09F1:C9 FC F0 07 38 E9 01 8D AF
09F9:02 1A 60 AC FB 19 AE FA 07
0A01:19 20 4F 16 A9 FB 8D 02 5F
0A09:1A AC FB 19 C8 8C FB 19 EF
0A11:C0 16 D0 03 20 9C 09 60 3B
0A19:AD 0F 1A F0 05 A0 01 4C 13
0A21:35 14 AD 03 1A C9 FF F0 A3
0A29:07 18 69 01 8D 03 1A 60 11
0A31:AC FD 19 AE FC 19 20 4F 05
0A39:16 A9 FC 8D 03 1A AC FD 13
0A41:19 88 8C FD 19 C0 02 D0 16
0A49:03 20 AE 09 60 AD 10 1A 41
0A51:F0 05 A0 02 4C 0F 14 AD C7
0A59:04 1A C9 F8 F0 07 38 E9 BC
0A61:01 8D 04 1A 60 AC FF 19 4A
0A69:AE FE 19 20 4F 16 A9 FB DB
0A71:8D 04 1A AE FE 19 E8 8E 38
0A79:FE 19 E0 27 D0 03 20 C0 75
0A81:09 60 AD 11 1A F0 05 A0 38
0A89:03 4C 88 14 AD 05 1A C9 04
0A91:FB F0 07 18 69 01 8D 05 B1
0A99:1A 60 AC 01 1A AE 00 1A 1E
0AA1:20 4F 16 A9 F8 8D 05 1A 19
0AA9:AE 00 1A CA 8E 00 1A E0 8E
0AB1:00 D0 03 20 D2 09 60 A9 81
0AB9:30 85 34 85 38 AD 0E DC 97
0AC1:29 FE 8D 0E DC A5 01 29 65
0AC9:FB 85 01 A0 00 A9 00 85 93
0AD1:FB A9 D0 85 FC A9 00 85 D4
0AD9:FD A9 30 85 FE A2 00 A0 D8
0AE1:06 B1 FB 91 FD C8 D0 F9 A9
0AE9:E0 FC E6 FE E8 E0 10 D0 39
0AF1:F0 A5 01 09 04 85 01 AD 7E
0AF9:0E DC 09 01 8D 0E DC 18 F3
0B01:AD 18 D0 29 F0 69 0C 8D 73
0B09:1D D0 A2 00 A0 00 BD 38 6C
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PROGRAMS

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0B11:19 9D 50 37 E8 E0 08 D0 44
0B19:F5 A2 00 BD CC 18 8E D8 6B
0B21:19 A2 00 99 58 37 C8 E8 20
0B29:E0 08 D0 F7 AE D8 19 E8 3F
0B31:C0 48 D0 E7 A2 00 BD D5 B8
0B39:18 99 58 37 C8 E8 E0 20 0C
0B41:D0 F4 A9 00 A8 99 C0 37 96
0B49:C8 C0 40 D0 F8 A9 00 A8 20
0B51:AA BD F5 18 99 C3 37 99 50
0B59:C4 37 98 18 69 08 A8 E8 D9
0B61:E0 04 D0 ED A9 00 A8 AA 2B
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1991:00 42 4F 4E 55 53 3A 00 8F
1999:12 50 52 45 53 53 20 53 03
19A1:50 41 43 45 20 4F 52 20 0C
19A9:42 55 54 54 4F 4E 92 00 FA
19B1:12 20 20 20 20 54 4F 20 0C
19B9:53 54 41 52 54 20 47 41 EA
19C1:4D 45 20 20 20 20 92 00 98
19C9:12 53 4D 41 52 54 20 42 FD
19D1:4F 4D 42 53 3A 92 00 00 98
    
```

Maurice Yanney is a frequent contributor. Some of his programs are *Brick Layer*, *Umbrellas*, and *Cats & Mice*. He lives in Lebanon, Pennsylvania.

NAME MACHINE

By Brent Spurlock

Name Machine is a utility that lets you alphabetize lists of peoples' names or other items. To make the job easy for you, you can enter names in either first-name or last-name order, and the program will

alphabetize the names by the last name. You can then print out the names in various formats, including first-name or last-name order. The program also lets you print the list in columns.

Other features include the ability to save and load files and to handle items other than names, such as song titles, books, videos, and so on. The program is written to be as user friendly and crashproof as possible. Just be sure that your printer is on and ready when you're set to print.

Typing It In

Name Machine is written entirely in BASIC. 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 before you try to run it.

When you run Name Machine, you'll see the main menu and its seven choices. Choices include Enter, Edit, Print, Save, Load, Choose Format, and Erase All Names.

Before you alphabetize a list of names, you must first decide on a format for entering them. By selecting Choose Format, you'll see three options: First name Last name; Last name, First name; and No names. The first two choices let you select whichever way is easier for you to enter names, either with the first or last name first. In either of these formats, the program will still alphabetize the list by last names.

The third choice allows you to enter items that are not names of people. These may be song titles or any other items you might like.

The current format is shown on the main menu under the Choose Format choice. The default format is First name Last name. After you've selected a format, select Enter from the main menu to begin entering your names.

To enter a name, type it as indicated by the prompt and then press Return. The prompt states the current format, and the current record number is at the top of the screen. To exit to the main menu, type *M* followed by Return. As a shortcut, you may go directly to the edit menu by typing *E* followed by Return.

To edit or view the names, select Edit from the main menu. The names will

be displayed up to 20 at a time. If the list is longer than 20 names, press Return to continue listing. To return to the main menu, press *M*.

To edit a name, enter the number beside that name and press Return. The name will be shown followed by a prompt to reenter the name correctly. Type the name as you would like it. If you would like to delete the name, type *D* followed by a Return.

To print the list of names, select Print from the main menu. You will be asked if you want the first or last name printed first. Press either *F* or *L*. You'll then be asked whether or not you want the names numbered. You'll then be asked if you are using single sheets or continuous paper.

You'll then be asked how many spaces you want between names. You can have up to three spaces between each name. If your list is long enough to print more than one page, you'll be asked whether you want it printed in two columns.

The final prompts asks for a list title. If you want one, enter a title and press Return. If any of your choices are wrong, press *Q* to quit and return to the main menu. Make sure the printer is on and the paper is ready and then press any key to print.

To save or load a file, select the option from the main menu and then type in the filename. The filename can contain up to 15 characters. If you change your mind, enter *M* to return to the menu. Any disk errors will be displayed on the screen, and you'll be given a prompt to start over.

To erase the names from a list, select Erase All Names from the menu. You will be asked if you are sure. Be careful with this option; once the names have been erased, they cannot be recovered.

NAME MACHINE

```

MS 10 REM COPYRIGHT 1993 - COM
PUTE PUBLICATIONS INTL L
TD - ALL RIGHTS RESERVED
RF 20 RT=0:FT=1:FT$(1)="FIRST
{SPACE}NAME LAST NAME":F
T$(2)="LAST NAME, FIRST
{SPACE}NAME"
EE 30 FT$(3)="AS IS"
KD 40 R$=CHR$(13):NU=1:DIMNA$(
350),OG$(350):POKE53280,
15:POKE53281,15:POKE646,
    
```

```

6
XA 50 PRINT "{CLR}{12 SPACES}
{YEL}{A}*****
{S}"
XM 51 PRINT "*****{W}
{PUR}NAME{SHIFT-SPACE}MA
CHINE {YEL}{Q}*****
*";CHR$(14)
BH 52 PRINT "{12 SPACES}{Z}****
*****{X}{PUR}"
PP 55 PRINT "{2 DOWN}PLEASE ENT
ER{SHIFT-SPACE}NUMBER
{SHIFT-SPACE}OF
{SHIFT-SPACE}SELECTION
{BLU}"R$R$
KP 60 PRINT "1...ENTER"R$R$;"2.
..EDIT"R$
DF 61 PRINT "3...PRINT"R$R$;"4.
.SAVE"R$R$;"5...LOAD"R$R$
"6...ERASE ALL NAMES"
RK 62 PRINTR$;"7...CHANGE INPUT
FORMAT"
XF 63 IF FT=3 THEN PRINT"
{4 SPACES}{NO NAMES}":GO
TO70
FH 64 PRINT "{4 SPACES}("FT$(F
T)")"
JA 70 GETA$:IFAS<"1"ORAS>"7"TH
EN70
AJ 80 A=VAL(A$):ONA GOTO 100,3
00,600,800,900,1000,1100
PP 100 E=0:PRINT "{CLR}{YEL}"TA
B(13)"{A}*****{S}
"
KD 101 PRINTTAB(13)"- {PUR}NAM
E # "NU TAB(25)"{YEL}"-
SS 102 PRINT "{YEL}{40 T}"
FX 103 PRINT "{BLU}TYPE {PUR}M
{BLU} TO EXIT TO MAIN M
ENU"
MH 104 PRINT "TYPE {PUR}E{BLU}
{SPACE}FOR EDIT MENU"
BF 105 PRINT "{PUR}{3 DOWN}ENTE
R{SHIFT-SPACE}NAME ("FT
$(FT)"R$"{BLU}{DOWN}?
{@}";:D$=""
GJ 110 GOSUB1300
KQ 130 IFA$=""THEN100
CF 131 IFA$="M"ORAS="M"ORAS="M
ENU"THEN200
QK 132 IFA$="D"ORAS="D"THEN 50
0
BF 133 IF E=1 THEN GOSUB 290
CH 134 IF A$="E" OR A$="E" OR
{SPACE}A$="EDIT" THEN R
T=1:GOTO300
BC 135 OG$=A$
XF 136 IF FT=3 THEN NA$=A$:GOT
O200
QH 138 IF FT=2 THEN 170
DE 140 A=LEN(A$):C=A:B=0
RC 145 IF MID$(A$,A,1)=" " THE
N 160
AF 150 A=A-1:B=B+1:IFA=0THENNA
$=A$:GOTO200
FA 155 GOTO145
DR 160 B$=RIGHT$(A$,B):C$=LEFT
$(A$,C-B):NA$=B$+" "+C
$:GOTO200
PK 170 A=LEN(A$):C=A:B=1
FP 175 IF MID$(A$,B,1)="," TH
EN 190
XG 180 IF B=A THEN NA$=A$:GOTO
200
DX 185 B=B+1:GOTO175
AM 190 B$=RIGHT$(A$,C-B):C$=LE
FT$(A$, (B-1)):OG$=B$+"
{SPACE}"+C$:NA$=A$
EF 200 D=1
HM 205 REM PRINTLENHR$(142)
JQ 210 IFD>NUTHENNA$(NU)=NA$:O
G$(NU)=OG$:GOTO260
KA 220 IFNA$>NA$(D) THEND=D+1:G
OTO210
EB 230 B=NU:FORI=1TONU-D
FQ 240 NA$(B)=NA$(B-1):OG$(B)=
OG$(B-1):B=B-1:NEXT
SP 250 NA$(D)=NA$:OG$(D)=OG$
GP 260 NU=NU+1:PRINTCHR$(14):I
FE=1THEN458
AB 270 GOTO100
KJ 280 IFE=1THENE=0:GOTO458
EC 282 IFRT=1THENRT=0:GOTO100
CH 285 GOTO50
QM 290 NA$(C)=NA$(C+1):OG$(C)=
OG$(C+1):IFC<NU THEN C=
C+1:GOTO290
MS 298 NU=NU-1:RETURN
XM 300 A=1
RE 304 PRINT "{CLR}{6 SPACES}
{PUR}PLEASE
{SHIFT-SPACE}SELECT
{SHIFT-SPACE}NUMBER
{SHIFT-SPACE}TO
{SHIFT-SPACE}EDIT{YEL}"
GC 305 PRINT "{5 SPACES}{30 T}
{BLU}"
AE 306 IF NU<=20 THEN 309
CS 308 PRINT "HIT {PUR}RETURN
{BLU} TO{SHIFT-SPACE}CO
NTINUE{SHIFT-SPACE}LIST
ING"
FM 309 PRINT "TYPE {PUR}M{BLU}
{SPACE}TO EXIT TO MAIN
{SPACE}MENU"
JS 310 FORI=1TO20
QH 320 IFA<=9THENPRINT " ";A;NA
$(A):A=A+1:GOTO327
FB 325 PRINTA;NA$(A):A=A+1:C=0
XB 327 NEXT:C=0
DQ 330 PRINT"?{@}";:D$=""
BX 331 GETZ$:IFZ$=""THEN331
RR 332 IFZ$=CHR$(13)ORZ$=CHR$(
14)THENAS=D$:GOTO340
AX 333 IFLEN(D$)=0ANDZ$=CHR$(2
0)THEN331
GP 334 IFZ$=CHR$(20)THEND$=LEF
T$(D$,LEN(D$)-1):PRINT"
{LEFT} {LEFT}"Z$"{@}";
IFZ$<" "ORZ$>CHR$(130)A
NDZ$<CHR$(160)THEN331
PX 336 IFLEN(Z$)>3THEN331
CK 338 IF Z$="M" OR Z$="M" OR
{SPACE}Z$="MENU"THEN282
JG 339 D$=D$+Z$:PRINT "{LEFT}"Z
$"{@}";:GOTO331
PG 340 IF A$=""THEN370
PE 350 B=VAL(A$)
QE 355 IFB<=0ORB>=NUTHENFORI=0
TOLEN(A$):PRINT "{LEFT}
{SPACE}{LEFT}";:NEXT:PR
INT "{@}";:D$="" :GOTO331
BJ 360 GOTO400
HA 370 IFA>=NUTHENNA=1:GOTO304
KQ 380 GOTO 304
AX 398 GOTO134
RF 400 PRINT "{CLR}{3 DOWN}TYPE
{PUR}D{BLU} TO DELETE.
{SPACE}NAME"
CR 410 PRINT "TYPE {PUR}M{BLU}
{SPACE}TO RETURN TO MEN
U"
QX 420 PRINT "{2 DOWN}OLD
{SHIFT-SPACE}ENTRY--"NA
$(B)
SS 430 PRINT "{DOWN}{PUR}TYPE
{SHIFT-SPACE}IN
{SHIFT-SPACE}NEW
{SHIFT-SPACE}ENTRY (LAS
T NAME, FIRST NAME)
{BLU}"R$R$"?{@}";
RS 450 E=1:Q=NU:TF=FT:D$="" :C=
B
DG 453 IF FT=3 THEN 110
DC 455 FT=2:GOTO110
PJ 458 NU=Q:FT=TF:E=0:IF RT=1
{SPACE}THEN RT=0:GOTO10
0
PA 459 GOTO300
FH 500 PRINTR$R$;"ARE YOU SURE?
(Y/N)"
QC 510 GET A$:IFAS=""THEN510
AK 520 IFA$="N"ORAS="N"THEN E=
0:NU=Q:FT=TF:GOTO300
JC 530 GOSUB290:GOTO300
ES 600 PRINT "{CLR}{DOWN}{PUR}
{5 SPACES}TYPE M TO RET
URN TO MAIN MENU{YEL}"
HF 605 PRINT "{5 SPACES}{29 T}
{BLU}
PRINT "{DOWN}PRINT {PUR}
E{BLU}IRST OR {PUR}L
{BLU}AST NAME FIRST?";
XB 610 GET A$:IFAS<>"F"ANDAS<>
"F"ANDAS<>"L"ANDAS<>"L"
ANDAS<>"M"ANDAS<>"M"THE
N 610
KK 615 IFA$="M"ORAS="M"THEN500
RH 620 PRINTA$:A=1:IFA$="F"ORA
S="F"THEN A=0
QK 626 PRINTR$"NUMBER LIST OF
{SPACE}NAMES? (Y/N)";
HC 627 GOSUB797
BP 628 IFA$="M"ORAS="M"THEN500
JJ 629 PRINTA$:D=1:IFA$="Y"ORA
S="Y"THEN D=0
BX 630 PRINTR$"ARE YOU USING S
INGLE SHEETS? (Y/N)";
PD 631 GOSUB797
MJ 632 PRINTA$:O=1:IFA$="Y"ORA
S="Y"THEN O=0

```

PROGRAMS

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BX 635 PRINTR$"NUMBER OF LINES
      BETWEEN NAMES (0-3)?"
RD 636 GETA$:IFA$<"0"ORAS>"3"TH
      HEN636
AM 637 F=VAL(A$):PRINTF
CH 641 IF(NU*(F+1))<55THEN645
MJ 642 PRINTR$"PRINT IN TWO CO
      LUMNS? (Y/N)"
XC 643 GOSUB797
HS 644 P=0:IF A$="Y"ORAS="Y"TH
      ENP=1
CR 645 PRINTR$"TYPE TITLE: {0}
      ";D$="":GOSUB1300:B$=A
      $
XS 646 PRINTR$"{3 DOWN}{PUR}PR
      ESS{SHIFT-SPACE}ANY
      {SHIFT-SPACE}KEY
      {SHIFT-SPACE}TO
      {SHIFT-SPACE}BEGIN
      {SHIFT-SPACE}PRINTING"
KG 647 PRINT"{2 DOWN}TO CANCEL
      PRESS {RVS}Q{OFF}"
GG 648 GETA$:IFA$="M"THEN648
HC 649 IF A$="Q"THEN50
RB 650 OPEN 4,4,7:G=INT(LEN(B$
      )/2):PRINT#4,R$
AD 651 FORI=1TO(40-G):PRINT#4,
      " ";:NEXT:PRINT#4,B$R$R
      $
BC 655 IFP=1THEN700
PP 656 FORI=1TONU
MD 657 GETA$:IFA$="Q"THEN50
SM 658 IFM<=55THEN666
KC 659 M=1:IF O=1 THEN 664
EJ 660 PRINT"{CLR}{3 DOWN}PRES
      S{SHIFT-SPACE}ANY
      {SHIFT-SPACE}KEY
      {SHIFT-SPACE}TO
      {SHIFT-SPACE}CONTINUE"
KG 661 PRINT"{2 DOWN}TO CANCEL
      PRESS {RVS}Q{OFF}"
FJ 662 GETA$:IFA$="M"THEN662
PD 663 PRINT"{CLR}":PRINT#4,R
      $,R$,R$:GOTO666
HC 664 FORB=1TO5:PRINT#4,R$:NE
      XTB
GQ 666 IF D=0ANDI<=9THENPRINT#
      4," ";I;:GOTO669
BS 667 IF D=0THENPRINT#4,I;
SG 669 IF A=0THEN PRINT#4,OG$(
      I):GOTO680
MS 670 IF A=1THEN PRINT#4,NA$(
      I)
ES 680 IFD>0THENFORQ=1TOF:PRIN
      T#4,"":M=M+1:NEXTQ
RD 682 M=M+1:NEXT:CLOSE4:GOTO5
      0
BR 700 M=1:Q=1:I=1:LN=INT(55/(
      F+1)):IFF>0THEN LN=LN+1
XB 705 K=I:IFI>NUTHENCLOSE4:GO
      TO50
HR 708 GETA$:IFA$="Q"THENCLOSE
      4:GOTO50
JG 710 IFM<=LNTHEN745
XH 715 M=1:I=I+LN:K=I:Q=1:IF O
      =1 THEN 740
BR 720 PRINT"{CLR}{3 DOWN}PRES
      S{SHIFT-SPACE}ANY
      {SHIFT-SPACE}KEY
      {SHIFT-SPACE}TO
      {SHIFT-SPACE}CONTINUE"
MK 725 PRINT"{2 DOWN}TO CANCEL
      PRESS Q"
HS 730 GETA$:IFA$="M"THEN730
JD 735 PRINT"{CLR}":PRINT#4,R$
      ,R$,R$:GOTO745
RP 740 FORB=1TO10:PRINT#4,"":N
      EXT B
KH 745 IF D=0ANDK<=9THENPRINT#
      4,"{3 SPACES}";K;:GOTO7
      55
CK 750 IF D=0THENIFNA$(K)<>"T
      HENPRINT#4,"{2 SPACES}";
      K;
DR 755 IF A=0THEN PRINT#4,OG$(
      K);:GOTO765
RR 760 IF A=1THEN PRINT#4,NA$(
      K);
AQ 765 IF Q=0THEN780
XE 775 K=I+LN:FORJ=1TO40-(LEN(
      NA$(I))+3):PRINT#4," ";
      :NEXTJ:Q=0:GOTO745
DK 780 K=I:Q=1
CH 790 FORQA=0TOF:PRINT#4,"":N
      EXTQA
PX 795 M=M+1:I=I+1:GOTO705
CS 797 GET A$:IF A$<>"Y"ANDA$<
      >"Y"ANDA$<>"N"ANDA$<>"N
      "ANDA$<>"M"ANDA$<>"M"TH
      EN797
HQ 798 IFA$="M"ORAS="M"THEN50
RP 799 RETURN
MK 800 PRINT"{CLR}{DOWN}TYPE
      {PUR}M{BLU} TO EXIT TO
      {SPACE}MAIN MENU"
BP 805 PRINT"{2 DOWN}{PUR}TYPE
      TITLE TO SAVE: {0}
      {BLU}";D$="":GOSUB1300
AQ 808 IFA$="M"ORAS="M"THEN50
JE 810 OPEN8,8,4,"@0:"+A$+",SE
      Q,W"
EQ 820 PRINT#8,NU:FORI=1TONU:P
      RINT#8,OG$(I):NEXTI
GB 890 CLOSE8:GOTO50
CX 900 PRINT"{CLR}{DOWN}{BLU}T
      YPE {PUR}M{BLU} TO EXIT
      TO MAIN MENU"
JH 905 PRINT"{2 DOWN}{PUR}TYPE
      TITLE TO LOAD: {BLU}
      {0}";D$="":GOSUB1300
FM 908 IFA$="M"ORAS="M"THEN50
JQ 910 OPEN8,8,4,A$+",SEQ,R"
PM 919 INPUT#8,NU:FORI=1TO(NU-
      1):INPUT#8,OG$(I):NEXTI
      :CLOSE8
FX 920 IFOG$(1)<>"M"THEN924
DS 921 OPEN15,8,15:INPUT#15,A$
      ,B$:PRINTR$R$R$R$"{PUR}"B
      $:CLOSE15
AX 922 NU=1:FORZ=1TO1000:NEXTZ
      :GOTO900
FD 924 PRINTR$"{3 DOWN}{PUR}PL
      EASE WAIT{BLU}"
DK 925 FORI=1TONU:A$=OG$(I)
AK 928 A=LEN(A$):C=A:B=0
BF 930 IFA=0THENO$ (I)=" ":GOT
      O990
KS 940 IFMID$(A$,A,1)=CHR$(32)
      THEN960
XF 950 A=A-1:B=B+1:IFA=0THENNA
      $=A$:GOTO960
AF 955 GOTO940
ES 960 B$=RIGHT$(A$,B):C$=LEFT
      $(A$,C-B):NA$(I)=B$+",
      {SPACE}"+"C$
JA 990 NEXTI:GOTO50
GE 1000 PRINT"{CLR}{3 DOWN}ERA
      SE ALL NAMES"
KC 1005 PRINT"{DOWN}{PUR}ARE Y
      OU SURE (Y/N){7}"
RH 1010 GET A$:IFA$="M"THEN L01
      0
FC 1015 PRINT"{3 DOWN}{PUR}PLE
      ASE{SHIFT-SPACE}WAIT
      {BLU}"
GG 1020 IFA$="N"THEN 50
BP 1030 FORI=0TO349:NA$(I)="":
      OG$(I)="":NU=1:NEXTI:G
      OTO50
MM 1100 PRINT"{CLR}{PUR}
      {2 DOWN}PLEASE
      {SHIFT-SPACE}SELECT
      {SHIFT-SPACE}FORMAT
      {SHIFT-SPACE}FOR
      {SHIFT-SPACE}ENTERING
      {SHIFT-SPACE}NAMES
      {BLU}"
HP 1110 PRINT"{2 DOWN}1...FIRS
      T NAME LAST NAME"
PE 1120 PRINT"{DOWN}2...LAST N
      AME, FIRST NAME"
AM 1130 PRINT"{DOWN}3...NO NAM
      ES (USE FOR NAMES OTHE
      R THAN"
HK 1140 PRINT SPC(14)"PEOPLE-
      {SPACE}SONG TITLES, ET
      C.)"
RR 1145 PRINT"{2 DOWN}NOTE: TH
      E FORMAT IS FOR ENTERI
      NG NAMES"
GQ 1147 PRINT"{6 SPACES}ONLY.
      {2 SPACES}THEY WILL ST
      ILL BE ALPHA-"
KP 1148 PRINT"{6 SPACES}BETIZE
      D BY THE LAST NAME, UN
      LESS"
CM 1149 PRINT"{6 SPACES}NO NAM
      ES IS SELECTED."
QC 1150 GET A$:IF A$<"1" OR A$
      >"3" THEN1150LIST1145-
      SA 1160 FT=VAL(A$):GOTO50
XR 1300 GETZ$:IFZ$="M"THEN1300
FH 1310 IFZ$=CHR$(13)ORZ$=CHR$(
      141)THENA$=D$:RETURN
KP 1320 IFLEN(D$)=0ANDZ$=CHR$(
      20)THEN1300
EQ 1330 IFZ$=CHR$(20)THEND$=LE
      FT$(D$,LEN(D$)-1):PRIN
      T"{LEFT} {LEFT}"Z$"{0}
      ";
SH 1340 IFZ$<" "ORZ$>CHR$(130)

```

```

ANDZ$<CHR$(160) THEN 130
0
SE 1350 D$=D$+Z$:PRINT "{LEFT}"
Z$"{@}";:GOTO 1300
XQ 1500 LD=1:GOTO 50

```

Brent Spurlock wrote this program after his mother couldn't understand why it was so much trouble to alphabetize a list of names using a database. He lives in Green Forest, Arkansas.

MEGAMORPH

By Tom Zdanowicz

If you've seen any sci-fi movies or TV shows recently, you've probably seen characters from the future who change their shapes at will. This metamorphic technique is achieved by computers, and now you can *morph* with your 64.

Megamorph can take two bitmapped images and render up to a 99-frame morph of the first image as it transforms into the second. The program works with any graphic images that you've saved to disk as either PRG or SEQ files.

You'll also need a copy of Gazette's HAG (High-resolution Animation Generator) from the April 1992 issue. HAG makes minimovies on a 64 by loading each frame, compressing it, and then saving the whole sequence as a stand-alone program ready for playback.

Megamorph will do all the hard work for you. It'll load your images one at a time, map each pixel to disk, and render each frame into a smooth metamorphosis of the first image as it changes into the second.

All this work can take a lot of time because a single, full-screen bitmapped image can have up to 64,000 pixels. The computer doesn't have enough memory to store the coordinates of all the pixels in the first and second images, so the data is stored on disk as what I call start points and stop points.

The computer then reads the data and calculates and draws each frame of the transformation for you. You can customize the animation by selecting the number of frames and image size as well as other parameters.

Entering the Program

Megamorph's main program is written in BASIC, but it uses a machine language subroutine to speed up the scanning and plotting of images. To help

avoid typing errors, use The Automatic Proofreader to enter the BASIC program. See "Typing Aids" elsewhere in this section. Be sure to save a copy before you attempt to run it. Watch lines 95 and 8242. They are too long to fit on two screen lines without using abbreviations. For the proper Proofreader checksums, list the line after you've entered it, cursor to it, and press Return.

To enter the machine language portion of the program, you'll need MLX, our machine language entry program; again, see "Typing Aids." When MLX prompts, reply with the following.

Starting address: C000

Ending address: C1F7

Save this routine with the filename MORPH.ML on the same disk as Megamorph. The BASIC program will load the file when it is first run.

Using the Program

Load and run Megamorph as you would any BASIC program. After the ML file loads, you will be prompted for a work disk containing your two images. These can be created with a graphics program such as The Print Shop, WorldMap 64, LISA, or whatever you have. The graphics should be two-color, high-resolution images saved as standard noncompressed PRG or SEQ files.

Save the first image on your work disk with the filename 1PAG, and save the second image as 2PAG. If you are uncertain about the compatibility of your files, use the Look option in the main menu to check them. This option will be described in more detail later.

Make sure there's enough room on your work disk to store all the slides and start points/stop points (S/S) files. Each frame can be anywhere from 2 to 32 blocks in size, depending on the size of your images. These and the S/S files can easily fill a disk. Keeping image sizes to half the screen or less will usually leave plenty of room for slides.

After inserting the work disk, press a key to see the main menu. The numbered options are as follows.

1. **Load keyframes and morph (builds S/S).** This option loads and maps each image to disk and builds the start points and stop points files for

morphing. After the S/S files have been created, the program will proceed to render each frame of the morph. (See Parameter Setup below.)

2. **Morph existing S/S files.** In order for this option to work correctly, you must have first used option 1 to generate the S/S files. Then this option will set up parameters and proceed with the rendering without having to rescan and map the original images. (See Parameter Setup below.)

3. **Look.** This option allows viewing of a PRG or SEQ bitmap file so you can check the compatibility of your graphics. After selecting the file type and name, your image will be displayed if it's compatible. Press any key to exit this option.

4. **Exit.** This option reboots BASIC and erases the program.

Parameter Setup

After selecting option 1 or 2, you will be prompted for the file type, number of rows in each image, the number of frames to render, and a frame offset.

For file type simply press P for PRG or S for SEQ files. This is the file type of your before and after images.

The number of rows refers to the size of each image. You have a minimum of 1 row and a maximum of 25. Measuring from the top of the screen, enter the approximate size in rows for each image. This determines how much of each image is to be scanned and mapped since you may not always want full-screen images. The size of each frame rendered will be the larger of the two images.

The number of frames that you select can be 2-99. The more frames, the smoother the morphing effect will be. But with more frames, you'll also use more disk space. If the disk fills up before the last frame is rendered, no more frames will be saved.

Finally, the frame offset enables you to start the rendering at a frame number other than 1. Rendering will begin with the next frame after the offset. This means an offset of 5 will begin rendering at frame 6, which is useful in chaining one morph to another.

Once your images are ready, load and display them with HAG. It will convert them into a stand-alone program for viewing.

PROGRAMS

A Few Notes

The amount of time it takes to render a sequence is related directly to the number of frames and the size of the images. Smaller sequences can be rendered within an hour, while larger, more detailed sequences can take 8-12 hours or more. The results, however, are well worth the wait. I usually set up large images on my computer before I go to bed and awake to a new morph in the morning.

Another thing worth mentioning is that during testing I seem to have discovered a possible bug in the HAG program in that no two slides can be identical. HAG can load them, but when they're played back, strange things can happen. Also, with less than full-screen sequences, the HAG program doesn't blank the rest of the screen. While this can be annoying, it isn't a major problem. (Editor's note: HAG and all of the other programs on the April 1992 Gazette Disk are still available. The U.S. price is \$11.95. Write to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. You can order by credit card by calling 919-275-9809.)

To let the user know what the program is doing, the border color will change according to what is taking place. The colors are as follows. Blue indicates an image is loading. Red indicates an image is being scanned and mapped to disk. Yellow means the program is comparing and equalizing S/S files. Green indicates a frame is being rendered. Light blue indicates the program is saving a slide to disk.

When it has finished rendering, the program will flash the border and sound an alarm. Press any key to turn off the alarm and return to the main menu.

Any disk errors that occur during mapping or rendering are usually fatal, so make sure that you have the proper files on your work disk. If you select option 1, make sure there are no S/S files on your work disk because it will try to create them, producing a disk error and possible crash. Also, if your disk contains slides from another morph, make sure you don't try to create slide numbers that already exist. This too will cause an error. If you wish to

add one morph to another, use the offset to render the new morph, starting with the next available slide number.

Experimentation is the best way to realize the full potential of Megamorph. There is no limit to the detail of the images, and they don't even have to be the same size or on the same section of the screen. I've used this program to create some truly dazzling morphing sequences that have been used for eye-catching titling and graphics effects.

MEGAMORPH

```
JF 10 REM MEGAMORPHS V2.0 BY T
OM ZDANOWICZ
HM 80 REM COPYRIGHT 1993 - COM
PUTE PUBLICATIONS INTL L
TD - ALL RIGHTS RESERVED
SR 85 IFA=0THENA=1:LOAD"MORPH.
ML",8,1
GS 94 OPEN15,8,15
AQ 95 PRINT"{CLR}":POKE53280,0
:POKE53281,0:PRINT"
{2 SPACES}PLEASE INSERT
{SPACE}WORK DISK WITH IM
AGES"
MC 96 PRINT"{5 SPACES}AND PRES
S A KEY TO CONTINUE"
CH 97 GETA$:IFA$=""THEN97
AF 100 PRINT"{CLR}":POKE53280,
0:POKE53281,0
RJ 110 PRINT:PRINT:PRINTSPC(14
)"{BLU}MEGAMORPHS"
CF 120 PRINT SPC(14)"{10 Y}":P
RINT:PRINT
JG 130 PRINT "{CYN}1. LOAD KEY
FRAMES & MORPH (BUILDS
{SPACE}S/S)":PRINT
DR 140 PRINT "2. MORPH EXISTIN
G S/S POINTS FILES":PRI
NT
BH 155 PRINT "3. LOOK":PRINT
BC 157 PRINT "5. EXIT"
DM 160 GET C$:C=VAL(C$):IFC<10
RC>5THEN 160
CQ 170 ON C GOTO 200,190,6021,
180
XF 180 SYS64738
CF 190 GOSUB 9000:GOTO8020
DG 200 REM *SET BITMAP AND LOA
D KEYFRAMES*
PX 204 PRINT"IMAGE FILE TYPE (
{RVS}P{OFF}RG/{RVS}S
{OFF}EQ)":GETFT$
MX 205 IFFT$<>"S"ANDFT$<>"P"TH
ENPRINT"{2 UP}":GOTO204
QD 206 GOSUB9000
XQ 230 REM *****LOAD KEYFRAM
E1*****
FF 241 MB=N1*320:NMS=""0:1PAG,"
+FT$+",R"
CB 250 GOSUB6040:OPEN5,8,5,"0:
STARTPOINTS,S,W":YMAX=N
1*8:GOSUB300:L1=CT
JH 252 MB=N2*320:NMS=""0:2PAG,"
+FT$+",R"
CM 253 GOSUB6040:OPEN5,8,5,"0:
STOPPOINTS,S,W":YMAX=N2
*8:GOSUB 300:L2=CT
RH 260 GOSUB 7031:GOTO8026
BA 297 REM *** MAP IMAGE TO DI
SK *****
ED 300 POKE53280,2:CT=0:FORY=0
TOYMAX:FORX=0TO319
ER 301 HB=INT(X/256):LB=X-(256
*HB)
FB 310 POKE 840,LB:POKE841,HB:
POKE842,Y:POKE 766,0:SY
S49271
JB 320 IF PEEK(767)=0 THEN 340
QQ 330 PRINT#5,X:PRINT#5,Y:CT=
CT+2
FD 340 NEXT:NEXT:CLOSE5:RETURN
KX 6010 REM ***VIEW IMAGE FILE
*****
FP 6021 GOSUB6025:GOTO6105
BS 6025 PRINT"IMAGE FILE TYPE
{SPACE}({RVS}P{OFF}RG/
{RVS}S{OFF}EQ)":GETFT$
AS 6026 IFFT$<>"S"ANDFT$<>"P"TH
ENPRINT"{2 UP}":GOTO6
025
JS 6030 PRINT"{CLR}":INPUT"FIL
ENAME TO VIEW";N$:NMS=
"0:"+N$+", "+FT$+",R"
HK 6031 IFFT$="P"THEN6055
CA 6035 INPUT"NUMBER OF ROWS T
O VIEW/SAVE";NR:MB=NR*
320
MR 6040 SYS49161:POKE680,12:SY
S49220
PR 6050 BC=PEEK(53280):POKE532
80,6:OPEN5,8,5,NMS:GOT
06057
CA 6055 SYS49161:POKE680,12:SY
S49220:POKE147,0:SYS57
812N$,8,1:SYS62631:GOT
06105
SQ 6057 AD=8192:NB=0
XD 6060 GET#5,X$
MP 6070 IFX$=""THENX$=CHRS(0)
HG 6075 X=ASC(X$):POKEAD,X:AD=
AD+1:NB=NB+1:IFNB=MBTH
EN6100
GJ 6076 IF ST=64THEN6100
RD 6080 GOTO6060
RH 6100 CLOSE5:POKE53280,BC:RE
TURN
PH 6105 GETA$:IFA$=""THEN6105
CS 6107 REM ***RECOVER TEXT MO
DE*****{5 SPACES}6108
REM *****
*****
HP 6110 POKE53265,PEEK(53265)A
ND223:POKE53272,(PEEK(
53272)AND240)OR4:GOTO1
00
XP 7010 REM ** REMAP AND EQUAL
IZE ***
PD 7020 REM * STARTPOINTS/STOP
POINTS *
```

```

KJ 7031 POKES53280,7
BB 7040 IFL1<L2THEN 7070
XE 7050 IFL2<L1THEN 7200
KH 7060 IFL1=L2THEN RETURN
EG 7070 OPENS,8,5,"0:STARTCOPY
,S,W":OPEN6,8,6,"0:STAR
TPOINTS,S,R"
KG 7080 INPUT#6,X:INPUT#6,Y:SU
=ST:PRINT#5,X:PRINT#5,
Y:IFSU=64THEN7100
CA 7090 GOTO7080
PQ 7100 CLOSE5:CLOSE6
GS 7110 OPENS,8,5,"0:STARTPOIN
TS,A":OPEN6,8,6,"0:STAR
TPOINT,S,R"
MB 7120 INPUT#6,X:INPUT#6,Y:SU
=ST:PRINT#5,X:PRINT#5,
Y:L1=L2+2:IFL1=L2THEN7
150
CF 7121 IFSU=64THEN7140
CC 7130 GOTO 7120
XE 7140 CLOSE6:OPEN6,8,6,"0:ST
ARTCOPY,S,R":GOTO7120
QF 7150 CLOSE5:CLOSE6:PRINT#15
,"S0:STARTCOPY":RETURN
PH 7200 OPENS,8,5,"0:STOPCOPY,
S,W":OPEN6,8,6,"0:STOP
POINTS,S,R"
JR 7210 INPUT#6,X:INPUT#6,Y:SU
=ST:PRINT#5,X:PRINT#5,
Y:IFSU=64THEN7230
ME 7220 GOTO7210
KF 7230 CLOSE5:CLOSE6
BH 7240 OPENS,8,5,"0:STOPPOINT
S,A":OPEN6,8,6,"0:STOP
COPY,S,R"
BX 7250 INPUT#6,X:INPUT#6,Y:SU
=ST:PRINT#5,X:PRINT#5,
Y:L2=L2+2:IFL2=L1THEN7
290
RE 7260 IFSU=64THEN7280
XX 7270 GOTO 7250
HQ 7280 CLOSE6:OPEN6,8,6,"0:ST
OPCOPY,S,R":GOTO7250
PP 7290 CLOSE5:CLOSE6:PRINT#15
,"S0:STOPCOPY":RETURN
AD 8000 REM *****
*****
FH 8010 REM *** MORPH TWO IMAG
ES ***
PF 8020 REM **** MAIN MENU OPT
ION 2 HERE**
EH 8021 PRINT:PRINT:OPENS,8,5,
"0:STARTPOINTS,S,R":L1
=0
FQ 8022 INPUT#5,V:L1=L1+1:IFST
<>64THEN8022
JC 8023 PRINT"{PUR}NUMBER OF P
IXELS IN S/S FILES=
{GRN}";INT(L1/2)
FD 8024 PRINT:PRINT"{7 SPACES}
{RED}{RVS}PRESS A KEY
{SPACE}TO CONTINUE
{OFF}{CYN}":CLOSE5
RJ 8025 GETAS:IFAS="THEN8025
JS 8026 REM ***MAIN MENU OPTIO
N 1 HERE**
BM 8027 POKES53280,5
HG 8030 SS=1/NS
GD 8040 FORI=0TONS:SYS49161:PO
KE680,12:SYS49220:IA=I
*SS
HQ 8045 OPENS,8,5,"0:STARTPOIN
TS,S,R":OPEN6,8,6,"0:S
TOPPOINTS,S,R"
FE 8050 FORJ=0TOLLSTEP2
AJ 8055 INPUT#5,X:INPUT#5,Y:IN
PUT#6,X2:INPUT#6,Y2
FP 8060 X1=X+IA*(X2-X):Y1=Y+IA
*(Y2-Y)
KR 8070 HB=INT(X1/256):LB=X1-(
256*HB)
SE 8080 POKES40,LB:POKES41,HB:
POKES42,Y1:POKES43,S
YS49271
GX 8090 NEXT:CLOSE5:CLOSE6
FC 8091 REM ***BUILD SLIDE FIL
ENAME**
DK 8092 IFI=SI THEN GOSUB 8700
MH 8093 GOSUB 8500
PE 8105 BC=PEEK(53280):POKES532
80,BC:NEXT
QR 8111 REM ****RECOVER TEXT M
ODE****
MM 8200 POKES53265,PEEK(53265)A
ND223:POKES53272,(PEEK(
53272)AND240)OR4:PRINT
"{CLR}"
BQ 8201 PRINT:PRINT:PRINT"
{11 SPACES}{CYN}MORPH
{SPACE}FINISHED"
AS 8202 PRINT:PRINT:PRINT:PRIN
T:PRINT:PRINT:PRINT"
{11 SPACES}{RVS}{BLU}P
RESS ANY KEY{OFF}"
FS 8240 GETAS:IFAS<>"THEN100
DP 8242 POKES4296,21:POKES4277
,9:POKES4278,0:POKES42
73,48:POKES4276,32:POK
ES4276,33
FS 8244 POKES53280,253-(PEEK(53
280)+1):FORD=1TO300:NE
XT:GOTO8240
GQ 8500 SN=I+1+OS:SS=STR$(SN)
FQ 8510 IFSN>9THEN8540
CR 8520 SS=MID$(SS,2,1):SS="0"
+SS
QS 8530 GOTO 8550
AM 8540 SS=MID$(SS,2,2)
KK 8550 SN$="SLIDE"+SS
KM 8560 MM=757:FORP=1TO7:K$=MI
D$(SN$,P,1):POKEMM,ASC
(K$):MM=MM+1:NEXT
BB 8570 IFN1>N2THENMB=N1*320
XX 8580 IFN2>N1THENMB=N2*320
AS 8590 IFN1=N2THENMB=N1*320
GK 8600 LA=8192+MB:LH=INT(LA/2
56):LL=LA-(256*LH):POK
E755,LL:POKES756,LH:RET
URN
RK 8700 I1=I:O1=OS:OS=0
FF 8710 FORI=1TOEI:GOSUB8500
QC 8720 BC=PEEK(53280):POKES532
80,14:SYS49612:POKES532
80,BC:NEXT
PP 8730 I=I1:OS=O1:RETURN
PA 9000 INPUT"#{RIGHT}ROWS IN
{SPACE}IMAG1(1-25)";N1
:IFN1<LORN1>25THENPRIN
T"{2 UP}":GOTO9000
HP 9005 INPUT"#{RIGHT}ROWS IN
{SPACE}IMAG2(1-25)";N2
:IFN2<LORN2>25THENPRIN
T"{2 UP}":GOTO9000
AJ 9010 INPUT"NUMBER OF FRAMES
(2-99)";NS:IFNS<2ORNS>
99THENPRINT"{2 UP}":GO
TO9010
AP 9012 NS=NS-1
AM 9015 OS=0:INPUT"FRAME OFFSE
T";OS$:IFVAL(OS$)>99OR
OS<0THENPRINT"{2 UP}":
GOTO9015
KX 9016 OS=VAL(OS$):RETURN
AK 10060 GOTOL00

```

MORPH.ML

```

C000:EE 48 03 D0 03 EE 49 03 E1
C008:60 AD 18 D0 09 08 8D 18 D0
C010:D0 AD 11 D0 09 20 8D 11 89
C018:D0 A9 00 85 FC A9 20 85 19
C020:FD A2 00 A0 00 A9 00 91 8B
C028:FC C8 C0 C8 D0 F9 E8 E0 20
C030:28 F0 10 18 A5 FC 69 C8 42
C038:85 FC A5 FD 69 00 85 FD A4
C040:4C 23 C0 60 AD 11 D0 29 4B
C048:80 F0 F9 A9 00 85 FC A9 D9
C050:04 85 FD A2 00 A0 00 AD 4F
C058:A8 02 91 FC C8 C0 C8 D0 5C
C060:F9 E8 E0 05 F0 10 18 A5 23
C068:FC 69 C8 85 FC A5 FD 69 18
C070:00 85 FD 4C 55 C0 60 AD F3
C078:4A 03 4A 4A 4A 8D 3C 03 D1
C080:AD 48 03 8D 4B 03 AD 49 2F
C088:03 8D 4C 03 4E 03 03 6E C0
C090:4B 03 4E 4C 03 6E 4B 03 72
C098:4E 4C 03 6E 4B 03 AD 4B A8
C0A0:03 8D 3D 03 AD 4A 03 29 A4
C0A8:07 8D 3E 03 AD 48 03 29 C6
C0B0:07 8D A7 02 38 A9 07 ED 92
C0B8:A7 02 8D 3F 03 AD 3C 03 7E
C0C0:0A AA BD 42 C1 8D 44 03 9D
C0C8:E8 BD 42 C1 8D 45 03 AD C7
C0D0:3D 03 0A AA BD 74 C1 8D 6E
C0D8:40 03 E8 BD 74 C1 8D 41 3B
C0E0:03 18 A9 00 6D 44 03 85 27
C0E8:FE A9 20 6D 45 03 85 FF 70
C0F0:1E A5 FE 6D 3E 03 85 FE A6
C0F8:A5 FF 69 00 85 FF 18 A5 7C
C100:FE 6D 40 03 85 FE A5 FF 0A
C108:6D 41 03 85 FF AE 3F 03 87
C110:BD C4 C1 8D 47 03 A0 00 3C
C118:B1 FE 2D 47 03 F0 08 A9 E3
C120:01 8D FF 02 4C 2C C1 A9 E7
C128:00 8D FF 02 B1 FE 48 AD F6
C130:FE 02 F0 07 68 0D 47 03 4B
C138:91 FE 60 68 4D 47 03 91 F5
C140:FE 60 00 00 40 01 80 02 64
C148:C0 03 00 05 40 06 80 07 5F
C150:C0 08 00 0A 40 0B 80 0C 12
C158:C0 0D 00 0F 40 10 80 11 C4
C160:C0 12 00 14 40 15 80 16 77

```

```

C168:C0 17 00 19 40 1A 80 1B 2A
C170:C0 1C 00 1E 00 00 08 00 4D
C178:10 00 18 00 20 00 28 00 58
C180:30 00 38 00 40 00 48 00 B5
C188:50 00 58 00 60 00 68 00 13
C190:70 00 78 00 80 00 88 00 70
C198:90 00 98 00 A0 00 A8 00 CD
C1A0:B0 00 B8 00 C0 00 C8 00 2B
C1A8:D0 00 D8 00 E0 00 E8 00 88
C1B0:F0 00 F8 00 00 01 08 01 E0
C1B8:10 01 18 01 20 01 28 01 ED
C1C0:30 01 38 01 01 02 04 08 D3
C1C8:10 20 40 80 A9 05 A2 08 1B
C1D0:A0 FF 20 BA FF A9 07 A2 AB
C1D8:F5 A0 02 20 BD FF A9 00 03
C1E0:85 FC A9 20 85 FD A9 FC 12
C1E8:AE F3 02 AC F4 02 20 D8 94
C1F0:FF 60 00 00 00 00 00 00 8C
    
```

Tom Zdanowicz is a 26-year-old film and video major at Phillips Junior College in Daytona Beach, Florida. When he's not at the beach, he enjoys writing software to prove the 64 can still keep up with the times.

MENU MAKER

By Rizwaan Ahmed Khan

Have you ever loaded a disk directory and been confused by what you see? All the program names, filenames, and data files can be confusing unless you use them every day. Does this program actually run, or is it a data file for another program? If you're fed up searching cluttered disk directories for programs, then you need Menu Maker.

This program for the 64 creates a menu from which you can boot programs. You specify the program names you want to appear on the menu, and Menu Maker does the rest.

Typing It In

Menu Maker 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 try to run it.

Getting Started

When you run Menu Maker, you'll be asked for the filenames of programs that you want to appear on your disk menu. At this point, make sure that you know the program filenames and that the desired disk is in the drive.

Enter all the filenames that you'd normally use to boot a program. Enter only the name of any boot programs. Do

not include any secondary programs or data files. Remember, the whole point is to keep your disk menu uncluttered for easy use.

When you have finished entering filenames, enter an asterisk (*) to quit. Once again, make sure that the desired disk is in the drive. Menu Maker will modify itself and save a new version to your disk under the filename MENU.

Once the process is complete, the READY prompt will appear, but your 64 will be locked up. Simply reboot it. To make use of the new menu, simply type LOAD "MENU",8,1 and press Return. The menu program will load and run automatically.

You'll then see a menu of the filenames that you entered. To select a program, highlight the desired program with the cursor keys or with a joystick plugged into either port. Run the highlighted program by pressing Return or the fire button.

Should you want to add additional programs to the menu at a later time, simply rerun Menu Maker. It will create a new version of the menu and delete the old one.

MENU MAKER

```

HJ 0 GOTO601: REM COPYRIGHT 19
93 - COMPUTE PUBLICATIONS
INTL LTD
GQ 5 F=0:DIMN$(50):PRINT"{CLR}
":POKE53281,0:POKE53280,2
:J=56320:K=56321
BK 6 Q=126:W=125:E=254:R=253:Y
=111:U=239:PRINTCHR$(142)
:PRINTCHR$(8)
XD 7 X$="{CYN}{RVS}{16 SPACES}
":Y$="{OFF}{16 SPACES}{6}
"
SQ 9 DATA,"{CYN}{RVS}
{16 SPACES}","{RVS}{CYN}
{16 SPACES}"
PG 190 READN$(F):IFN$(F)="*":TH
ENB=F-3:N$(F)=X$:F=F+1:
N$(F)=X$:GOTO200
FX 195 F=F+1:GOTO190
XK 200 PRINT"{HOME}{13 SPACES}
{YEL}{RVS}AUTO LOADER":
POKE198,3:L=1:OPEN15,8,
15,"I":CLOSE15
KG 210 PRINT"{5 DOWN}{5}{40 P}
"
XE 215 PRINT"{4 DOWN}{5}{40 Y}
"
QQ 216 PRINT"{6 DOWN}";"{3} US
E CURSOR KEYS OR JOYSTI
CK TO SELECT"
EH 217 PRINT"{DOWN}{5 SPACES}P
    
```

```

RESS 'RETURN' OR 'FIRE'
TO LOAD."
DQ 230 PRINT"{HOME}{5 DOWN}{6}
":I=L
KG 235 PRINT"{DOWN}{7 RIGHT}
{6}";N$(I);Y$:L=I:I=I+1
SK 240 PRINT"{7 RIGHT}";N$(I);
Y$:I=I+1
PH 245 PRINT"{7 RIGHT}{RVS}
{YEL}";N$(I);Y$:B$=N$(I
):I=I+1
FR 250 PRINT"{7 RIGHT}{6}";N$(
I);Y$:I=I+1
RH 255 PRINT"{7 RIGHT}";N$(I);
Y$:I=I+1
FK 405 IFPEEK(J)=QORPEEK(K)=ET
HENIFL<>LTHENL=L-1:GOTO
230
PS 410 IFPEEK(J)=WORPEEK(K)=RT
HENIFL<>BTHENL=L+1:GOTO
230
JS 415 IFPEEK(J)=YORPEEK(K)=UT
HEN500
KK 450 GETA$:IFA$="{DOWN}"THEN
IFL<>BTHENL=L+1:GOTO230
KQ 455 IFA$="{UP}"ORAS="{
RIGHT}"THENIFL<>LTHENL
=L-1:GOTO230
BH 460 IFA$=CHR$(13)THEN500
RD 470 GOTO405
PP 500 L=L+2:PRINT"{BLK}{CLR}
{HOME}LOAD";CHR$(34);N$(
L);CHR$(34);",8,1":PRI
NT"{4 DOWN}RUN"
JF 505 PRINT"{HOME}{11 DOWN}
{9 RIGHT}{PUR}LOADING :
{CYN}";N$(L);"{BLK}":P
RINTCHR$(9)
ME 510 POKE631,19:POKE632,13:P
OKE633,13:POKE198,3:END
CQ 600 POKE1024,18:POKE1025,1:
POKE1026,11:POKE1027,8:
POKE1028,1:POKE1029,14
JA 601 L=15:C=0
EA 602 PRINT"{CLR}{YEL}{DOWN}
MENU MAKER":POKE53281,0
:POKE53280,0
BB 603 PRINT"{DOWN} BY {RVS}R.
A.KHAN":IFX=1THEN620
HE 604 PRINT"{2 DOWN} PRESS '*'
TO STOP":PRINT"TYPE
{SPACE}IN FILENAME":INP
UTAS:L$=L$+A$+",
QM 605 PRINT"{BLK}";:C=C+1:IFA
$="*":THENX=1:GOTO607
PM 606 IFC<>4THEN602
BE 607 G=LEN(L$):L$=LEFT$(L$,G
-1):PRINT"{CLR}{HOME}";
L;"DATA";L$:L$=""
MQ 608 PRINT"L=L"+1:X="X":GOT
O602"
RQ 615 POKE631,19:POKE632,13:P
OKE633,13:POKE198,3:END
QG 620 PRINT"{CLR}{HOME}0 POKE
770,131:POKE771,164":PR
INT"GOTO 630"
RQ 622 POKE631,19:POKE632,13:P
    
```



```

OKE633,13:POKE198,3:END
CR 630 POKE198,0:C=600:Q=C+10
KE 631 PRINT"{CLR}{HOME}";
QA 632 PRINT"{YEL}";C:C=C+1:IF
C=QTHENPRINT"{BLK}C="C"
:Q=C+10:":GOTO634
MS 633 GOTO632
AE 634 PRINT"IFC=640THENPOKE19
8,0:RUN9900"
EH 635 PRINT"{2 DOWN}GOTO631":
GOTO636
AS 636 POKE631,19:FORJ=632TO64
4:POKEJ,13:NEXTJ:POKE19
8,13:END
BQ 9899 END
PG 9900 OPEN15,8,15,"I":CLOSE1
5:OPEN15,8,15,"S0:MENU
":CLOSE15
FQ 9905 PRINT"{CLR}{12 DOWN}
{12 RIGHT}BOOTING MENU
...."
AE 9910 POKE770,113:POKE771,16
8:POKE43,0:POKE44,3:SA
VE"MENU",8:END

```

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REDI-RITER 128

By Robert Nellist

The elaborate features of commercial word processors are great if you use them every day, but occasional writers often forget many of the complicated commands. Many times you have to pull out the instruction manual before you can write and print a simple document. As a consequence, many letters either never get written or are banged out on an old typewriter.

If you can identify with the above paragraph, Redi-Riter 128 is just for you. It's a simple-to-use word processor written entirely in BASIC 7.0, but you will need an 80-column monitor. To help avoid typing errors, enter Redi-Riter 128 with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you try to run it.

Starting to Write

Redi-Riter 128 loads in about two seconds from a 1571 drive. The commands are constantly displayed at the top of the screen, so there's seldom a need to refer to the instructions. This is a true WYSIWYG word processor with word-wrap and fast typing response. All you have to do is select a margin and start typing.

Since your letter prints line by line, it'll be ready for signing and mailing the instant you finish typing it. Just make sure your printer is ready when you start to write. Best of all, Redi-Riter 128 provides some welcome options that are usually lacking in the more elaborate word processors.

Unusual Features

There are four quick-set options available to you. An Option Status Bar, located just above the line numbers, provides important information such as when you can select an option and which one, if any, is in use. Only one option can be in effect at any given time.

The Tab key activates a paragraph indent. This option indents the first line of a paragraph, and the option stays in effect until you turn it off.

Ctrl-C selects single-line auto centering, and Ctrl-R selects single-line right justification. Single-line options accept six fewer characters than normal lines and must be ended by a Return. To select any one of the above options, be sure the Option Status Bar reads *OK to select*. You can then issue an appropriate command.

There is one more option that won't be used much for letter writing but is great for an outline, list, or index. This feature lets you lock in a left margin indent of up to 20 characters.

To activate it, first make sure the Option Status Bar is clear and then press the space bar up to 20 times to position the cursor at the desired indent. The Option Status Bar will help you by displaying the indent count. When you have defined the indent, press Ctrl-Tab to lock it in.

A document can contain as many different indents as you desire. To change the indent, you must turn off the option (see below) and then repeat the above procedure.

Pressing the Esc key immediately following a Return will turn off any option and permit another to be selected. (Single-line options are automatically turned off when you press Return.) The Esc key will also cancel any option you may have chosen accidentally, as long as you use it before typing.

Form feed occurs automatically after 55 lines or whenever Ctrl-F is pressed immediately following a Return. Each

line is numbered on the screen, so you'll always know where you are. A warning tone will sound for each of the last three lines on a page.

Limitations

Since each line is printed out as soon as it is completed, corrections must be made prior to printing. A beep warns you that a line will print after four more keypresses. When you hear this, it's a good idea to double-check the current line for errors.

You can go back and correct any errors by pressing the Inst/Del key and re-typing the remainder of the line. Just as with a conventional typewriter, Redi-Riter 128 won't be able to save your document to disk or make duplicate printouts. Save that job for your regular word processor.

Customizing

Its ease of customizing is one reason I like BASIC. CHR\$(12) is an almost universal printer command for form feed. If you have a form-feed problem, you can change this command in lines 110 and 470 to whatever command your printer requires. If you want the program to issue any whole-document printer commands (such as for NLQ), you can enter them in place of the REM statement in line 80. For example, to put my Panasonic printer in its NLQ mode, line 80 would read as follows.

```
PRINT#2,CHR$(27)CHR$(120)CHR$(1)
```

Miscellaneous Memoranda

Return is used to end paragraphs and the single-line options. You can also use it to create blank lines or to add more space at the top of a document. Press Ctrl-↑ to close the printer and end the program. If you have a document to send to the printer, be sure to use Ctrl-F first to issue a form feed.

REDI-RITER 128

```

BM 0 REM COPYRIGHT 1993 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
MM 10 CLR:FAST:DIMA$(80):N=1:L
=1:SP=1:COLOR5,1:COLOR6,
16:FORX=1TO39:P$=P$+"*":
NEXT
AQ 20 SYS49474:SYS65520,,6,20,
0:PRINT"* * *{2 SPACES}R
EDI - RITER

```

```

{2 SPACES}1 2 8
{2 SPACES}* * *
AA 30 SYS65520,,18,17,0:PRINT"
PLEASE ENTER A MARGIN VA
LUE BETWEEN 3 AND 20 ";:
INPUTM:LS=M:LM=M:RS=81-(
AD 40 PRINTCHR$(14)CHR$(147)"R
ETURN = END PARAGRAPH"SP
C(5)"CTRL-↑ = QUIT"SPC(6
)"INST/DEL = CORRECT IN
{SPACE}CURRENT LINE"
MD 50 PRINT"CTRL-TAB = LOCK IN
DENT AT CURSOR POSITION"
SPC(5)"TAB KEY = AUTO PA
RAGRAPH INDENT":PRINT"CT
RL-C = CENTER 1 LINE"SPC
(5)"ESC KEY = OPTION CAN
CEL"SPC(4);
CJ 60 PRINT"CTRL-R = RT.JUSTIF
Y 1 LINE":PRINT"BEEP = N
EAR END OF LINE"SPC(4)"T
ONE = NEAR END OF PAGE"SP
PC(4)"CTRL-F = FORCED FO
RM FEED"
DA 70 OPEN4,4,7:OPEN 2,4:SYS52
591:WINDOW0,4,79,24:PRIN
T
AA 80 REM:YOU CAN ENTER YOUR P
RINTER'S SPECIAL COMMAND
(S) HERE (SEE INSTRUCTIO
NS)
EM 90 FORX=NTORS:TRAP550:IFX=R
S-3THENSOUND1,7000,10
JQ 100 IFX=NANDL>52THENPLAY"V1
04T0U9X0B"
GQ 110 IFL=56THENPRINT#2,CHR$(
12):L=1:PRINTTAB(LM)PS
RB 120 IFRT=1ANDC=1THENX=RS:LS
=LS+4:RS=RS-4:RT=0:GOTO
420
PG 130 IFX=1THENS=0:SP=1:SYS51
794:GOSUB500
MH 140 IFX<N+2ORAS(1)=CHR$(32)
ANDB=0ANDC=0THENGOSUB51
0
PQ 150 AS(X)="":GETKEYAS(X):I=
ASC(AS(X)):IFI=34THENI=
39:AS(X)=CHR$(39)
GR 160 IFX=1THENBEGIN
XQ 170 IFR=1ANDI=32THEN150
MD 180 IFI=27THENX=RS:LS=M:LM=
M:RS=81-(LM+M):RT=0:C=0
:B=0:R=0:GOTO420
CJ 190 IFI=9ANDB=0ANDC=0THENC=
1:RT=1:B$=" PAR. INDENT
{SPACE}ON ":GOTO120
HX 200 IFI=3ANDB=0ANDC=0THENB=
1:LS=M+INT(RS/2):B$=" C
ENTERING ON{2 SPACES}":
GOTO130
EP 210 IFI=18ANDB=0ANDC=0THENB=
2:LS=M+RS-1:B$=" RT.JU
STIFY ON ":GOTO130
XJ 220 BEND:IFI=6ANDB=0THENL=5
6:GOTO110
HB 230 IFI=24ANDB=0ANDC=0ANDSP
=XANDX>LANDX<22THENC=2:
LM=M+X-1:X=RS:LS=LM:RS=
81-(LM+M):B$=" INDENT LO
CK ON ":N=1:GOTO420
AQ 240 IFI=32THENS=0:SP=SP+1
FQ 250 IFI=20ANDX>1THEN320
KG 260 IFI=30ANDX=1THEN430
XJ 270 IFI=30THENS=0:RS=X-1:GO
SUB440:GOTO430
JE 280 IFI=13THENA$(X)=CHR$(95
):I=95:GOTO300
CH 290 IFI<32ORI>96ANDI<193ORB
>0ANDX>RS-6THEN150
RB 300 IFB=1ANDX/2<>INT(X/2)OR
B>0ANDI=95THENLS=LS+1
BA 310 IFB>0THENC=C$+AS(X):LS
=LS-1:SYS51794:GOSUB500
:PRINTC$;:GOTO360
HS 320 PRINTAS(X);:IFI=20THENB
EGIN
FG 330 IFB=1ANDX/2=INT(X/2)THE
NLS=LS-1
HR 340 IFB>0THENLL=LEN(C$)-1:C
$=LEFT$(C$,LL):LS=LS+1
QP 350 BEND:X=X-2:S=S-1:SP=SP-
1:GOTO420
JK 360 IFI=95THENBEGIN:C$="" :B
=0:N=1:S=0:RT=1:L=L+1
EE 370 IFX=1THENX=RS:PRINT#4:L
S=LM:RS=81-(LM+M):R=0:P
RINT:GOTO420
FQ 380 BEND:RS=X-1:GOSUB440:X=
RS:GOTO420
FD 390 IFX=RSANDS=0ORX=RSANDI>
40ANDI<48ORX=RSANDI>57A
NDI<60ORX=RSANDI=33ORX=
RSANDI=63THENS=0:GOSUB4
40:N=1:L=L+1:R=1:GOTO42
0
HC 400 IFX=RSTHENGOSUB440:N=S+
1:L=L+1:GOTO420
RS 410 S=S+1
SS 420 NEXT:GOTO90
FA 430 CLOSE4:CLOSE2:SYS52639:
PRINTCHR$(142)CHR$(19)C
HR$(19)CHR$(147):END
AR 440 R=0:FORZ=1TORS-S:IFZ=1T
HENPRINT#4,""SPC(LS);
JF 450 PRINT#4,AS(Z);:NEXT:J=1
DE 460 PRINT#4:IFS=0THENPRINT:
LS=LM:RS=81-(LM+M):RETU
RN
QS 470 FORV=1TOS:PRINTCHR$(20)
;:NEXT:IFL=55THENPRINT#
2,CHR$(12):PRINT:PRINTT
AB(LM)PS;:L=0
AE 480 PRINT:PRINTCHR$(18)L+1C
HR$(146)CHR$(157)TAB(LM
);
GS 490 FORV=RS-(S-1)TORS:AS(J)
=AS(V):PRINTAS(J);:J=J+
1:NEXT:LS=LM:RS=81-(LM+
M):RETURN
EC 500 PRINTCHR$(18)LCHR$(146)
CHR$(157)TAB(LS);:RETUR
N
QB 510 SYS65520,,,,1:RREG,G,H:
IFB=0ANDC=0ANDR=0THENB$
=" OK TO SELECT
{2 SPACES}":ELSE540
QJ 520 IFX>1THENB$=" DO NOT SE
LECT{3 SPACES}"
QF 530 IFX>1ANDX<22ANDSP=XTHEN
B$=" INDENT COUNT"+STR$(
X-1)+CHR$(32)
SR 540 PRINTCHR$(19)CHR$(18)BS
CHR$(146);:SYS65520,,G,
H,0:RETURN
RE 550 IFR=30THENRESUME:ELSEP
RINT:PRINTERR$(ER)EL:ST
OP

```

Robert Nellist, the author of *Ancestry* (January 1993), is an avid letter writer. He lives in Brockport, New York.

DOUBLE DUB 1541

By Daniel Lightner

With this utility program and two 1541 disk drives, you can make duplicate copies of any disk that doesn't contain copy protection.

Double Dub 1541 is written in machine language, but it loads and runs like a BASIC program. To enter it, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following addresses.

Starting address: 0801

Ending address: 0D58

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

Copying Disks

When you run Double Dub 1541, it prompts you to place the source disk in disk drive number 8. This is the disk that you wish to copy. Place the disk in drive 8 and press the space bar. At this point Double Dub 1541 reads the disk name and ID.

It then prompts you to place the target disk in drive 9. Put a blank disk in drive 9 and press the space bar. There is no need to use a formatted disk. Double Dub 1541 automatically formats the disk for you and copies the contents of the disk in drive 8 to the disk in drive 9. The screen will blank while the actual copying is taking place.

The program will inform you when the copy is complete. You will be asked if you wish to make more cop-

ies. If you do, tap the Y key. If you don't, tap the N, and Double Dub 1541 returns you to BASIC.

DOUBLE DUB 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 20 22 0B 20 DD
0819:CC FF A9 FF 8D 54 0D A9 46
0821:20 8D B2 02 20 41 0A 20 55
0829:30 0B A9 08 20 B1 FF A9 3B
0831:6F 85 B9 20 93 FF A0 00 71
0839:B9 39 0C 20 A8 FF C8 C0 8F
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 44 0C 20 56
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 A9 96
0899:02 20 C3 FF 20 56 0A 20 B9
08A1:5A 0B 20 66 0A 20 30 0B 48
08A9:20 45 0B 4C 4E 09 AE 54 89
08B1:0D 20 91 0B A9 08 20 B1 92
08B9:FF A9 6F 85 B9 20 93 FF EF
08C1:A0 00 B9 4D 0C 20 A8 FF 60
08C9:C8 C0 07 D0 F5 20 0F 0A B4
08D1:20 AE FF A2 02 20 C6 FF E5
08D9:A0 00 20 CF FF 99 55 0D 59
08E1:C8 C0 00 D0 F5 20 A8 09 1E
08E9:A2 03 20 C9 FF A9 09 20 85
08F1:B1 FF A9 6F 85 B9 20 93 ED
08F9:FF A0 00 B9 5B 0C 20 A8 C1
0901:FF C8 C0 07 D0 F5 20 AE 1B
0909:FF A2 03 20 C9 FF A0 00 B5
0911:B9 55 0D 20 D2 FF C8 C0 E1
0919:00 D0 F5 A9 09 20 B1 FF E4
0921:A9 6F 85 B9 20 93 FF A0 20
0929:00 B9 54 0C 20 A8 FF C8 61
0931:C0 07 D0 F5 20 0F 0A 20 50
0939:AE FF 20 85 09 AD CF 02 9F
0941:CD CB 02 D0 1F AD CD 02 C7
0949:CD C7 02 D0 11 AE 54 0D 7A
0951:E8 8E 54 0D E0 07 F0 03 DE
0959:4C AF 08 4C FA 0A 20 75 F8
0961:09 4C B5 08 20 6B 09 4C 4F
0969:B5 08 18 AD CF 02 69 01 90
0971:8D CF 02 60 18 AD CD 02 99
0979:69 01 8D CD 02 18 A9 00 D2
0981:8D CF 02 60 A9 09 20 B4 FA
0989:FF A9 6F 85 B9 20 96 FF C7
0991:20 A5 FF 8D E0 02 C9 30 C8
0999:D0 30 20 A5 FF 8D E1 02 7A
09A1:C9 30 D0 2C 4C AB FF A9 3C
09A9:08 20 B4 FF A9 6F 85 B9 2E
09B1:20 96 FF 20 A5 FF 8D E0 A4
09B9:02 C9 30 D0 0D 20 A5 FF 86
09C1:8D E1 02 C9 30 D0 09 4C 13
09C9:AB FF 20 A5 FF 8D E1 02 0C
09D1:A0 02 20 A5 FF 99 E0 02 3D
09D9:C8 C9 0D D0 F5 20 AB FF F8
09E1:A9 08 20 C3 FF 20 A6 0A E2
09E9:20 CC FF A9 0D 20 D2 FF 68
09F1:A9 1D 20 D2 FF 20 D2 FF 77
09F9:A0 00 B9 E0 02 20 D2 FF D7

```

```

0A01:C8 C9 0D D0 F5 68 68 68 25
0A09:68 A0 17 4C FF 0A AE CD 74
0A11:02 A9 00 20 B0 0B A0 00 85
0A19:B9 FB 02 20 A8 FF C8 CC EE
0A21:B0 02 D0 F4 A9 20 20 A8 2E
0A29:FF AE CF 02 A9 00 20 B0 41
0A31:0B A0 00 B9 FB 02 20 A8 5F
0A39:FF C8 CC B0 02 D0 F4 60 C1
0A41:A0 00 B9 68 0C 20 D2 FF E9
0A49:C8 C0 2D D0 F5 20 E4 FF 9E
0A51:C9 20 D0 F9 60 A0 00 B9 4B
0A59:94 0C 20 D2 FF C8 C0 2D BD
0A61:D0 F5 4C 4E 0A AD 11 D0 C3
0A69:29 EF 8D 11 D0 A9 08 20 2E
0A71:B1 FF A9 6F 85 B9 20 93 71
0A79:FF A0 00 B9 62 0C 20 A8 7D
0A81:FF C8 C0 03 D0 F5 20 AE 5D
0A89:FF A9 09 20 B1 FF A9 6F 7B
0A91:85 B9 20 93 FF A0 00 B9 50
0A99:62 0C 20 A8 FF C8 C0 03 18
0AA1:D0 F5 4C AE FF A9 02 20 DA
0AA9:C3 FF A9 03 20 C9 FF A2 B7
0AB1:00 20 C9 FF A2 00 20 C6 23
0AB9:FF AD 11 D0 09 10 8D 11 1D
0AC1:D0 A9 08 20 B1 FF A9 6F FB
0AC9:85 B9 20 93 FF A0 00 B9 88
0AD1:65 0C 20 A8 FF C8 C0 03 D1
0AD9:D0 F5 20 AE FF A9 09 20 9B
0AE1:B1 FF A9 6F 85 B9 20 93 E1
0AE9:FF A0 00 B9 65 0C 20 A8 06
0AF1:FF C8 C0 03 D0 F5 4C AE 26
0AF9:FF 20 A6 0A A0 00 B9 C0 C4
0B01:0C 20 D2 FF C8 C0 33 D0 FF
0B09:F5 20 E4 FF C9 00 F0 F9 E8
0B11:C9 4E F0 07 C9 59 F0 06 C9
0B19:4C 0A 0B 4C E2 FC 4C 18 B9
0B21:08 A0 00 B9 F3 0C 20 D2 E1
0B29:FF C8 C0 61 D0 05 F6 0A 68
0B31:01 A2 38 A0 0C 20 BD FF DD
0B39:A9 02 A2 08 A0 02 20 BA 81
0B41:FF 4C C0 FF A9 01 A2 38 51
0B49:A0 0C 20 BD FF A9 03 A2 E1
0B51:09 A0 03 20 BA FF 4C C0 A5
0B59:FF A9 4E 8D 35 03 A9 30 B5
0B61:8D 36 03 A9 3A 8D 37 03 40
0B69:18 AD 34 03 69 03 8D 34 54
0B71:03 AD 34 03 A2 35 A0 03 59
0B79:20 BD FF A9 0F A2 09 A0 5F
0B81:0F 20 BA FF 20 C0 FF A9 2C
0B89:0F 20 C3 FF 20 A8 09 60 BD
0B91:BD 1C 0C 8D C5 02 8D CD 07
0B99:02 BD 23 0C 8D C7 02 BD 92
0BA1:2A 0C 8D C9 02 8D CF 02 06
0BA9:BD 31 0C 8D CB 02 60 8D F9
0BB1:B4 02 8E B3 02 A2 00 8E D8
0BB9:B0 02 A2 09 8E B5 02 A0 7D
0BC1:B0 AD B3 02 DD FC 0B AD D8
0BC9:B4 02 FD FD 0B 0F 8D A0
0BD1:B4 02 AD B3 02 FD FC 0B C0
0BD9:8D B3 02 C8 D0 E3 98 CA 82
0BE1:F0 11 C9 B0 F0 03 8D B5 5D
0BE9:02 2C B5 02 30 05 AD B2 86
0BF1:02 F0 05 29 7F 20 07 0C 0F
0BF9:CA 10 C4 60 01 00 0A 00 34
0C01:64 00 E8 03 10 27 8C B1 80
0C09:02 AC B0 02 99 FB 02 C9 0E
0C11:20 F0 04 C8 8C B0 02 AC 5A
0C19:B1 02 60 01 09 11 12 19 70
0C21:1A 1F 08 10 11 18 19 1E 49
0C29:23 00 00 00 00 00 00 00 D2

```

```

0C31:14 14 14 12 11 11 10 23 0C
0C39:55 31 20 32 20 30 20 31 A2
0C41:38 20 30 42 2D 50 20 32 C4
0C49:20 31 34 34 55 31 20 32 69
0C51:20 30 20 55 32 20 33 20 77
0C59:30 20 42 2D 50 20 33 20 36
0C61:30 55 49 2D 55 49 2B 0D 16
0C69:9A 20 50 55 54 20 1C 53 E4
0C71:4F 55 52 43 45 20 9A 44 29
0C79:49 53 4B 20 49 4E 20 44 7E
0C81:52 49 56 45 20 38 20 1C 72
0C89:50 52 45 53 53 20 53 50 4E
0C91:41 43 45 0D 9A 20 50 55 5F
0C99:54 20 1C 54 41 52 47 45 D3
0CA1:54 20 9A 44 49 53 4B 20 D1
0CA9:49 4E 20 44 52 49 56 45 EB
0CB1:20 39 20 1C 50 52 45 53 97
0CB9:53 20 53 50 41 43 45 0D A1
0CC1:96 20 20 43 4F 50 59 20 F3
0CC9:43 4F 4D 50 4C 45 54 45 6B
0CD1:44 20 21 21 21 0D 0D 9A 3C
0CD9:20 20 4D 41 4B 45 20 41 B8
0CE1:4E 4F 54 48 45 52 20 43 FA
0CE9:4F 50 59 3F 20 1C 59 2F 30
0CF1:4E 0D 96 93 0D 20 20 44 ED
0CF9:4F 55 42 4C 45 20 44 55 A4
0D01:42 42 45 52 20 31 35 34 FE
0D09:31 0D 9A 20 20 43 4F 50 51
0D11:59 52 49 47 48 54 20 31 0F
0D19:39 39 33 0D 20 43 4F AC
0D21:4D 50 55 54 45 20 50 55 86
0D29:42 4C 49 43 41 54 49 4F 12
0D31:4E 53 20 49 4E 54 4C 20 5C
0D39:4C 54 44 0D 20 41 4C 38
0D41:4C 20 52 49 47 48 54 53 BF
0D49:20 52 45 53 45 52 56 45 4B
0D51:44 0D 0D FF EA 00 00 00 C9

```

Daniel C. Lightner is a prolific programmer who lives in Sidney, Montana.

EXPLORER 64

By Michael Bolin

You look around furtively, hoping to see a passage through the tangled mass of rocks and trees. Suddenly you spy a opening in the bushes. You dash through it and pounce on the yellow stone lying on the ground. There! You've finally managed to recover that jewel. Now it's time to explore another maze to find the next jewel.

Explorer is a one-player game for the 64 written entirely in machine language. To enter it, use MLX, COMPUTE's machine language entry program. When MLX prompts, respond with the following addresses.

Starting address: C000
Ending address: C98F

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

Into the Maze

Load Explorer with the ,8,1 extension and then run it by typing *SYS 49152*. You'll be presented with a menu. Use a joystick plugged into port 2 to move the green arrow up and down the menu. Press the fire button to select your option.

The first time you select Play from the menu, don't be surprised if you see a window filled with gray @ symbols and reversed Commodore B characters. This is because these characters normally are in memory after you turn on the computer.

You'll also see a purple diamond in the center of this window. This diamond indicates the position of your explorer. You can move the diamond across a huge map.

The two numbers in the upper left of the screen indicate your explorer's status. If either of these numbers reaches 0, the game is over.

On the map, you may encounter characters that raise or lower your statistics. Other characters will stop your movement completely, kill you on touch, speed you up, slow you down, or slow you only when you are touching them. If you touch a certain character, your player collects the jewel and wins the game. To exit a game, pull down on the joystick and simultaneously press the fire button.

Other Menu Selections

If you select Edit from the menu, a window twice as large as the playing window will appear with a purple diamond in the center. This will let you design your own screens to explore.

All 256 characters in the character set appear in the upper left of the screen. One of the characters (usually the ball) will be highlighted. Use the joystick to move around the map. Press the fire button to place the highlighted character on the screen beneath the cursor.

In the editing mode, press Q to select a different character. This shifts joystick control from the playing screen to the character table. You can now move the joystick to select different characters. Then, when you press the fire button, that character will appear onscreen. If you hold down the fire button while moving the joystick,

you can place a continuous string of characters onscreen.

Press Q again and notice that the cursor stops blinking. You can now change character color by pressing the back-arrow key. Notice that all like characters onscreen will change to the new color. You can return to the menu at any time by tapping the A key.

Stop, Go, Destroy

From the editor screen, press the space bar to change the attributes of the highlighted character. You have a choice of eight possible actions that will occur whenever your game character makes contact. You can choose to stop movement, reduce food, reduce life, disappear, destroy, speed up, slow down, or slow temporarily. A plus sign following the action name indicates that it's active; a minus sign means that it's turned off. Press the appropriate number key to toggle the plus and minus signs. Press A when the character is the way you want it.

Select Save from the menu to save your current game. The program will ask for a filename. The character attributes are saved along with the map. The map is huge, so be sure you have at least 93 blocks free on your disk.

Select Load to load a previously saved game. When the game prompts you for a filename, insert the disk on which you have saved a game, type in the filename, and press Return. You can then play the game or edit it.

Quit returns you to BASIC, but you may return to the game by typing *SYS 49152*. Since the game resets an important BASIC pointer, it's better to reset the computer when you've finished.

More Control

When you have designed a game, select Quit from the menu. You can now select the character that you need to locate to win. Select this character by entering *POKE 51550, character*. For the designated character, enter any of the Commodore screen characters.

Here are some other POKES to alter gameplay. Remember to enter values between 1 and 255 when poking numbers for speed, food, and life.

Starting speed: *POKE 51547, speed*

Starting food: *POKE 51549, food*

Starting life: *POKE 51548, life*

Character to increase food: *POKE 51582, character*

Character to increase life: *POKE 51583, character*

Character that appears when you hit a character that has the Disappear option on: *POKE 51572, character*.

When you've finished customizing your game, type *SYS 49152* to return to the action.

Design

To construct interesting adventure screens, you need to use the right characters and colors. For example, change the cursor color to green and then press Shift-Q to make symbols for a forest. The following key and color suggestions should help.

Water: blue reverse Space

Path: brown Commodore key++

Bricks: red reverse Shift-@

Lava: pink Shift-V

Plain: yellow semicolon (;)

Field: green Shift-3

Explorer is compact, using only 2448 bytes of memory at 49152 (\$C000), but it gives you an infinite number of games—thanks to its editor. It's fun to create a great adventure and then let someone who hasn't seen it play it.

EXPLORER

```

C000:A9 00 8D C6 C6 8D C7 C6 37
C008:20 5B FF A9 4B 8D C5 C6 ED
C010:A9 42 85 38 A9 0A 8D 59 15
C018:C9 8D 5A C9 A2 04 8E 88 94
C020:02 CA CA 8E 20 D0 CA 8E FF
C028:86 02 CA 8E 21 D0 CA 8E 20
C030:8A 02 8E 91 02 A2 EC A0 77
C038:C8 20 84 C6 20 DB C0 4C 61
C040:99 C5 AD 5B C9 8D C5 C6 42
C048:A9 01 8D 86 02 20 44 E5 F7
C050:AD 5D C9 8D 75 C8 AD C6 03
C058:C6 18 69 03 8D C6 C6 AD 63
C060:C7 C6 18 69 03 8D C7 C6 B5
C068:A9 EF 8D 76 C8 A9 00 8D 52
C070:57 C9 AD C5 C6 8D 58 C9 09
C078:A9 05 8D 59 C9 8D 5A C9 5A
C080:AD 5C C9 8D 6D C8 20 E3 B4
C088:C0 A2 60 A0 C9 20 84 C6 C7
C090:A2 00 A0 05 18 20 F0 FF EA
C098:A9 00 AE 6D C8 20 CD BD BB
C0A0:A2 01 A0 05 18 20 F0 FF 3B
C0A8:A9 00 AE 75 C8 20 CD BD 4C
C0B0:20 5A C1 20 78 C6 AD 57 A4
C0B8:C9 C9 01 F0 11 C9 02 D0 45
C0C0:C5 A2 B1 A0 C8 20 84 C6 A4
C0C8:20 DB C0 4C 08 C0 A2 77 2E
C0D0:A0 C8 20 84 C6 20 DB C0 50
C0D8:4C 08 C0 AD 00 DC C9 7F FB
    
```

MARKOV

C0E0:F0 F9 60 20 21 C1 AE 59 2E	C310:8D 57 C9 60 AD C5 C6 C9 4F	C540:86 C5 4C BE C4 A9 2B 8D A6
C0E8:C9 AC 5A C9 B1 02 91 04 1F	C318:FF F0 03 8D 58 C9 A9 FF 52	C548:B4 04 A9 08 20 86 C5 4C D7
C0F0:85 0A 98 48 A4 0A B9 C8 D8	C320:8D C5 C6 60 AD C5 C6 8D 5E	C550:BE C4 A9 2B 8D DC 04 A9 E5
C0F8:C6 85 0A 68 A8 A5 0A 91 88	C328:58 C9 C9 01 F0 09 CE C5 A6	C558:10 20 86 C5 4C BE C4 A9 B1
C100:06 88 10 E8 8A 48 A2 02 F5	C330:C6 AD C5 C6 8D 58 C9 60 6D	C560:2B 8D 04 05 A9 20 20 86 4A
C108:A9 96 20 9E C6 A2 04 A9 66	C338:AD C5 C6 8D 58 C9 C9 FF 37	C568:C5 4C BE C4 A9 2B 8D 2C 4F
C110:28 20 9E C6 A2 06 A9 28 98	C340:F0 F5 EE C5 C6 AD C5 C6 37	C570:05 A9 40 20 86 C5 4C BE 95
C118:20 9E C6 68 AA CA 10 C9 1D	C348:8D 58 C9 60 A9 19 8D C5 7E	C578:C4 A9 2B 8D 54 05 A9 80 99
C120:60 A9 26 85 04 A9 05 85 B1	C350:C6 20 44 E5 20 E3 C0 A9 E5	C580:20 86 C5 4C BE C4 85 0A 59
C128:05 A9 26 85 06 A9 D9 85 C5	C358:5A 8D F3 05 A9 04 8D F3 AB	C588:AC 40 9D B9 40 9C 45 0A D2
C130:07 A9 00 85 02 A9 40 85 B6	C360:D9 A0 00 98 99 00 04 A9 05	C590:99 40 9C 60 85 C6 4C 54 C6
C138:03 AD C7 C6 F0 0F A8 A5 C8	C368:01 99 00 D8 88 D0 F4 AC 82	C598:C3 A2 A9 A0 C6 20 84 C6 74
C140:02 18 69 96 85 02 90 02 B8	C370:C8 C7 B9 C8 C6 99 00 D8 87	C5A0:A9 0B 85 FB A9 04 85 FC 99
C148:E6 03 88 D0 F2 A5 02 18 68	C378:A9 00 85 C6 20 78 C6 AD 10	C5A8:A9 1F A0 00 91 FD 20 78 1A
C150:6D C6 C6 85 02 90 02 E6 AA	C380:00 DC 85 02 29 01 F0 2E 6D	C5B0:C6 AD 00 DC C9 7D F0 0E 0D
C158:03 60 A9 5A 8D 78 05 A9 52	C388:A5 02 29 02 F0 2B A5 02 2A	C5B8:C9 7E F0 20 C9 6F F0 32 09
C160:04 8D 78 D9 A0 FF AD 00 56	C390:29 04 F0 2E A5 02 29 08 3E	C5C0:4C A8 C5 4C A8 C5 A5 FB BD
C168:DC C9 7F D0 03 88 D0 F6 9C	C398:F0 25 A5 02 29 10 F0 1C 3E	C5C8:C9 AB F0 F7 A9 20 A0 00 D0
C170:C9 7E F0 20 C9 7D F0 23 E1	C3A0:A5 C5 C9 3C F0 1F C9 3E 3F	C5D0:91 FB A5 FB 18 69 28 85 D4
C178:C9 77 F0 26 C9 7B F0 29 86	C3A8:F0 24 C9 4A F0 1D 4C 54 74	C5D8:FB 4C C3 C5 A5 FB C9 0B 06
C180:C9 6D F0 0B A9 00 8D 73 EE	C3B0:C3 D0 A1 4C 00 00 4C D4 B4	C5E0:F0 E1 A0 00 A9 20 91 FB 5E
C188:C8 8D 74 C8 4C D0 C2 68 82	C3B8:C3 4C DF C3 4C EF C3 4C 63	C5E8:A5 FB 38 E9 28 85 FB 4C 87
C190:68 4C 08 C0 A0 81 A2 00 B8	C3C0:08 C4 4C 15 C4 20 95 C4 EE	C5F0:C3 C5 A5 FB C9 AB F0 0F 32
C198:4C AD C1 A0 01 A2 00 4C CE	C3C8:4C 4C C3 4C 08 C0 20 23 6D	C5F8:C9 83 F0 13 C9 5B F0 12 49
C1A0:AD C1 A0 00 A2 01 4C AD DE	C3D0:C4 4C 54 C3 AD C7 C6 F0 9F	C600:C9 33 F0 11 4C 42 C0 A9 05
C1A8:C1 A0 00 A2 81 AD C5 C6 74	C3D8:13 CE C7 C6 4C 8E C3 AD D4	C608:01 8D 86 02 4C 44 E5 4C F5
C1B0:C9 FF F0 06 AD C5 C6 8D 37	C3E0:C7 C6 C9 90 F0 06 EE C7 85	C610:20 C6 4C 37 C6 A9 00 8D C6
C1B8:58 C9 AD C6 C6 8D 6F C8 11	C3E8:C6 4C 8E C3 4C 54 C3 20 50	C618:C6 C6 8D C7 C6 4C 4C C3 AC
C1C0:8D 71 C8 AD C7 C6 8D 70 40	C3F0:21 C1 A0 05 A2 02 A9 97 E5	C620:20 46 C6 A9 F2 85 FB A9 12
C1C8:C8 8D 72 C8 8E 73 C8 8C 4F	C3F8:20 9E C6 88 D0 F6 AD C8 20	C628:42 85 FC A9 FB A2 40 A0 FD
C1D0:74 C8 AD 73 C8 30 08 F0 B5	C400:C7 A0 00 91 02 4C 54 C3 5C	C630:9D 20 D8 FF 4C 08 C0 20 D3
C1D8:09 EE 6F C8 4C E2 C1 CE 57	C408:AD C6 C6 C9 90 F0 11 EE E8	C638:46 C6 A9 00 A2 F2 A0 42 34
C1E0:6F C8 AD 74 C8 30 08 F0 53	C410:C6 C6 4C 9A C3 AD C6 C6 0B	C640:20 D5 FF 4C 08 C0 A2 61 02
C1E8:09 EE 70 C8 4C F2 C1 CE C7	C418:F0 06 CE C6 C6 4C 9A C3 42	C648:A0 C0 20 84 C6 20 60 A5 C1
C1F0:70 C8 AD 6F C8 C9 94 F0 13	C420:4C 54 C3 A0 00 98 99 00 FC	C650:A0 00 B9 00 02 F0 60 99 DE
C1F8:15 C9 02 F0 11 8D C6 C6 DB	C428:04 A9 01 99 00 D8 88 D0 1D	C658:80 C9 C8 D0 F5 C0 00 F0 62
C200:AD 70 C8 C9 94 F0 07 C9 6E	C430:F4 AC C8 C7 B9 C8 C6 99 0D	C660:E5 C0 11 B0 E1 98 48 A9 E9
C208:02 F0 03 8D C7 C6 20 21 BE	C438:00 D8 20 78 C6 AD 00 DC 4D	C668:01 A2 08 A0 00 20 BA FF 20
C210:C1 A0 02 A2 02 A9 97 20 0F	C440:C9 7E F0 32 C9 6F F0 3A B7	C670:68 A2 80 A0 C9 4C BD FF EF
C218:9E C6 88 D0 F6 A0 00 AD A4	C448:C9 7D F0 37 C9 77 F0 3F F4	C678:AE C5 C6 A0 00 88 D0 FD 73
C220:71 C8 8D C6 C6 AD 72 C8 49	C450:C9 7B F0 1C A5 C5 C9 39 8E	C680:CA D0 F8 60 8E 8D C6 8C 91
C228:8D C7 C6 B1 02 CD 5E C9 28	C458:D0 E3 AE C8 C7 FE C8 C6 38	C688:8E C6 A0 00 B9 FF FF F0 E1
C230:D0 05 A9 02 8D 57 C9 B1 C3	C460:20 E3 C0 A9 5A 8D F3 05 9B	C690:0C 20 D2 FF C8 D0 F5 EE EA
C238:02 CD 7E C9 D0 06 EE 75 90	C468:A9 04 8D F3 D9 4C 23 C4 C3	C698:8E C6 4C 8C C6 60 18 75 CE
C240:C8 20 06 C3 B1 02 CD 7F DF	C470:CE C8 C7 4C 23 C4 AD C8 A1	C6A0:00 95 00 B0 01 60 F6 01 17
C248:C9 D0 06 EE 6D C8 20 06 6B	C478:C7 38 E9 28 8D C8 C7 4C 1F	C6A8:60 1E 93 9F 50 4C 41 59 E9
C250:C3 A8 B9 40 9C 29 01 F0 99	C480:23 C4 60 AD C8 C7 18 69 B2	C6B0:0D 45 44 49 54 0D 4C 4F F1
C258:03 20 E1 C2 B9 40 9C 29 01	C488:28 8D C8 C7 4C 23 C4 EE 86	C6B8:41 44 4D 53 41 56 45 0D C9
C260:02 F0 03 20 EE C2 B9 40 BB	C490:C8 C7 4C 23 C4 A9 01 8D 88	C6C0:51 55 49 54 00 00 00 00 BA
C268:9C 29 04 F0 03 20 FD C2 6D	C498:86 02 20 44 E5 AD C8 C7 6D	C6C8:0F 0F 0F 0F 0F 0F 0F 0F 56
C270:B9 40 9C 29 08 F0 03 20 33	C4A0:8D 40 9D A2 C9 A0 C7 20 5F	C6D0:0F 0F 0F 0F 0F 0F 0F 0F 5E
C278:06 C3 B9 40 9C 29 10 F0 C7	C4A8:84 C6 A9 00 AE 40 9D 20 2D	C6D8:0F 0F 0F 0F 0F 0F 0F 0F 66
C280:03 20 0E C3 B9 40 9C 29 BE	C4B0:CD BD A9 0D 20 D2 FF A2 85	C6E0:0F 0F 0F 0F 0F 0F 0F 0F 6E
C288:20 F0 03 20 24 C3 B9 40 A0	C4B8:DE A0 C7 20 84 C6 A9 3C A3	C6E8:0F 0F 0F 0F 0F 0F 0F 0F 76
C290:9C 29 40 F0 03 20 38 C3 92	C4C0:85 FB A9 04 85 FC A9 01 F5	C6F0:0F 0F 0F 0F 0F 0F 0F 0F 7E
C298:B9 40 9C 29 80 F0 06 20 25	C4C8:85 08 AC 40 9D B9 40 9C A1	C6F8:0F 0F 0F 0F 0F 0F 0F 0F 86
C2A0:14 C3 4C AB C2 AD 58 C9 AC	C4D0:25 08 F0 09 A9 2B A0 00 D8	C700:0F 0F 0F 0F 0F 0F 0F 0F 8F
C2A8:8D C5 C6 B1 02 C9 E0 D0 24	C4D8:91 FB 4C E3 C4 A9 2D A0 B9	C708:0F 0F 0F 0F 0F 0F 0F 0F 97
C2B0:03 EE 75 C8 AD 6F C8 C9 35	C4E0:00 91 FB A2 FB A9 28 20 6F	C710:0F 0F 0F 0F 0F 0F 0F 0F 9F
C2B8:94 F0 07 C9 02 F0 03 8D A9	C4E8:9E C6 18 06 08 90 DB A9 BA	C718:0F 0F 0F 0F 0F 0F 0F 0F A7
C2C0:C6 C6 AD 70 C8 C9 94 F0 9F	C4F0:00 85 C6 A5 C6 F0 FC A5 A8	C720:0F 0F 0F 0F 0F 0F 0F 0F AF
C2C8:07 C9 02 F0 03 8D C7 C6 38	C4F8:C5 C9 38 F0 21 C9 3B F0 85	C728:0F 0F 0F 0F 0F 0F 0F 0F B7
C2D0:AD 75 C8 D0 03 20 0E C3 29	C500:2A C9 08 F0 33 C9 0B F0 EA	C730:0F 0F 0F 0F 0F 0F 0F 0F BF
C2D8:CE 76 C8 D0 03 CE 75 C8 90	C508:3C C9 10 F0 45 C9 13 F0 9D	C738:0F 0F 0F 0F 0F 0F 0F 0F C7
C2E0:60 AD 71 C8 8D 6F C8 AD 26	C510:4E C9 18 F0 57 C9 1B F0 50	C740:0F 0F 0F 0F 0F 0F 0F 0F CF
C2E8:72 C8 8D 70 C8 60 AD 75 2B	C518:60 C9 0A D0 56 60 A9 2B 4B	C748:0F 0F 0F 0F 0F 0F 0F 0F D7
C2F0:C8 F0 04 CE 75 C8 60 A9 BD	C520:8D 3C 04 A9 01 20 86 C5 F7	C750:0F 0F 0F 0F 0F 0F 0F 0F DF
C2F8:01 8D 57 C9 60 AD 6D C8 47	C528:4C BE C4 A9 2B 8D 64 04 19	C758:0F 0F 0F 0F 0F 0F 0F 0F E7
C300:F0 F5 CE 6D C8 60 A0 00 37	C530:A9 02 20 86 C5 4C BE C4 1F	C760:0F 0F 0F 0F 0F 0F 0F 0F EF
C308:AD 74 C9 91 02 60 A9 01 BB	C538:A9 2B 8D 8C 04 A9 04 20 CC	C768:0F 0F 0F 0F 0F 0F 0F 0F F7

PROGRAMS

C770:0F 0F 0F 0F 0F 0F 0F 0F FF
 C778:0F 0F 0F 0F 0F 0F 0F 0F 08
 C780:0F 0F 0F 0F 0F 0F 0F 0F 10
 C788:0F 0F 0F 0F 0F 0F 0F 0F 18
 C790:0F 0F 0F 0F 0F 0F 0F 0F 20
 C798:0F 0F 0F 0F 0F 0F 0F 0F 28
 C7A0:0F 0F 0F 0F 0F 0F 0F 0F 30
 C7A8:0F 0F 0F 0F 0F 0F 0F 0F 38
 C7B0:0F 0F 0F 0F 0F 0F 0F 0F 40
 C7B8:0F 0F 0F 0F 0F 0F 0F 0F 48
 C7C0:0F 0F 0F 0F 0F 0F 0F 0F 50
 C7C8:51 05 93 43 55 52 52 45 C6
 C7D0:4E 54 20 43 48 41 52 41 02
 C7D8:43 54 45 52 3A 00 31 2E 4F
 C7E0:20 53 54 4F 50 53 20 4D 32
 C7E8:4F 56 45 4D 45 4E 54 0D 4C
 C7F0:32 2E 20 52 45 44 55 43 77
 C7F8:45 53 20 46 4F 4F 44 0D B5
 C800:33 2E 20 52 45 44 55 43 09
 C808:45 53 20 4C 49 46 45 20 E7
 C810:0D 34 2E 20 44 49 53 41 2C
 C818:50 50 45 41 52 53 20 0D CF
 C820:35 2E 20 44 45 53 54 52 92
 C828:4F 59 53 20 0D 36 2E 20 E1
 C830:53 50 45 45 44 53 20 55 81
 C838:50 20 0D 37 2E 20 53 4C F3
 C840:4F 57 53 20 44 4F 57 4E 18
 C848:20 0D 38 2E 20 53 4C 4F 4D
 C850:57 53 20 54 45 4D 50 4F FA
 C858:52 41 52 49 4C 59 20 0D 57
 C860:00 05 93 46 49 4C 45 4E 5E
 C868:41 4D 45 3A 00 00 00 00 3A
 C870:00 00 00 00 00 00 FF 05 07
 C878:93 59 4F 55 20 48 41 56 64
 C880:45 20 46 41 49 4C 45 44 E3
 C888:20 59 4F 55 52 20 51 55 CA
 C890:45 53 54 0D 46 4F 52 20 29
 C898:54 48 45 20 4A 45 57 45 6C
 C8A0:4C 2E 20 50 52 45 53 53 8E
 C8A8:20 41 4E 59 20 4B 45 59 0C
 C8B0:00 05 93 59 4F 55 20 48 E3
 C8B8:41 56 45 20 53 55 43 43 E4
 C8C0:45 45 44 45 44 20 49 4E A6
 C8C8:20 52 45 54 55 52 4E 49 C6
 C8D0:4E 47 20 54 48 45 0D 4A 60
 C8D8:45 57 45 4C 2E 20 50 52 35
 C8E0:45 53 53 20 41 4E 59 20 6C
 C8E8:4B 45 59 00 9E 93 12 20 24
 C8F0:20 20 20 20 20 20 20 54 B6
 C8F8:48 45 20 51 55 45 53 54 D3
 C900:20 20 46 4F 52 20 54 48 6D
 C908:45 20 4A 45 57 45 4C 20 6C
 C910:20 20 20 20 20 20 20 0D 90
 C918:0D 59 4F 55 20 4D 55 53 FB
 C920:54 20 46 49 4E 44 20 54 5B
 C928:48 45 20 4A 45 57 45 4C 38
 C930:20 57 48 49 43 48 20 49 0C
 C938:53 20 4C 4F 53 54 20 49 71
 C940:4E 0D 54 48 45 20 48 55 DD
 C948:47 45 20 57 49 4C 44 45 93
 C950:52 4E 45 53 53 2E 00 00 D1
 C958:00 00 00 56 64 64 5A 00 BE
 C960:05 13 4C 49 46 45 3A 20 35
 C968:20 20 0D 46 4F 4F 44 3A 94
 C970:20 20 20 00 20 00 00 00 21
 C978:00 00 00 00 00 00 00 00 0C
 C980:00 00 00 00 00 00 00 00 14
 C988:00 00 00 00 00 00 00 00 1C

TYPING AIDS

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

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ONLY ON DISK

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

Bowling Manager

By Tim Rich
 Austin, TX

Keeping track of your team's weekly bowling scores by hand can be a tedious and time-consuming exercise. With Bowling Manager, you can use the power of your 64 to keep track of a team's weekly statistics for an entire season.

Once you've entered the players' names, Bowling Manager lets you enter and edit each bowler's score by name and date. You can then see a date-by-date listing of your team's performance. All statistical data is saved to disk for easy retrieval and editing.

Bowling Manager automatically computes a player's average, tracks high and low scores, tracks high and low series, and more. This is a great program for any active bowler.

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

OMNIBOOK 300

It sounds too good to be true. A 20-MHz 386 notebook computer that runs Windows from a ROM card, weighs only 2.9 pounds, and gets nine hours of battery life with continuous use. It even includes a built-in mouse that pops out when needed and slides back for traveling. Could this really be the road warrior's dream machine?

First, the bad news. The OmniBook's VGA screen isn't backlit, though it is one of the best reflective LCD screens around. In bright to moderately bright light, you shouldn't have any trouble reading it (except possibly with very small type, if you and your eyes are over 40). In dim light to near darkness, you'll either have to refrain from computing altogether or seek out the nearest light.

If you're looking for a DOS machine, this isn't it. The OmniBook was optimized for Windows. Even when I stripped out some of the drivers, I could squeeze out only 470K for DOS programs. In addition, the OmniBook's ROM-based Windows can't run in 386 enhanced mode, so you won't be able to multitask DOS programs under Windows.

Back to the good stuff. The OmniBook comes in two models: one with a 40MB hard drive and one with a 10MB Flash-RAM card. Both storage devices are automatically compressed by the built-in DoubleSpace compression (essentially doubling the capacity of either card), and both are PCMCIA cards (making them easy to upgrade later on). The hard drive model gives you more storage (80MB versus 20MB) for

less money (\$1,950 versus \$2,375), but the Flash-RAM model can run as long as nine hours on the OmniBook's rechargeable battery; it can also run from four ordinary alkaline AA batteries. The hard disk model can run as long as five hours on the rechargeable

tional Type II PCMCIA slot. If you buy the Flash-RAM model, you'll have two additional Type II PCMCIA slots. Besides being able to use most Type II cards, you can also use many Type I cards.

I was able to move data between the OmniBook and



Hewlett-Packard's OmniBook 300 packs up to ten hours of battery power and Windows in ROM in a 2.9 pound package.

battery; it can also use four lithium AA batteries.

Despite the OmniBook's light weight and compact proportions (11.1 x 6.4 x 1.4 inches), its keyboard is full-size—except for the Home, End, PgUp, PgDn, Tab, and cursor keys. The screen is a generous nine inches wide, with contrast buttons mounted nearby. The unit ships with 2MB of RAM (which isn't as bad as it sounds, since Windows 3.1, Microsoft Word for Windows 2.0c, Microsoft Excel 4.0a, and LapLink come on a ROM card and use only small amounts of system memory when they run). A separate slot lets you add another 2MB or 6MB of system RAM.

If you buy the hard disk model, you'll have an addi-

an HP 95LX palmtop using an Epson 2MB RAM card. And you don't have to give up a PCMCIA slot for communications—HP offers an optional internal fax/data modem that fits into yet another slot.

The OmniBook 300 is nothing short of a technical marvel, with its light weight, compact size, all-PCMCIA storage, and small hideaway mouse. If you can live with the nonbacklit screen (and many can't), the OmniBook is the state of the art for high-tech traveling.

DAVID ENGLISH

Hewlett-Packard
(800) 443-1254
OmniBook 300 with 40MB hard drive—\$1,950
OmniBook 300 with 10MB Flash-RAM drive—\$2,375

Circle Reader Service Number 434

PAGEMAKER 5.0

At the high end of the desktop-publishing market, Aldus and Quark play a perpetual game of one-upmanship. Quark extended the battle beyond the Macintosh platform with its recent Windows version of XPress, but the new PageMaker 5.0 for Windows and the Macintosh promises to secure Aldus's place as king of the desktop publishing hill.

Of course, PageMaker 5.0 sports all the features that made the previous releases of the program successful, such as easy interchange of documents between the PC and Mac, the pasteboard interface (which allows you to drop document elements off the side of a page for safekeeping while you shuffle them around), the speedy Story Editor for altering or adding text, the handy Table Editor program, and professional output to personal printers and typesetters alike.

Version 5.0 adds a raft of new features that overcome previous limitations and directly compete with those in archival XPress. One of the most useful and long-awaited improvements is the ability to open multiple documents (limited only by available memory) and drag and drop elements from one to another. Text and graphics rotation and skewing are other major enhancements, allowing for much more flexible and creative layouts. You can rotate text and graphics in 0.01-degree increments and directly edit rotated text. And you no longer have to purchase an add-on program to do process-color separations—that's now a standard feature.

Most of the bugs in earlier versions have been elimi-



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REVIEWS

nated. Gone is the annoying glitch in PageMaker 4.0 for Windows that would truncate your font list if it extended to the bottom of the screen. The Font menu now uses submenus to display your entire list. PageMaker also used to hate 32,768-color video



PageMaker 5.0 adds multiple documents, rotation, and a control palette.

modes, but no longer; we were able to use it with a 32,768-color driver on a Dell 466/M with no problems.

Manipulating text and graphic elements on the page is much easier and faster with PageMaker's new floating control palette. This narrow little panel is tool-sensitive, so whenever you change tools, the most often-used functions are only a mouse click away. When you select the text tool, the control palette lets you switch between paragraph and character modes to give you complete text control without your having to access the Type menu. Interruptible screen redraws also boost productivity; you no longer have to wait for the entire screen to redraw before you take another action.

Version 5.0 is shipped with more than 20 Aldus Additions: macros and independent software components used for making drop caps, bulleting or numbering lists, creating shortcut printer style sets, listing styles used in your document, balancing columns, and more. Many of these Additions were written with PageMaker's new script language. Third-party Additions are already available, and you can create your own using the script language. The script-language manual isn't included, but it's available free to registered users.

Aldus provides more than 65 filters for importing data; PageMaker now supports Photo CD and Ventura Publisher files, and you can import Windows Metafiles and PICT images directly into either the Windows or Macintosh platform. You have the option of converting images from one format to the other when you transfer documents

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across platforms, or you can leave them unconverted if you plan to transfer the document back to its original platform. Unfortunately, the popular JPEG 24-bit format isn't supported, but we were able to import JPEG images using PageMaker's OLE support and a third-party program.

PageMaker has new features and enhancements for nearly every aspect of page layout. Three leading methods, baseline shift, and precise control of kerning from within the control palette greatly simplify typesetting. You can now scan directly into a PageMaker document using a TWAIN-standard scanning device. Panose font mapping simplifies bringing documents from systems with different typefaces, and six color libraries (including PANTONE) make color matching a snap; you can even create custom color libraries. There are many other improvements, including automatic true typographer's quotation marks, support for printing nonconsecutive groups of pages, and new printing code that no longer requires custom drivers.

There's a lot more that's new than we have room to describe here. Suffice it to say that Aldus has taken a good program and made it great, and that current users will find PageMaker 5.0 to be well worth the \$150 upgrade price. Documentation is complete, and the program includes free technical support for 90 days after the first call. Whether you're putting out a laser-printed company newsletter or a color-separated national magazine, you'll find PageMaker 5.0 is up to the task.

PHILLIP MORGAN and DENNY ATKIN

Aldus
(206) 625-2320
\$895

Circle Reader Service Number 435

LEMMINGS 2: THE TRIBES

When asked to give our two cents worth about Lemmings 2: The Tribes, our reaction has to be that two cents isn't nearly enough! This sequel is packed with cute, engaging new features, more Lemming abilities, and oodles of new scenarios. If the original Lemmings was a perfect arcade game, then this is perfection improved upon.

Once again, the goal is to guide a bunch of suicidal Lemmings from one part of the screen to another. This time, though, your seemingly endless quest to save your Lemming friends from calamity involves 12 tribes of 60 of the diminutive rodents. Each tribe is native to a different part of Lemming Is-

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land, a strange land composed of polar ice, tropical beach, highlands, medieval adventure, Egyptian thrills, circus fun, caves, and even outer space! You guide each tribe through ten levels of obstacles, and each level starts with the number of Lemmings you've saved in the previous one. The reward for guiding all 60 Lemmings through all ten levels is a piece of the sacred Gold Talisman, necessary to the ultimate salvation of the tribes—evacuating them to the safety of the Ark.

If you played Lemmings and Oh No! More Lemmings, you'll be delighted as you encounter many new features and innovations with Lemmings 2. There are now 50 Lemming skills, including kayaking, riding magic carpets, flying jet-packs, and pole-vaulting. We've spent many rewarding hours rescuing the original Lemmings, and we're reaping the same harvest of enjoyment and pleasure with Lemmings 2.

As an extra bonus for those with sound cards, each of the 12 tribes has a different musical accompaniment. Jazzy tunes will draw you even deeper into the mood of the game.

Just one warning: Sneak Lemmings 2 into your home and try it out before anyone else has a chance! If not, be prepared to give up your PC. Even the most computer-averse folks in your family will become engrossed in this cute game. We applaud Psygnosis for doing it again—at least 12 times better than the first time!

BRUCE and MARGARET BOWDEN

Psygnosis
(617) 497-7794
\$59.95

Circle Reader Service Number 436

STACKER 3.1

Who needs more hard disk space? Everyone does, as Microsoft admitted when it included DoubleSpace with MS-DOS 6. If you're uncomfortable using DoubleSpace, however, or if you



Lemmings 2: The Tribes now gives you 50 different skills to use to save the cute little rodents from extinction.

want slightly faster and tighter compression with a more flexible interface, try Stacker 3.1.

This newest version of Stacker comes in two versions: a special version for DOS 6 and another version for all other DOSs. If you're not using DOS 6, however, you can probably skip the upgrade, because many of the program's best features require the new DOS. I'll focus on the DOS 6 version.

The biggest news with Stacker 3.1 is that the Stacker device driver loads before CONFIG.SYS and AUTOEXEC.BAT run, so the days of mirrored system files are over. With 3.1, you have one set of system files, and they're on drive C, just where they should be.

Other new features abound. Stacker 3.1 can convert DoubleSpace drives to Stacker drives, it sports an editable STACKER.INI file,

and disk and file compression statistics are available from Windows File Manager and the DOS Dir command. My favorite feature, however, is one that's buried in the on-disk README file: When you exit Windows, Stacker 3.1 flushes the SMARTDrive

cache. Safety first. That's Stac's motto, and I like it.

CLIFTON KARNES

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KIDCUTS

Those brightly colored miniature pairs of scissors, the kind you used when you were a kid, can coexist nicely with mice and keyboards in the Computer Age. In its new creativity kit, KidCuts, Brøderbund pairs them with software to give kids the tools they need to create paper dolls, masks, hats, cards, puzzles, puppets, and animal cutouts.

KidCuts puts a party on the keyboard. Kids use many of the same tools that delight them in Brøderbund's blockbuster drawing

program, KidPix, to color in ready-made forms of cat-face masks, princess paper dolls, monster puppets, and a host of imaginative characters, cards, and party favors. Just as in KidPix, they'll find the familiar Undo Guy, paint can, rubber stamps of funny creatures and facial expressions, wacky brushes and pencils that spatter and drip, crazy erasures, and odd little sound effects that accompany every dot, line, splotch, or smudge they make on-screen. And there's a new tool, the magic wand, that does different things depending on the project they're working on. The program comes with real plastic scissors to cut out creations.

Children work from a main menu, or Project Picker, where they choose what they'll create. With every selection, submenus pop up and present them with different options. If they choose puppets, for instance, the submenu asks if they want to create a clown, baby, vampire, or robot.

The printouts also present surprises. If they print a cat mask, for instance, the program prints a mask surrounded by drawings of claws and a mouse ring that the kids can wear as part of the disguise. And there are clever little notes on the printouts, like "Try Kitty Cat press-on nails! Kitty claws to tape on your paws!" The manual offers tips on how to milk the most fun from the activities. KidCuts provides an excellent blend of computer- and paper-based creativity.

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SCANPLUS COLOR 6000

Combining professional image capture and OCR in a small package is what the ScanPlus Color 6000 sheet-fed scanner is all about. The scanner is tiny. Its footprint is barely larger than a sheet of paper: a couple of inches wider and a couple of inches shorter. Yet it can gather enough information in a single pass to create a 24-bit color image at 600 dpi—plenty of resolution for professional work.

The unit is quiet and quick, feeding a sheet of paper through for a 10MB 24-bit scan in six minutes and scanning a typewritten



Plustek's ScanPlus Color 6000 gives your PC the capability to scan art in 600 dpi color for an amazingly low price.

page for OCR in 35 seconds, then interpreting the text (a software function

that'll vary depending on the OCR package selected) in an additional 55 seconds.

You can select your image-editing and OCR software from among some of the top contenders: Read-Right, Perceive/286, Omni-Page, TextPert, Wordscan, and Wordscan Plus, as well as PC Paintbrush IV Plus, WinRIX, and Micrografx Picture Publisher. Picture Publisher (a COMPUTE Choice winner) and Wordscan are the manufacturer's recommendations and the software tested here.

This suite of applications and a high-resolution color scanner make a team that would be hard to beat. If you're looking for simple OCR, this machine's features and power would be overkill; you should consider the much less expensive,

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300-dpi, black-and-white ScanPlus B/W 300 PageReader LT scanner.

On the other hand, the 6000's price is amazingly low for 600-dpi color scanning. (In contrast, the 600-dpi Sharp flatbed JX 610 color scanner costs \$13,500.) Being sheet fed reduces the scanner's versatility vis-à-vis a flatbed scanner, but for desktop publishing or photo editing, the system will fill the bill.

A model of the ScanPlus Color 6000 with 1MB of RAM (to speed scanning) and an automatic sheet feeder is available for \$1,299. Plustek US also offers a 600-dpi gray-scale scanner with a sheet feeder for \$899.

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STRIKE COMMANDER

When it was first shown at CES in 1991, Origin's Strike Commander promised to set a new standard for detail and audiovisual experience in PC flight simulators. The long-delayed game didn't ship until late April of this year, and in the meantime, many other companies had almost caught up technologically. However, the delay was good, because it gave the PC game-hardware

base time to catch up as well—Strike Commander is a game that's most at home on a very fast 486 with a really big hard drive.

You're a flyer in Stern's Wildcats, a mercenary F-16 squadron in a bleak, not-too-distant future where the U.S. has splintered into a number of republics and the IRS has hired its own guns to collect taxes from the breakaway states. Early in the game, Commander Stern doesn't make it home from a mission, and you find yourself in command, charged with keeping the squadron financially solvent while upholding Stern's ideals. Unlike most merc squads, Stern's Wildcats have a reputation for turning down mor-

ally questionable missions.

The game unfolds much like Wing Commander, with cinematic interludes alternating with pulse-pounding action missions. During the cinematic sequences, you choose which missions to commit the Wildcats to, and who will be your wing man (or wing woman, as the case may be—some of the hottest pilots in this game are women, a welcome change in the typically testosteronecentric flight sim arena). You'll also have to decide which weapons you can afford to buy while balancing the budget.

At the end of each interlude, you're given an opportunity to arm your plane (a full suite of modern air-to-air

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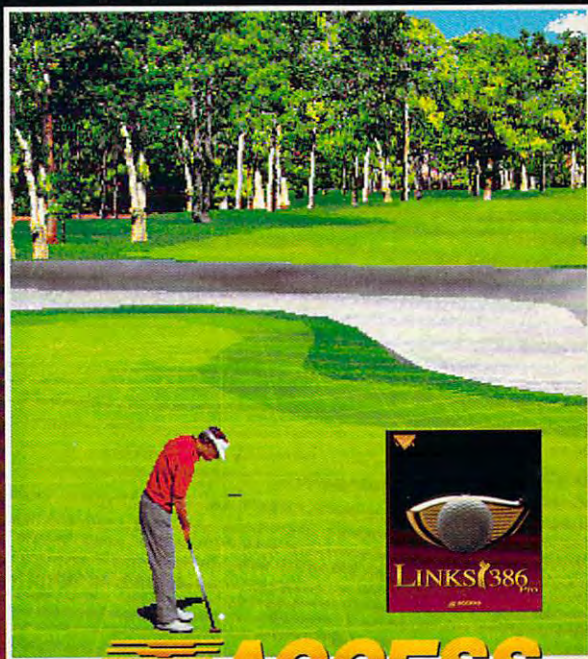
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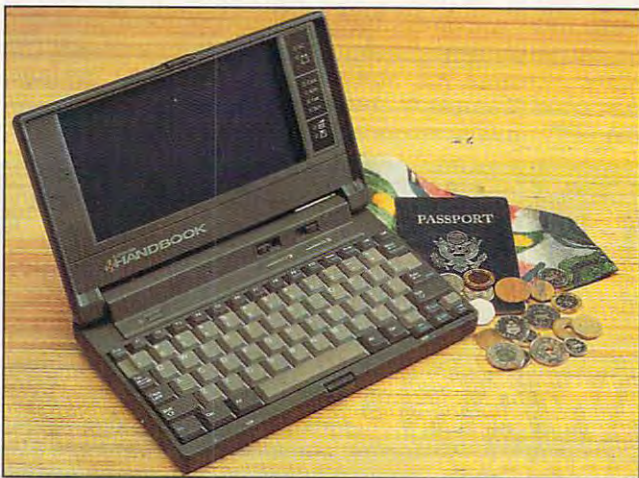
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and air-to-ground weapons is available), and then it's off into the wild blue yonder. Upon taking to the skies, you'll find that this isn't a complicated sim like Falcon 3.0, but neither is it an arcade game like Wing Commander. Strike Commander has found a near-perfect balance between realism and playability which won't intimidate the novice pilot but is accurate enough to satisfy the majority of PC pilots. Three levels of challenge await you in combat, and you'll face hot pilots in a wide variety of aircraft, ranging from the old MiG-21 Foxbat to the newer F-15 Eagle to the stealthy F-23 Black Widow, with a few sitting-duck 747 and AWACS aircraft thrown in for fun. You'll also fly air-to-ground missions against both fixed and mobile targets. Toward the end of the game, you get to trade in your F-16 for an F-22 Lightning II, a hot little plane. Early demo versions shown at trade shows offered many planes—even a P-38 Lightning—but this feature was dropped.

Strike Commander's graphics are remarkable. The ground interludes have the quality of a graphic novel, and the air-to-air detail is striking—you can actually see squadron markings and ejection seat warnings on enemy planes. There's a price to pay for this detail, though: Although Origin says the game can be played on a 386, anyone running on less than a 486SX/25 is sure to be disappointed. I found graphic updates troublesomely slow in gun combat even on a 486DX/33, although the game was quite playable. Owners of DX2 machines will love this game, and it's a great way to show off that new Pentium system. The



Origin's Strike Commander sets a new graphics standard for PC flight simulators, but it requires a lot of horsepower.



With a 40MB hard drive and 286-class performance, the tiny Handbook is great for taking DOS apps on the road.

gaming experience is made even better by a great musical score and digitized sound effects; an optional speech pack is a must-have if you can afford the hard drive space—8MB, in addition to the 33MB the base game takes up. (Although it will run from a Stacker or DoubleSpace drive, the files are already compressed and won't shrink much, if at all.) You'll want a joystick to play this game, and while Strike Commander supports the ThrustMaster WCS throttle, I couldn't get the FCS coolie hat to work, and the game

won't work properly with rudder pedals hooked up.

If you're not a detail purist and you have the horsepower and disk space to accommodate this game, you'll find hours of fast-action fun. Although it doesn't have the realism of Falcon, its audiovisual punch and playability keep me coming back to it more than any other sim.

DENNY "CRASH" ATKIN

Origin
(512) 335-5200
\$79.95
Speech Accessory Pack—\$24.95

Circle Reader Service Number 440

GATEWAY 2000 HANDBOOK

Portable computers are cramming more of the functionality of their desktop counterparts into their slim cases every day—you can now get a screaming-fast 486DX2 color notebook with a huge hard drive if that's what you need. But if you're like me, you leave the desktop publishing and national-debt balancing back at the office and use your road machine primarily for writing and communications. If having a little space left in your briefcase is more important than hypersonic performance, Gateway 2000's little Handbook may be your ticket to portable productivity.

Measuring 9.8 x 5.9 x 1.4 inches and weighing only 2.75 pounds with its battery, the Handbook is small enough and light enough to take along just about anywhere, but it's large enough to comfortably touch-type on. The 10-MHz Chips and Technologies 8680 "PC on a Chip" processor gives the Handbook 286-class performance, and the backlit double-scan 640 x 400 CGA display is fine for most MS-DOS applications. The 8680 processor doesn't fully emulate a 286 chip (it's actually an enhanced 80186 clone), so you can't run Windows 3.1 on the Handbook.

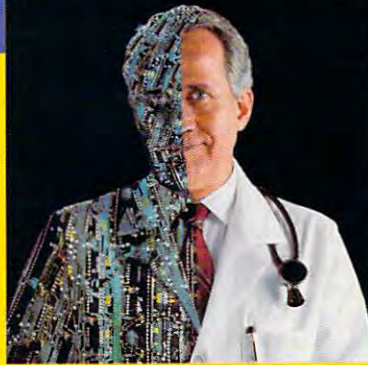
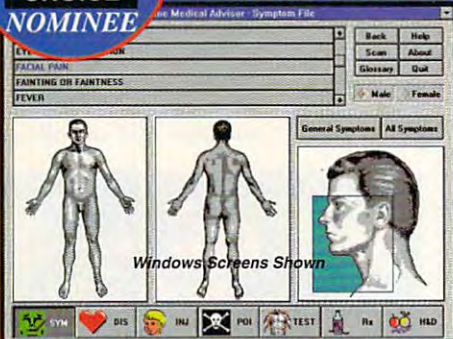
Shipped with 1MB of RAM, the Handbook is expandable to 3MB, which can be configured as extended or expanded memory. I found the Handbook's 40MB hard drive much easier to work with than the PCMCIA RAM cards used for storage by many computers in this size class. There's no built-in floppy drive, but an external 1.44MB floppy

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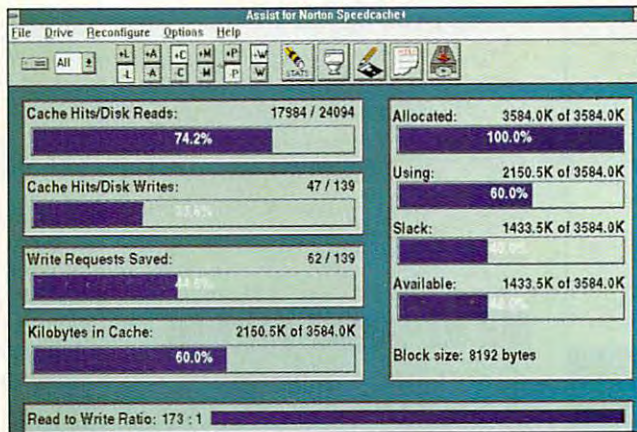


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drive that also sports a second serial port and a full-size parallel port is available as an option. The back of the Handbook has a 9-pin serial port and a custom mini parallel connector (an adapter is included that converts it to a full-size port).

Battery life is good, at 2.5 hours with power saving disabled and nearly 4 hours with it enabled. The battery is literally a snap to remove and replace, and a special pack is available that will let you use AA batteries in a pinch. When you turn the Handbook off, it actually goes into a suspend mode, so when you turn it back on you're right where left off.

The almost full-size keyboard is remarkably easy to type on for a computer this small, but some Handbook owners won't like the fact that the Home, End, Page Up, and Page Down functions require you to hit an Fn key and a cursor key. Although the screen is only CGA, it's very sharp; I had



The Norton Speedcache+ 4.0, which supports CD-ROM drives as well as hard disks, includes a Windows control interface.

no complaints when running DOS applications.

Bundled with your choice of MS Works 2.0 or WordPerfect for DOS, the Handbook is a superb value for those who need to do basic work and have a heavy-duty PC on the desk at home or at the office. And it's so light and small that I don't leave home without it. And if you do need to run Windows

apps on the road, Gateway is about to ship the Handbook486, a 486SX version with a VGA display, Windows 3.1, PCMCIA Type II slot, and pointing stick that will start at \$1495.

DENNY ATKIN

Gateway 2000
(800) 846-2059
\$995

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THE NORTON SPEEDCACHE+ 4.0

A disk cache program is one of the best and least-expensive ways to speed up your computer. It can breathe new life into a slow hard drive and make a fast one seem even faster. While a cache only speeds up access to data that's needed more than once, that speed increase can be as much as 4000 percent.

The Microsoft SMARTDrive cache program comes with both DOS and Windows, so it's essentially free. SMARTDrive works fine, but The Norton Speedcache+ runs faster (Norton claims two to three times faster) and adds support for both CD-ROM and removable cartridge drives. On the down side, Speedcache+ requires more memory than SMARTDrive. While SMARTDrive uses about 28K of memory, Speedcache+ uses about 68K

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REVIEWS

when its CD-ROM caching is turned on (you should be able to load some or all of a cache program into upper memory using QEMM-386 or a third-party memory manager).

Because CD-ROM drives access their data about 25 times slower than hard drives, Speedcache+ can make a big difference with CD-ROM programs. It significantly smooths operation of Microsoft Encarta, a CD-ROM-based encyclopedia with lots of high-resolution graphics and CD-quality sounds. With SMARTDrive, Encarta can bog down when you move from one section of the program to another. With Speedcache+, Encarta runs dramatically faster, especially on a relatively slow CD-ROM drive.

Like any good cache program, Speedcache+ offers a variety of options, including the ability to turn off write caching and to specify which drives will be cached. It automatically recognizes compression programs such as Stacker and DoubleSpace.

If you don't own a CD-ROM drive, you can take advantage of Speedcache+ as a faster alternative to SMARTDrive. If you do own a CD-ROM drive, your CD-ROMs will perform noticeably better. For owners of Level 1 MPC and sub-MPC CD-ROM drives, Speedcache+ may be the least expensive way to keep up with today's more demanding CD-ROM programs.

DAVID ENGLISH

Symantec
(800) 441-7234

\$99 (\$19 for registered users of The Norton Utilities and The Norton Desktop for DOS)

Circle Reader Service Number 442

MILLIE'S MATH HOUSE

Edmark's preschool introduction to numbers and geometry, Millie's Math House, is one of those rare and delightful programs parents can use with very young children. Rated for ages 2 to 6, it comes with nursery theme music, talking animals, and screen images as animated and colorful as a cartoon.

The program is designed for use both at home and in a preschool environment. Parents and teachers participate in the learning, supplementing the concepts taught onscreen with fun-filled activities outlined in the manual. The program features an adult mode, accessed via a three-key combination, that not only offers tips on home and school play but also outlines how the games are played, what each game's learning goals are, and how much you

should expect children of various ages to accomplish.

The program features six games. Each is accessed from a screen which features Millie, a cartoon horse, sitting in her "main room." On the wall of the room is a shelf with toys. Click on a toy to access a game: Build-a-Bug, Number Machine, and Cookie Factory teach numbers and counting;



Millie's Math House uses cartoon graphics to introduce numbers and geometry.

Mouse House, Bing & Boing, and Little, Middle, & Big teach shapes, sizes, patterns, and relationships.

Each game has two modes. The Explore and Discover mode allows children to browse the game, clicking on objects and numbers. As they click on objects, the game will read the names of game elements or play sound effects associated with those objects.

The Question and Answer mode presents children with a challenge. For instance, in Bing & Boing's Explore and Discover mode, children click on pictures of animals (a dog, duck, and pig) to hear an animal sound and on shapes (a triangle, circle, and square) to hear a noise. In Question and Answer mode, the game arranges the pictures in sets of two or three and plays the associated sounds. Then it challenges children to arrange objects to match the pattern and sounds it has presented. If your sound card has a recording feature, you can record your own sounds and use those in place of the ones in the game.

An outstanding manual offers game information, along with tips for extending the play into household or classroom situations by reinforcing the concepts in the game. That's just one of the beauties of the program. Learning isn't something that should stop at a keyboard or in a classroom. Millie's Math House treats math as an activity kids will take through life.

CAROL ELLISON

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REVIEWS

THREE SCREEN SAVERS

Faithful use of a screen saver is a good practice if you're interested in prolonging the life of your monitor screen, but the patterns most screen savers present tend to be rather mundane, with floating hearts, fish, or simple line patterns. These three programs offer quite a refreshing change.

Razzle Dazzle runs under either DOS or Windows, occupying a modest 234K of disk space and 12K of RAM as a TSR. After a period of keyboard inactivity, with a length you can specify, the program activates itself with a seemingly endless variety of striking patterns. Many are kaleidoscopic, but with effects no kaleidoscope ever imagined. Some simulate fireworks, with showers of stars. As the patterns change, the screen sometimes fades, scrolls, wraps up, or seems to melt from the top down.

The results are simply beautiful. Everyone who's seen the program has spent many minutes in rapt enjoyment of the effects. I can't recommend the program too highly; I was so smitten myself that I made a videotape of the screen and dubbed in some appropriate music for use as a background relaxation program on TV.

In quite a different mode and mood, Johnny Castaway runs only under Windows and requires 1800K of disk space. The program brings up an animated cartoon about a castaway on a small island (as you might gather from the title) and is complete with sound effects. The graphics and animation are quite well done. The program consists of a series of episodes rather than a continuous story line, so if you drop out and return, you don't miss a thing. The cartoon's mildly amusing for a while—children might enjoy it—but it gets pretty boring rather quickly, despite Johnny's adventures with sharks and mermaids and Lilliputian pirates. Moreover, you wonder a bit about the screen-saving feature, since much of the screen remains totally unchanged for long periods of time.

The most complex of the three screen savers, Origin FX, runs only under Windows and requires more than 5MB of disk space. In return for this, you get a menu of patterns. There are 26 "movies" from which to choose. Some of these are abstract patterns of lines or spheres, striking in their varying effects. Others have conventional moving objects, such as aircraft, spaceships, and asteroids. Others show cartoons, and still others display scenes

from Origin's other programs, such as Ultima and Wing Commander. Many of the movies have sound effects, and all are very well done in their graphics and animation.

If you're tired of movies, you can select a slide show, which displays a sequence of static images taken from any bitmapped files you happen to have around. The program includes



Sierra's Johnny Castaway blanks your screen and tells a story as well.

several such files, Windows has many, and you may add to these by capturing scenes from the program's movies or by including bitmapped files from other sources. If you want variety in your screen saver presentation, Origin FX does an excellent job.

CHARLES IDOL

Road Scholar
(800) 443-7623
Razzle Dazzle—\$49.95

Circle Reader Service Number 444

Sierra On-Line
(800) 326-6654
Johnny Castaway—\$34.95

Circle Reader Service Number 445

Origin
(800) 245-4525
Origin FX—\$39.95

Circle Reader Service Number 446

SPECTRE

If you like your gaming fast and hot, Spectre from Velocity Development may be just the action you're looking for. In this three-dimensional, first-person-view blastathon, you must pilot your battle vehicle through a "virtual-reality" landscape, destroying enemies as well as gathering ammo dumps and flags. While the ammo dumps give your vehicle a boost by repairing damage and restoring ammunition, the flags are most important, since you must grab them all before you can move on to the next level.

When you begin a game, you can choose among four different vehicles. Then it's off to the battle. As you fight your way toward the flags, you can blast a single enemy vehicle with your

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regular cannon or take on a pack by launching a fire grenade. Should you find yourself overwhelmed by the competition, a quick tap of your backspace key whips you into hyperspace, from which you'll emerge at a different, hopefully safer, location.

While the one-player game is challenging, Spectre was really designed for network play with human players at



Fast, 3-D action and multiplayer support will keep you coming back to Spectre.

different computers. In this mode, you can choose from three scenarios. In Arena, players gather points by destroying each other's vehicles; in Flag Rally, players must collect the required number of flags; and in Base Raid, two teams struggle to take over the opponent's base.

With its impressive 3-D graphics and awesome sound effects, Spectre is a simple but engrossing game when played against the computer. When you get a gang together—connected via either modem or formal network—you can kiss the evening goodbye.

CLAYTON WALNUM

Velocity Development
(415) 776-8000
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JOBHUNT

Looking for a job in today's market can be rough. But Jobhunt from Scope International might just make your life easier. It offers the contacts and the tools needed to conduct targeted national or regional mailings for a wide range of job titles.

The newest version of Jobhunt, 4.0, features three lists: Scope's own targeted profiles of 600-plus companies nationwide; a 3000- to 5000-record list of companies by Standard Industrial Code (S.I.C.) job classification; and your own compilation of contacts you assemble from such sources as classifieds, personal contacts, and Chamber of Commerce and school lists. Lists are expanded and updated regularly. One free update is included in the purchase price.

In Scope's list, you can narrow your search by region or job category or both. In the S.I.C. list, you can compile contacts by code number or state. For

SPEAK UP!

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 3. Enter the extension number printed at the end of the article you want to discuss. If you don't have the extension number, just listen to the menu selections, and they will lead you to the proper extension for each item.
 4. Listen to the comment or information corresponding to the article you selected.
 5. Then, at the tone, leave your desired message!
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- PET INC, Box 166, Hillywd., CA 90078. Must be 18 or older. Touch Tone phones only.

your own personal list, you can add as many contacts as you have disk space for.

Once you've narrowed your prospects, you can use Jobhunt's word processor to write a cover letter and then merge the contacts onto the letters and envelopes or mailing labels. Add your resume, and you're set. You can use your own word processor for cover letters and mail merge by exporting Jobhunt's contacts via a standard ASCII file.

Printing a list of your prospects gives a convenient trail of your job search's status and what leads need to be followed up on or crossed off. On the printout, each company's profile is followed by three blank lines for comments. There are also three small boxes, each with a letter inside: *N*, *E*, and *I*. These letters stand for *No opening*, *Evaluating*, and *Interview*. When a lead doesn't pan out, you can easily lock that company out, and it won't print. You can make follow-up calls from within the program using Jobhunt's autodialer and a Hayes-compatible modem.

Jobhunt has a 25-page instruction booklet and a 10-page tutorial you print out that steps you through an example of how to use the program. For the most part, the onscreen menus and instructions make Jobhunt intuitive. Coupling that intuitiveness with its minimal hardware requirements, Jobhunt should be useful to almost anyone looking for a new source of income. In today's competitive environment, this may be the boost you need.

BETH C. FISHKIND

Scope International
(704) 535-0614
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Circle Reader Service Number 448

L.A. LAW

Capstone's L.A. Law, The Computer Game, will have you collecting evidence and attending court as if you were the lawyer whose photorealistic image appears on your computer screen.

After choosing the character you want to play, you must decide the best way to collect evidence to uphold your case in court. Evidence can be collected from many sources, including associate lawyers, clients, witnesses, opposing counsel, detectives, and your own research. Not only can you get information by going to visit people, but you can also use the telephone in your office at McKenzie Brackman to confer with others who could be of help to your case. These people are listed in the phone directory that comes with the game.

The directions are very simple to follow. You're given choices as to where to go and what questions to ask. Your only task is making the decision that'll give you the most information and use up the least amount of time. No, you don't have unlimited time to uncover all the mysteries of your case. The clock is counting down the time allotted until the trial takes place.

You can elect to go to trial whenever you feel that enough preparation has been done to warrant a winning verdict. Once there, you must decide which opening statement to use and which witnesses to cross-examine. Objections are allowed, along with requests for a recess, a continuance, a directed verdict, or a mistrial.

Throughout the game, there's a case file you can re-

fer to for helpful information. Each time you learn something useful or receive helpful advice, it'll be added to the notes in your case file.

You're given a score at the end of each trial according to what Douglas Brackman thinks of your performance. If you win all of the eight cases, you're made senior partner of McKenzie Brackman.

Should you have a difficult time solving your cases, there's an easy way out—a text file is provided that gives a step-by-step, foolproof way of winning each case. This will give you the results you're seeking without the challenge. You decide whether you're clever enough to act as the attorney you're portraying, or if you need help from a crooked source. That's what L.A. Law is all about.

KIM HAVLENA

Capstone
(800) 468-8226
(305) 591-5900
\$59.95

Circle Reader Service Number 449

LAP TOP SECRETARY

When you're traveling—away from your desk, calendar, workstation, and other office materials—it's easy to fall behind because you've simply lost track of your work in progress. If you need to stay organized both in the office and on the road, Lap Top Secretary is your key to success. A DOS program that runs fine under Windows 3.1, LTS will track your address book, meeting schedules, time management sheets, and to-do lists.

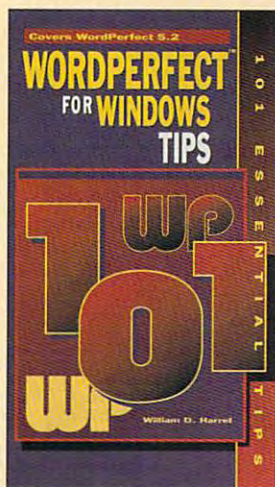
The Address Book tracks the usual address and

phone number data, and includes an entry for keywords you can use to search your address book. For instance, you could mark an address as business, customer, or personal. The Meetings menu allows you to create and maintain information about meetings. Meetings may be designated as scheduled or unscheduled, depending on your personal involvement. You can have any number of unscheduled meetings occurring at the same time, but the program won't permit you to create simultaneous or overlapping scheduled meetings. The meeting data includes purpose, contact, and location information, and you can do searches on that text data. The main LTS screen shows the day's activities, and the meeting entries change color and give you audible warning alarms as the meeting time approaches.

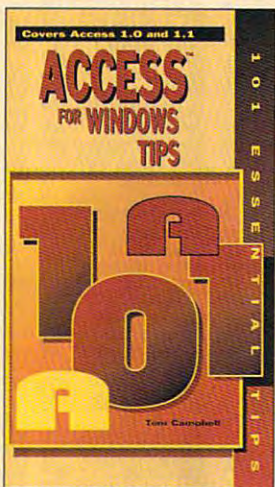
The To-Do menu lets you track impending tasks, along with completion target dates and priorities. These tasks pop up on the daily activities screen on their target dates. The Time Management menu provides an overview of your commitments by the day, week, or month. It also provides an analytical tool that will help you better understand how you have spent or plan to spend your time. Using this tool, you can determine how much of your time is spent in meetings, whether or not you've been devoting enough time to your highest-priority tasks, how many tasks you have pending, how long they've been pending, and other important information. It might just help you make your work habits more efficient and organized.

You can have several da-

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REVIEWS

tabases, so you can create one set of data for daily home office work, for instance, and another with your travel schedules. You can create these databases on your home PC and copy them to your laptop computer or Wizard for portable reference. Lap Top Secretary will keep you organized at the office and on the road.

CHARLES IDOL

EXIM
(800) 424-3946
\$129.95

Circle Reader Service Number 450

FAILSAFE COMPUTER GUARDIAN

Have you ever wondered how to keep casual users from deleting, copying, renaming, or even looking at sensitive or secret files? FailSafe Computer Guardian delivers the solution in a tiny 15K device driver or TSR, with a perfect combination of convenience, security, and performance.

As a member of the single-user, non-security old school of computing, I tend to find any kind of security cumbersome. FailSafe had to walk a tightrope between staying out of my way and protecting my machine from strangers—not an easy task.

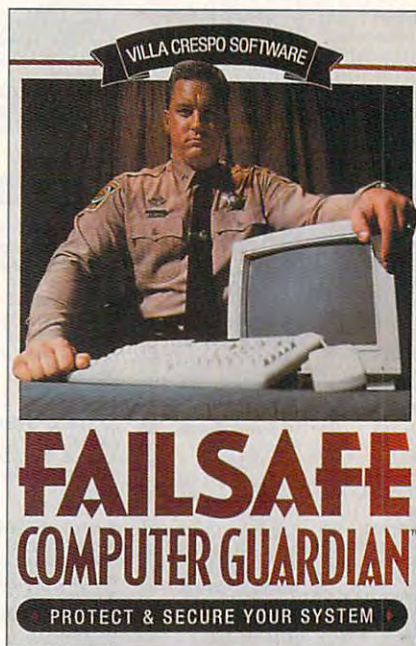
The installation is almost a model of its kind. It explains itself every step of the way and makes only a single change to CONFIG.SYS, which it lets you review. FailSafe is normally installed as a device driver, although you can run it as a TSR from the same COM file if you so choose. The installation program can start Windows automatically, create a group file for the program, and return from Windows.

You can set FailSafe to watch for any possible file operation, such as creation, deletion, modification, renaming, reading, execution, or modification of attributes. For any of these categories, you can restrict files or groups of files using wildcards, explicitly including or excluding any combinations thereof. FailSafe also offers password protection, and you can restrict keyboard access or blank the screen. Custom profiles are available for multiple users or groups of users. Corporate users will like the fact that FailSafe generates a readable log file of all its activities, noting when attempts are made to access, delete, or copy protected files.

A side effect of FailSafe's operation is that it works effectively as a virus protection program as well. While it

doesn't scan specifically for hundreds of viruses, as other programs do, its general security tactics can arguably do a better (albeit somewhat more intrusive) job, since it's constantly on the lookout for security violations.

Remember that it's still possible to defeat a software-based protection scheme by interrupting the boot process and inserting a new boot floppy.



FailSafe Computer Guardian protects your valuable files for a nominal price.

FailSafe includes a coupon for hardware disk locks from another company at the eminently reasonable price of \$25, for everything from older PS/2 machines to standard PCs to Macintoshes.

If you need software-based protection for your computer, you can't go wrong with FailSafe. Priced a good 80 percent less than much of its competition and able to run under both DOS and Windows, it's now the computer-security package to beat.

TOM CAMPBELL

Villa Crespo
(800) 521-3963
(708) 433-0500
\$59.95

Circle Reader Service Number 451

EPSON LQ-570+

It seems that laser printers are all you read about nowadays. But if you're budget-conscious, you need a lower-cost alternative that will still produce professional results. Epson's LQ-570+ might be just what you're looking for.

Compared to earlier dot-matrix printers, the LQ-570+ features enhanced graphics, faster output, and quieter op-

Advertisers Index

Reader Service Number/Advertiser	Page	Reader Service Number/Advertiser	Page	Reader Service Number/Advertiser	Page
162 8-Bit	G-7	Humongous	71	210 Software Support International	116
Abacus Software	13	129 HyperLight Enterprises	120	Software Toolworks	25
169 Access Software	102,103	IBM	5	SOGWAP Software	G-9
AICS	37	IBM	53	145 SOMICH Enterprises	122
268 Amish Outlaw Shareware Co.	120	300 ID Software	101	201 Spectrum Holobyte	40,41
157 AMTEX Software Corporation	59	200 Jack Daniels	49	154 Spirit of Discovery	81
244 Antigrav Toolkit	G-17	231 Jackson Marking Products Co. Inc.	116	203 Star Micronics	11
Bare Bones Software	120	Jasmine Multimedia	31	130 Starware Publishing Corp.	123
152 Bear Technologies	G-17	JP PBM Products by Mail	G-21	179 SubLogic	62,63
Best Personalized Books	117	170 Keystone Software	G-11	176 Tek-Shop	118
173 Blue Valley Software	124	197 KF-PD Software	G-7	147 Thrustmaster	123
218 Body Cello	122	Kid Secure of America	117	247 Turtle Beach Systems	87
245 Broderbund	43	178 LACE	123	193 Turtle Beach Systems	87
121 B.R. ROMS	122	Landmark Solutions, Inc.	121	242 Tycom Inc.	G-21
181 Caloke Industries	G-21	184 Logitech	27	301 U.S. Robotics	IBC
118 Cell Micro	119	255 Logitech	44,45	127 Value Software Inc.	120
175 Chips & Bits	21	260 Mad Man Software	G-9	132 Virgin Games	78,79
Citizen American Corp.	6,7	199 Mallard	35	189 Walnut Creek CDROM	120
139 CMD/Creative Micro Design	G-11	158 Maxis	99	172 Wedgwood Computer	124
251 Colorado Spectrum	16	211 MicroLeague Sports	55	128 Windows 900	118
150 CompSult	124	Microsoft	72,72	WOL/School of Computer Training	17
114 CompSult	G-23	289 MicroStorm Software	G-17	Product Mart	116,117,118,119,120,121,122,123,124
227 Comptons NewMedia	48	191 Needham's Electronics, Inc.	118	Classifieds	125,126,127
205 CompuServe	33	141 Odyssey OnLine	122	104 COMPUTE Books	98,112,G-10
Computer Business Services	116	248 Origin	85	OMNI Books	99
254 Computer Friends, Inc.	120	Parsons Technology	23		
Computer Technologies	G-11	186 Patch Panel Software	122		
Comtrad	15	250 PC Enterprises	124		
Comtrad	115	Pendragon Software Library	124		
125 Creative Labs	3	Penthouse Interactive CD-ROM	98		
113 Creative Pixels Ltd.	G-21	107 Penthouse Modem	125		
226 Crosley Software	122	103 Penthouse OnLine	109		
144 CyberDreams	91	153 Performance Peripherals Inc.	G-21		
D & K Enterprises	117	207 Pixel Perfect	105		
Dechtar	106	256 Profit Group, The	119		
161 Delphi	1	Pure Entertainment	94		
131 DemoSource	118	Q Enterprises Software	G-17		
253 Disks O'Plenty	G-10	241 Quadra	47		
208 Disk-Count Software	111	163 ReadySoft	95		
275 DR. Ts Music Software	50	212 SafeSoft Systems Inc.	122		
143 Electronic Arts	61	111 School of PC Repair	116		
165 Electronic Arts	56,57	116 SeXXy	124		
FGM Connection	G-23	171 Shareware Central	122		
115 Free Spirit Software	107	148 Sierra OnLine	BC		
228 Genovation Inc.	121	109 Smart Luck Software	124		
159 Grapevine Group, The	G-17	126 SoftShoppe	120		
258 Grollier	IFC	166 SoftVision International	121		
234 Horse Feathers Graphics	G-10	190 Software Support International	G-5		
				COMPUTE Editor 900 Line	109
				COMPUTE'S SharPak Disk Subscription	77
				Gazette Disk Subscription	G-9
				Gazette Index	G-17
				Gazette Productivity Manager	G-19
				Gazette Specialty Disks	G-13

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eration. I did most of my testing from Windows, where the LQ-570+ driver does a great job of taking advantage of the new-and-improved graphics capabilities. You'll have a hard time finding a dot-matrix printer that can produce better results for letters and reports. The pages printed about twice as fast as with my HP IIP laser printer, even with largely graphical documents. And don't count out this dot-matrix printer because your office already has too much noise. This printer doesn't feature the usual bumps and grinds associated with pin printers. It makes about as much noise as my hard drive at bootup.

The manual boasts of easy letterhead printing—I'll admit that I hadn't yet learned this trick, even with my laser printer. After several false starts, I carefully read the manual and got it right. Single-feeding of normal envelopes was very easy, and the results were very nice. As a matter of fact, I found feeding single sheets as easy with this printer as with any I'd ever used.

If you're working with DOS-based software that doesn't directly support the LQ-570+, you can use a generic Epson 24-pin driver, or you can embed the proper codes in your document manually, using the comprehensive listing of printer commands in the manual.

The printer has a wide variety of built-in fonts, including Roman, Sans Serif, Courier Prestige, Script, and others. Many of these include proportional versions, which print characters at their true width, so you don't end up with a lot of space around the letter *i*, for instance. This makes your documents more readable and profes-

sional-looking.

If you're not ready to take the laser plunge, you'll find that this printer is on the leading edge of dot-matrix technology, and it offers a long list of very nice features that might just be all you need.

RICHARD C. LEINECKER

Epson
(800) 289-3776
\$349

Circle Reader Service Number 452

EL-FISH

Maxis had us playing with bugs in SimAnt and stirring the primordial soup in SimLife. Now the king of eccentric simulations invites us to take a dive with El-Fish, a software toy bound to make your head swim. The world's first interactive electronic aquarium lets you catch, breed, and evolve fish, and then watch them frolic in your specially designed tanks.

Stocking and managing your aquariums are remarkably easy. To catch new fish, simply cast your line onto the ocean map and reel them in. Keep the ones you like and toss the rest back in. Your final selections can be used as they are, or you can breed them with other fish to spawn new varieties. You can even speed up the machinery of life and evolve your species to a dazzling new order or strange mutation. The program uses a complex algorithm to simulate genotype-to-phenotype conversion—in other words, artificial life. The final results of this chaotic progression are both beautiful and unpredictable, but always intriguing and surprising.

The ultimate step to aquatic glory is to animate the fish, using a 3-D imaging process that generates up

to 256 frames of ultrarealistic movement. Unfortunately, this stage requires intense computation, pushing your system's power to its limits. For example, animating a normal-sized fish on a 25-MHz 386DX machine takes from three to four hours. Add a math coprocessor chip—a highly recommended move—and this time is reduced to 25–35 minutes. On a 33-MHz 486DX, complete animation takes less than 10 minutes. The stunning, life-like results are well worth the wait. Fish can be rendered in standard 256-color VGA or high-resolution VESA Super VGA.

Creating a fish tank, on the other hand, offers instant gratification. Among your design tools are 48 sets of bottom gravel, 60 different backgrounds, 42 species of plants, a variety of background music scores, and dozens of often-humorous scanned foreground objects (both stationary and animated). You can even create your own artwork or MIDI soundtrack and import it directly into the program. Finally, the program can produce genetically coded fish eggs, called roe, to ex-

change among fellow enthusiasts. Services such as CompuServe and GEnie contain a gallery of user-created roe. Serious ichthyologists, beware: The program's depiction of its various fish species is purely a fantasy. In fact, beneath the surface, there's surprisingly little substance to this software toy. The fish exhibit no personality or distinguishing traits, and they fail to react to their surroundings and other fish. Likewise, fish owners can do little more than tap food into the tank and stare as they slowly nibble. The designers should have programmed real-life characteristics such as aggression, sickness, and spontaneous, erratic behavior. Although these electronic fish never die, they don't appear to do much living, either.

El-Fish succeeds in capturing only a limited aspect of the aquarium experience. It's a fascinating concept, but under close inspection, it just doesn't hold water.

SCOTT A. MAY

Maxis
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Circle Reader Service Number 453

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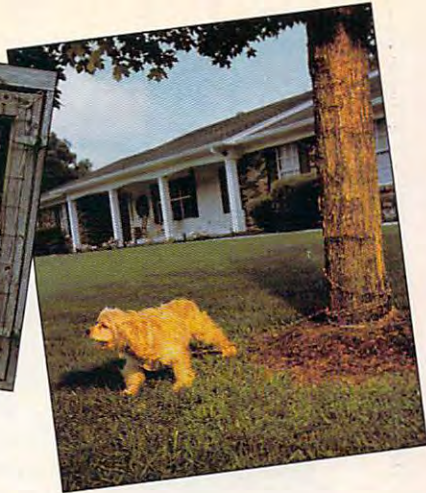
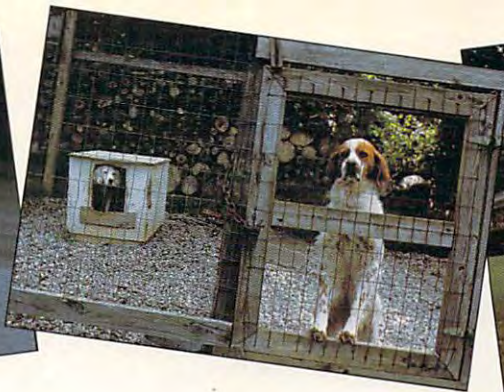
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P.O. Box 186, Hollywood, California 90078.



Could this be your dog?

New product by **Radio Fence** creates a hidden barrier to keep your dog in your yard and out of trouble. Finally, you can protect your dog from traffic and other dangerous situations without locking him in a pen.

By Charles Anton

All dog owners have the same dilemma. On one hand they want to give their dog the freedom to roam and exercise. On the other hand, they are worried about his safety.

Up until now the only solution was to install a costly conventional fence. Not anymore!

No leashes or cages.

Now there's Radio Fence, the breakthrough alternative for dog owners. Radio Fence is an underground electrical barrier which works with a receiver on your dog's collar. It beeps your dog when he nears the boundary and gives him a small electrical correction if he tries to cross it. It keeps your dog safe and out of trouble without having to resort to expensive fences, runs ropes or chains that could injure your pet.

A hidden barrier. Radio Fence acts as a hidden barrier that gives your dog access to the whole yard but inhibits his movements into unwanted areas. Your prize-winning rose garden or pool will be safe. Unlike standard fences, Radio Fence does not detract from the beauty of your home or lawn.

A hidden barrier that only your dog knows is there...

- No more ugly, expensive fences
- No more restrictive enclosures
- No more ruined flower beds
- No more knocked over trash cans
- No more complaining neighbors
- No more worrying about your dog's safety or protection



Radio Fence creates a hidden barrier around your yard that safely contains your pet.

Easy training. By spending just fifteen minutes a day working with your dog, he will be fully trained in six to seven days. Radio Fence is more effective than other systems because it allows your pet to control the corrective treatment (which is definite but mild) and he soon learns to avoid it.

Safety and freedom.

Radio Fence will work with any size or breed of dog. The correction, which is similar to a static electricity charge, will not hurt your pet in any way.

Plus Radio Fence meets all FCC requirements, ensuring your dog's safety and giving you peace of mind.

Custom boundary.

With Radio Fence, you will receive 500 feet of wire that can be easily installed in just two to three hours. The wire will accommodate up to a half-acre yard. The Radio Fence System also includes a transmitter with a signal powerful enough to broadcast to approximately two acres. If you want to expand your Radio Fence boundaries, simply order an additional roll of wire.

You can train as many dogs as you want on the same system as long as they are each wearing a receiver collar.

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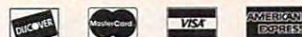
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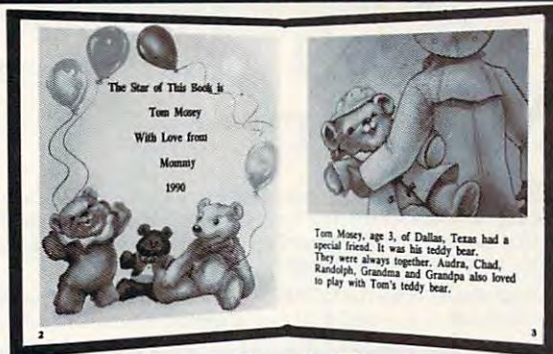
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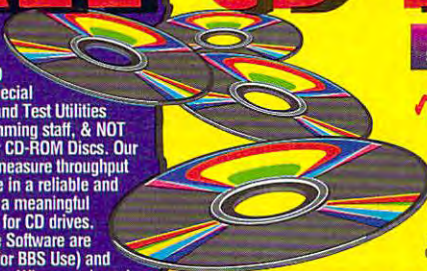
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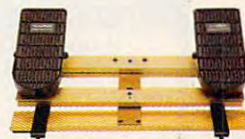
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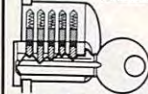
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Greatest Thing Since Color

You know what onscreen programming did for your VCR; now Optiquest is promising the same for your computer monitor. The 4000DC monitor (scheduled to ship in September) with onscreen programming and a color-matching system gives you a video readout as you make each monitor adjustment. The color-matching system allows you to adjust color intensity—making reds hotter and blues cooler—just as you would with your TV screen.

Big Blue Options

The once-elite IBM, finally hearing the 1990s call to arms—"Competition!"—is now attempting a major push into the retail computer-accessories market. Its new Easy Options line of peripherals and accessories for IBM and compatible computers includes audio cards, video cards, game cards, modems, joysticks, keyboards, mice, trackballs, hard drives, floppy drives, CD-ROM

drives, tape drives, power supplies, and scanners. Look for it all in your local computer-supply store.

Check It Out

Compton's NewMedia, which several months ago decided to buck the status quo and offer CD-ROM titles for rent in video stores, says its rental program is booming, and the company is expanding the number of titles for rent as well as moving into more video stores. Based on that success, Compton's plans to offer select CD-ROM titles to public libraries for lending. The specially marked series will include general reference, music, travel, children's, and business titles.

The 180-Day Wonder

Buying a computer has become more like buying a car. According to the July 1993 issue of *Adweek's Marketing Computers*, when the Boston Computer Exchange broke its 10-year monthly sales record a few months ago, "half of the approximately \$500,000 monthly sales volume consisted of new computers that are discontinued models and liquidated retail stock from local stores." According to one analyst cited in the article, "The typical life cycle for a desktop computer is now *six months*," which means that "this summer's computer models will probably be liquidated as discontinued merchandise by Christmas." As with autos, smart shoppers will find the best buys on those 1993 models at the *end* of 1993.

The Commandments

The Computer Ethics Institute, a nonprofit research, education, and study organization founded in 1992, proposes the following "Ten Commandments of Computer Ethics" as a voluntary code of

conduct for all users of computer technology and digital electronic data systems:

1. Thou shalt not use a computer to harm other people.
2. Thou shalt not interfere with other people's computer work.
3. Thou shalt not snoop around in other people's computer files.
4. Thou shalt not use a computer to steal.
5. Thou shalt not use a computer to bear false witness.
6. Thou shalt not copy or use proprietary software for which you have not paid.
7. Thou shalt not use other people's computer resources without authorization or proper compensation.
8. Thou shalt not appropriate other people's intellectual output.
9. Thou shalt think about the social consequences of the program you are writing or the system you are designing.
10. Thou shalt always use a computer in ways that ensure consideration and respect for your fellow human.

Pulling Rank

Brandweek magazine recently listed the 100 favorite brands in the U.S., reporting Total Research's 1993 Equi-Trend Survey. How did computer-related companies do? Very well indeed, reflecting how strongly computer companies have moved into everyday life. In a list populated by the likes of Crest and Tylenol, IBM Personal Computers ranked number 20, followed by WordPerfect (34), Microsoft (40), Kodak PhotoCD System (47), Apple Computer (52), Lotus 1-2-3 (62), Compaq (67), Sega Genesis (81), and Nintendo (84). □

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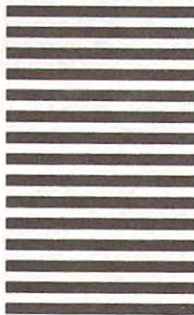
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- D. Which online service(s) do you use? CompuServe GEnie America Online Prodigy
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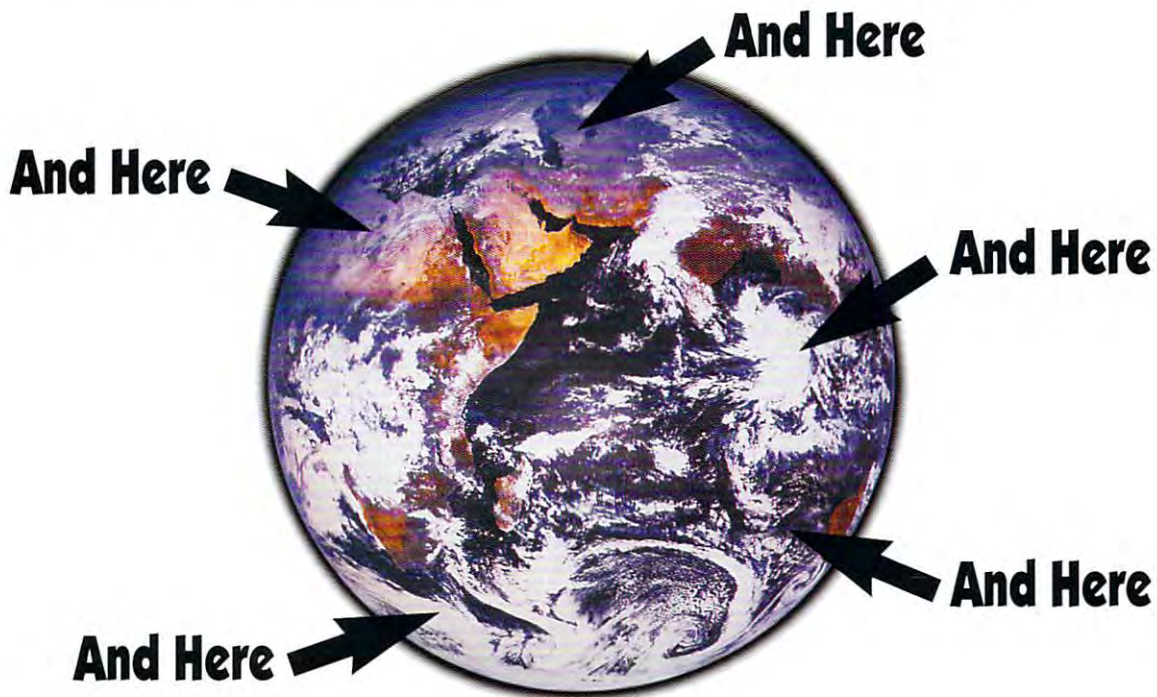
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