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NOTE: See page 93 before typing in programs.
Editor's Notes

David Thornburg's recent comments on piracy have evoked some stimulating reader responses. We generally have found, over the years, that those who scream the loudest about their right to steal software exhibit some pretty convoluted logic. Example: The company who makes it charges too much for it. Solution: This makes it okay to copy? The list goes on. We've quoted here from a letter that we feel provides an excellent example of some not-so-legitimate concerns. Although the author failed to include a name or address, we'd like to comment on some of his or her remarks.

...I feel that the software companies are making out like bandits. They charge outrageous amounts for programs that are not worth the money that is charged.

A more traditional belief in our society has upheld the theory of the free market rather than free theft. The free-market theory argues that a vendor who gouges, or delivers less than true value for one's dollar, will eventually be caught up with by the marketplace. Here's another novel argument our friend advances:...

...I support pirating and have on tap possibly 600 disks for both the Apple and IBM XT...[if]...I had to pay for them I would have more money in the software than I do in my house. And this is over $300,000...

This one's great. The logical extension of this argument is that we should collectively become a community of thieves. Given our need for software, and what apparently has become an inherent right to possess software, the solution to the expense of collecting it becomes pure thievery. The rest of us are fortunate that this same logic hasn't begun to be applied to houses and cars. Now we're getting to the real heart of the arguments.

We've covered the justifications of overcharging, in various guises, and now turn to the converse:...do not give me that it hurts the developer of the code. All companies and corporations buy hundreds—if not thousands of copies of the program at the price (if not higher) that the publisher asks for.

In other words, either the software company already makes enough money, or it has already factored individual theft into its corporate sales. This is logic similar to the present arguments over liability insurance. Eventually everything has some impact, positive or negative, on the individual consumer.

Software piracy, and theft, cannot have a beneficial impact. As an activity generally shielded by, for example, one's right to privacy, enforcement of software rights is quite difficult. It's one of those areas where there's a gray area between community standards enforced by fear of exposure and community standards enforced by one's own sense of duty to that community. We personally feel that is the response to our friend's final remark.

...if the software industry wishes me to buy and use software legally, they must give me more reason to, other than the pity stories of the developers losing money.

Every time we mention something related to software piracy, some reader raises the question, "How can you run advertisements for software designed to help users copy protected disks if that's the way you feel?" There's one significant reason. We used to decline advertising that in any way promoted utilities designed for copying protected software. After the copyright law was amended to allow for a software owner's right to make and store a backup of software, we amended our policy to support that notion. In short, we accept such advertising when it subscribes to those purposes supported in the copyright law. We refuse and routinely reject piracy-oriented advertising. There's a sense of semantic jousting with windmills here that's inescapable under the circumstances, simply because we can't avoid the fact that some people will use legitimate backup programs to make duplicate copies for nonlegitimate users of a product. There is no doubt in our minds that such use can only be described as theft, regardless of the various arguments, such as those above, raised to support it. On the other hand, we feel quite strongly that a user has a full right to make and keep a backup. Some companies have attended to this by providing users with a backup. Others have chosen to avoid copy-protection altogether. Still others have made provision for obtaining a backup. In short, we support the notion of having access to a backup. We don't support the notion of using that need to justify distribution of the software.

In this case perhaps we should ask the question, "When is the media the message?" That seems to be the heart of a recent debate over CompuServe's exercise of its right to limit distribution of software that is undeniably public domain software. The more heated proponents of the public domain position argue that CompuServe is somehow appropriating the public domain product. We think this is an oversimplification, and as CompuServe points out, it is in fact attempting to promote and assist the utilization of such software by its subscribers. Understandably enough, CompuServe is not trying to promote and disseminate such software to those who are not subscribers. Seems fair enough. You'll find a couple of sometimes contrasting points of view on pages 30 and 31.

...Until next time, enjoy your COMPUTE!

Robert C. Lock
Editor in Chief

We welcome Sheldon Leemon and his new column, "Microscope," to the pages of COMPUTE! Microscope will focus on industry news and what's on the horizon in the world of micro-computers. Sheldon, a free-lance author based in Michigan, has written two COMPUTE! books—Mapping the Commodore 64 and Inside Amiga Graphics—and co-authored COMPUTE!'s Amiga-DOS Reference Guide; MacTalk: Telecomputing on the Macintosh; and COMPUTE!'s Telecomputing on the IBM. The column debuts on page 66 in this issue.
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Readers’ Feedback

The Editors and Readers of COMPUTE!

If you have any questions, comments, or suggestions you would like to see addressed in this column, write to "Readers’ Feedback,” COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. Due to the volume of mail we receive, we regret that we cannot provide personal answers to technical questions.

Overseas Computing

I would very much appreciate an authoritative answer to my questions. I plan to purchase a Commodore 128 computer with 1902 monitor, 1571 disk drive, Datasette, printer, and joysticks. This set will be used in Poland where the power supply frequency is 50 hertz and the voltage is 220 volts AC. I can obtain a suitable step-down transformer to convert the voltage to 110 volts, but the frequency will be unchanged. Will this system work correctly with 50-hertz current?

I have visited numerous dealers in the New York City area. Some say that this equipment will work in Europe, others say that it won’t work, and others simply don’t know. My letter to Commodore has not been answered. I can easily purchase all of these items in Western Europe, but would prefer to buy them here and ship them to Poland. At the current exchange rates, this system will cost roughly twice as much in Europe as it does in the U.S.

M. H. Trenker
Chairman, Dept. of Surgery
Medical School
Gdansk, Poland

Though your question pertains to Commodore computers, the answer is generally the same for all U.S. computer systems. It is possible to use a step-down transformer to achieve the proper operating voltage, but you need to be sure that you do get a high-quality transformer. The small "voltage converter" units available for running hair dryers and such are not an acceptable substitute. However, the transformer may not solve all the problems of using a U.S. system overseas.

The most significant hurdle is that Europe and North America use different video standards. Television systems and monitors generate video displays by repeatedly drawing a series of horizontal lines across the screen, one under the other. Computers using the European (PAL) standard generate a frame of 312 lines redrawn 50 times per second, while those using the North American (NTSC) standard produce a frame of 262 lines redrawn 60 times per second. The Commodore 64 and 128 handle scan-line differences by providing two different versions of the VIC-II video chip—one for NTSC and one for PAL. The drawing rate is determined by an internal quartz crystal, with different crystal frequencies used for NTSC and PAL systems. While we have no direct experience with the situation, it is our understanding that a complete U.S. system—with both the computer and monitor designed for NTSC—should work in Europe if provided with the proper operating voltage. However, it is not possible to intermix U.S. and European equipment. You can’t hook a European (PAL) monitor or television to a U.S. (NTSC) computer, or a PAL computer to a NTSC monitor or television.

Disk drives are another area of confusion. Like that of the computer, the internal operating frequency of a Commodore drive is determined by a quartz crystal, and thus should not be affected by international variations in power-line frequency. However, the speed of the motor which spins the disk may be affected. The older 1541 disk drives have a speed adjustment and a strobe pattern on the drive flywheel to allow adjustment for either 50-hertz (North American) power-line frequency or the 50 hertz used in most of Europe. The 1571 drives we have seen lack this adjustment, but it may not be necessary because the 1571 uses a more sophisticated type of motor.

Unless you plan to travel frequently between the U.S. and Europe, you may find it simpler to purchase equipment designed specifically for the environment where it will be used. We’re interested in hearing about the experiences of any readers who have attempted to use their computers overseas.

Autobooting ST Programs

In the June 1986 issue of COMPUTE!, you explained how to make an ST program autoboot (load and run when you turn on the computer) simply by putting the program in a disk folder named AUTO. I have used this method and it seems to work for every program except IST Word, the word processor supplied with the ST. Is it possible to make this program autoboot? Also, I have tried to autoboot programs in medium resolution with a color monitor. Can you tell me whether it’s possible to autoboot a program in medium instead of low resolution?

Raymond Norris

As part of the boot process (caused when you turn on the power, press the reset button, or unplug the video cable) the ST checks the disk in the drive to see whether it contains a folder named AUTO. If so, it loads and runs the first program in AUTO which ends with the filename extension .PRG. These steps are performed by the BIOS (Basic Input/Output System) before the computer boots GEM, the ST’s visually oriented operating system interface. Since you can’t run a GEM program without GEM, you can’t autoboot any program that takes advantage of GEM’s windows, menus, icons, and mouse. Under ordinary circumstances, autobooting works only with TOS (TOS-Takes-Parameters) programs, which are limited to conventional text, keyboard, and input/output operations.

The answer to your second question involves the boot process as well. When it does a cold start, the ST defaults to low resolution for a color system or to high resolution for a monochrome system. If it can’t find a .PRG program in an AUTO folder, the computer boots GEM and eventually looks for a file named DESKTOP-.INF. The DESKTOP.INF file (created with the Save Preferences option) records the screen resolution, color palette, and much additional information about the desktop. If DESKTOP.INF is found, the ST reads it and sets the desktop to match your stored preferences. When you autoboot, however, the computer transfers control to the designated program before it has a chance to read DESKTOP.INF. As a result, you are always in low resolution after autobooting unless the program itself resets the video display for medium resolution. Low resolution is also in effect if the system finds neither an autoboot program nor a DESKTOP.INF file.

Other parts of the boot process check whether a cartridge is present or the disk contains a special boot sector. If either...
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condition exists, control is diverted from the normal boot process to the machine language program found in the cartridge or the boot sector. Once this occurs, it’s up to that program to set the resolution as needed.

**Applesoft B Commands**

I am familiar with the Applesoft BASIC commands LOAD, SAVE, and RUN. These commands sometimes show up in your magazine with the letter B in front. What do these commands do?

-Bruce Meulendyke

BSAVE, BLOAD, and BRUN are used to save, load, and run binary files. A binary file often consists of a machine language program, but it can also contain other data such as a screen image. Here’s the syntax for BSAVE:

**BSAVE filename, Address, Length, Sslot, Ddrive, Vvolume**

BSAVE saves the contents of a designated memory area to a disk file. Every BSAVE command must include at least three parameters: a filename, the letter A followed by the starting address of the memory area you wish to save (add a $ if the A if you supply the address value in hexadecimal), and the letter L followed by the length of the area to save (you can also add a $ after the L to supply the length value in hexadecimal). The last three parameters (S followed by a slot number, D followed by a drive number, and V followed by a volume number) are optional. (The volume number parameter is valid for DOS 3.3 only.) Here’s the syntax for BLOAD:

**BLOAD filename, Address, Sslot, Ddrive, Vvolume**

BLOAD loads a binary file from disk into the computer’s memory. Only the filename parameter is mandatory. The other parameters take the same format as for BSAVE (indicate hexadecimal numbers with a $). If you supply a load address, BLOAD loads the binary file into the designated memory area. If the address is omitted, the computer loads the file into the same area it was saved from. Note that you needn’t specify the file’s length. The computer simply loads until it reaches the end of the file. Here’s the syntax for BRUN:

**BRUN filename, Address, Sslot, Ddrive, Vvolume**

BRUN assumes that the binary file contains a machine language program. It performs a BLOAD of the designated file, then starts the program by performing a JMP to the beginning of the file. Just as with BLOAD, the address, slot, drive, and (for DOS 3.3) volume parameters are optional. BRUN offers a very convenient way to load and run a machine language program, since you don’t need to know where the program goes in memory. Some other computers (the Commodore 64, for instance) require that you start an ML program with a SYS to the correct address after you’ve loaded it.

**Atari DOS Mystery**

After reading “Atari Disk Speedup,” (“Readers’ Feedback,” November, 1985), I POKEd off the verify function and created a new copy of DOS 2.5 with this enhancement. Shortly thereafter I noticed that any file I save to disk has angle brackets (<>) on either side of the filename in the DOS directory. Is this normal?

-Mark A. Jossart

DOS 2.5 uses angle brackets around a filename to indicate that ‘that file cannot be accessed by the old DOS 2.0. This is only important if you boot up with DOS 2.0 (a single-density DOS) and want to use a file on your DOS 2.5 (enhanced-density) disk.

It’s possible that your POKE and the angle brackets are unrelated. If you have used more than 710 sectors of your disk, it is likely that you have no problem. There’s a chance, however, that you have confused DOS. To be safe, you might try booting up with an unmodified copy of DOS 2.5 and using the WRITE DOS option on your problem disk. Of course, you should always perform any changes to DOS on a copy of the master disk, not the master disk itself.

If you have the SETUP.COM file which comes with DOS 2.5, load it from the DOS menu with the L option. This is the preferred way to make the change. Otherwise, here is the POKE:

POKE 1913,80

Use the WRITE DOS option to save the change.

**Disguised Input In BASIC**

I have a Commodore computer and am writing a program with a code system. When I type in the code, anyone standing nearby can see it. Is there a way to replace each character in the code with an X or any other letter in order to disguise the code? I have noticed that 24-hour bank machines use this method to hide their customers’ codes.

-Michael Hamm

This simple routine waits for you to enter the word JUJUBE. Though it’s written for Commodore computers, only slight modifications are needed to convert it for any computer with Microsoft BASIC. Use the DEL key to erase mistakes; input terminates when you press RETURN.

10 CODES=" JUJUBE"
20 BS="" : PRINT "ENTER PASSWORD"
30 GET X$ : IF X$=" THEN 30
40 IF X$=CHR$(20) AND LEN(B$) > 0 THEN PRINT X$ : BS=LEFT$(BS,LEN(B$)-1) : GOTO 40
50 IF X$=CHR$(28) THEN 30
60 IF X$=CHR$(13) THEN PRINT X$ : BS=BS+$X$: GOTO 30
70 IF BS<>CODES THEN PRINT:PRINT "INVALID CODE":GOTO 2
80 PRINT "WELCOME"

**IBM BASIC Versions**

I would like to know the difference between IBM BASIC and BASICA.

-Glenn Kupsch, Jr.

IBM has created four different versions of BASIC for the PC and PCjr. They are known as cassette BASIC, disk BASIC, advanced BASIC (BASICA), and cartridge BASIC. BASICA is the simplest version. It resides in 32K of ROM and does not permit any disk commands or graphics other than plain text. If you boot up a PCjr without a BASIC cartridge, it activates cassette BASIC automatically. BASICA is rarely used on the PC, since few, if any, PCs were sold without a disk drive (in fact, the PC XT doesn’t have a cassette port at all). However, you can activate cassette BASIC on the PC by booting the computer without a disk in the drive.

Disk BASIC must be loaded from disk and requires at least 32K of RAM as well as a disk drive. Disk BASIC includes the commands in cassette BASIC as well as a timer function and support for RS-232 communications and two additional printers. BASICA, or advanced BASIC, is the most comprehensive version of IBM BASIC for the PC. It requires 48K of RAM and a disk drive. In addition to the disk BASIC commands, BASICA supports event trapping, which lets you monitor several different kinds of events (keyboard, joystick, light pen, timer, and RS-232 activity) in the background. Music and advanced graphics operations are also made available through commands such as PLAY, CIRCLE, PUT, GET, PAINT, and DRAW.

If you boot up a PCjr with a BASIC cartridge, the computer activates cartridge BASIC—an enhanced version of BASICA which supports the PCjr’s extra features. In addition to most BASICA commands, cartridge BASIC offers extra screen modes and new graphics commands such as PCOPY, PALETTE, and PALETTE USING.

You can tell what version of BASIC you’re using by looking at the version identifier in the BASIC startup message. The identifier C stands for cassette; D stands for disk; A stands for advanced BASIC; and J stands for cartridge BASIC (the J signifies junior). Some versions of IBM BASIC have gone through one or
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more revisions. The number after the identifier tells you which revision you are using. For instance, cassette BASIC on the PCjr is Version C1.20, while the PCjr’s cartridge BASIC identifies itself as Version J1.00, indicating that cassette BASIC was revised twice but cartridge BASIC has not yet been revised.

With minor exceptions, the more advanced versions of IBM BASIC understand all the commands in simpler versions. Thus, most cassette BASIC or disk BASIC programs run with BASICA on the PC or cartridge BASIC on the PCjr. But the reverse is not necessarily true. The PCOPY command, for example, is unique to cartridge BASIC, so it’s not available in any other version. One exception to the general rule of upward compatibility appears in cartridge BASIC, which doesn’t support the SHELL command found in both disk BASIC and BASICA.

Certain BASIC statements also require extra hardware. On the PC, a serial interface card is required for RS-232 communications, and a color/graphics card is necessary for color graphics. On the PCjr, you must have an internal modem in order to use telecommunications programs or the built-in terminal emulator (activated with the command TERM).

The PC and PCjr know whether you have the hardware needed to support special BASIC commands. If you attempt to use RS-232 or graphics features without the right hardware, the computer responds with the error message Illegal function call or Device unavailable. In other cases, BASIC informs you that you’re trying to do the impossible. Disk BASIC, for example, generates the error message Advanced feature when you attempt to execute a statement found only in BASICA.

The PCjr is a special case when it comes to booting BASIC. Since it’s designed for cartridge BASIC, it intercepts any attempt to boot other versions from disk. When you type BASIC or BASICA at the DOS prompt, the PCjr ignores your request and activates cartridge BASIC instead. However, there’s a simple trick that allows you to run BASICA on the PCjr (to take advantage of the SHELL command, for instance). Simply copy BASICA onto a disk and rename it as BASICB; then type BASICB from the DOS prompt. Actually, any letter will do in place of the A in BASICA. By renaming disk BASICA as BASIBC (or anything other than BASIC or BASICA) you can also run that version of BASIC on the PCjr.

### Saving Atari Graphics

I am writing a drawing program in BASIC for the 130XE. I would like to add the screens I create to my BASIC programs, but I don’t know how to save and retrieve the finished pictures on disk in various GRAPHICS modes, including the new 6¾ and 7¾ modes. I hope you can help.

A. Rosamilia

Here’s one way to do it. This program is taken from the book Mapping the Atari, written by Ian Chadwick and published by COMPUTE! Books.

```plaintext
1000 SCREEN = PEEK (88) + PEEK (89) * 256
1010 OPEN $2, 8, 0, "D:PICTURENAME"
1020 FOR TV: SCREEN TO SCREEN TO
1030 OPEN $2, 8, 0, "D:PICTURENAME"
2000 SCREEN = PEEK (88) + PEEK (89) * 256
2010 OPEN $2, 4, 0, "D:PICTURENAME"
```

### Infocom introduces four new gam

Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker’s Guide to the Galaxy,”™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: “Leather Goddesses of Phobos.”™ It has a scratch n sniff card and a 3-d comic book to excite all your senses. Once your interest is piqued, you’ll embark on a rowdy romp through the solar system. This hilarious spoof of 1930’s pulp science fiction has 3 “naughtiness levels,” for the prude to the lewd. “Leather Goddesses” is sure to amuse members of either sex.

**One’s really warped.**

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**One’s a real circus.**

It has been said that the circus is the only really mysterious thing left in civilization. One thing’s for sure, there is plenty of mystery in “Ballyhoo.”™ While trying to locate the circus owner’s kidnapped daughter, you are somersaulted into a three-ring world of deception and crime. To solve the crime

---

**Graphics mode** | **Full screen** | **Split screen**
---|---|---
7 | 4200 | 4190
14 | 4270 | 4296
15 | 8112 | 8138

To retrieve your screen, use this program segment:

```plaintext
2000 SCREEN = PEEK (88) + PEEK (89) * 256
2010 OPEN $2, 4, 0, "D:PICTURENAME"
```
These programs use the GET and PUT commands, which are used to communicate with input/output devices like the disk drive. Your letter uses the terms GRAPHICS 6½ and GRAPHICS 7½. These names became popular during the reign of ATARI 400 and 800 computers, when these modes were not available directly from BASIC. ATARI XL/XE computers call these modes 14 and 15. To set up mode 7½, just use the command GRAPHICS 15.

Dvorak Keyboard Update

Here is some follow-up information for the COMPUSTER reader who was interested in converting his Commodore 64 to a Dvorak keyboard (“Readers’ Feedback,” August, 1986). There are many products available for the 64 and other computers, ranging from inexpensive keycap overlays and emulation software to complete replacement keyboards and ROM upgrades. I’m sorry that you discouraged the reader by quoting the BYTE article from February, 1986. That article investigated only one topic—fingertip travel—and its results are controversial. The authors used a computer simulation, which is error-prone because of the assumptions inherent in any such program. In response to the article, a top English keyboard expert (Professor Hisao Yamada, University of Tokyo) noted that several factors influence the results when measuring finger travel, and it is very difficult to get accurate measurements.

It is a combination of factors, not any single factor, that makes Dvorak superior in the view of myself and others. According to a controlled study by the U.S. government, Dvorak can result in a 74-percent productivity increase over the qwerty method. It can be learned in less time, finger travel is less (much more less is controversial, but it is clearly less), and Dvorak results in higher speed and accuracy. If any of your readers want more information on the Dvorak method, including a list of products available for personal computers, please send a self-addressed, legal-size envelope with 39 cents in postage to me at the following address.

Randy Cassingham, Editor
Dvorak Developments Newsletter
P.O. Box 1895
Upland, CA 91785

Thank you for offering this additional information.

Reversing SpeedScript

Until recently, many of COMPUTE!’s foreign readers could not use SpeedScript because their languages use a different form of letters. That problem was solved by Charles Brannon’s “SpeedScript Fontmaker” (COMPUTE!, January 1986), which allows you to create your own custom character set. I’m sure that this program has made it possible for a large number of foreign readers to use this superb word processor. There are, however, some readers who still can’t use SpeedScript—those from Israel and the Arabic countries. In those languages, writing proceeds from right to left, so a word processor whose cursor moves left to right is of little use. Can you make another small step (at least, I think it’s small) and add a subroutine which permits us to write either from right to left or left to right?

Dov Ratzman

You’re correct in your suspicion that the problem isn’t as simple as it first seems. The direction of writing is far from a mere cosmetic feature of SpeedScript: It’s bound up with the fundamental structure of the program. To explain, at the heart of SpeedScript is a routine labeled Refresh, which redraws the entire screen display every time you press a key. In essence, Refresh scoops a screen-sized chunk of...
text from the text portion of memory and displays it in the computer's screen memory area.

SpeedScript's text memory begins immediately above the end of the program itself. As you type in more characters, the text grows upward into higher memory locations. Screen memory is also arranged sequentially, with lower memory locations at the upper left corner of the screen and higher locations toward the bottom. A higher location in text memory corresponds to a higher location in screen memory. To display a screenful of text, SpeedScript moves characters out by one character from a section of text memory into screen memory, automatically wrapping words which overlap the right screen border, until the entire screen is full. Since the Refresh routine is called so often, it must also be very fast.

To write from right to left, you would need to begin by rewriting the Refresh routine to display words in right to left order. Such a change destroys the simple, lower-to-higher correspondence between text memory and screen memory. In itself, the modification isn't impossible. However, it would add significantly to the size and complexity of Refresh and slow the routine somewhat.

Once Refresh has been rewritten, you would also need to rewrite all the routines that move the cursor from one character, word, sentence, or paragraph to another. Under the present scheme, moving the cursor forward (right) moves you forward in the text, which corresponds to a higher location in both text memory and screen memory. In a right-to-left SpeedScript, moving the cursor forward (right) along a screen line would move you forward (higher) in text memory, but backward (lower) in screen memory. When you hit the end of the line, you would need to jump to a higher screen memory location, without changing your location in text memory, and begin working your way backward (down) to the next line. Wrapping in particular, becomes much more difficult to implement under such circumstances.

Of course, if text is displayed from right to left, you'll want to print it the same way. A surprisingly large portion of SpeedScript involves printed output—which includes printing to disk, tape, or the screen, as well as with a printer. Rewriting these routines creates the same type of difficulties outlined above.

In short, what seems like a small change adds up to a very ambitious programming project which would change the size and location of nearly every routine in the program. In the past few years, we've published a number of SpeedScript enhancement programs such as "SpeedView" (elsewhere in this issue) and "SpeedCheck," the spelling checker (COM-
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The New Apple IIIGS

David D. Thornburg
Associate Editor

Apple’s new IIIGS computer is the latest—and strongest—addition to the company’s “Apple II Forever” campaign. Completely compatible with earlier Apple IIs, the IIIGS offers exceptional advances in both graphics and sound (hence, GS). With a new 16-bit microprocessor, 256K of RAM, and plenty of peripheral ports, the IIIGS redefines the Apple II series in some amazing ways—and IIe owners can easily upgrade their machines to the IIIGS.

COMPUTE! Associate Editor David Thornburg has had a hands-on preview of the new Apple IIIGS, and filed this report. Because of the importance of the IIIGS, COMPUTE! Publications is running this article concurrently in COMPUTE! magazine and COMPUTE!’s Apple Applications Special.

It happens whenever a new computer hits the market. In a matter of weeks, sometimes days, you start to hear two criticisms.

It doesn’t use the latest technology. That means the computer is compatible with earlier, similar machines. You heard this when computers like the Apple IIc, Commodore 128, and IBM PCjr were released.

There’s no software for the computer. A bit harder to decipher, this means the machine uses some or all of the latest technology. The Macintosh, Commodore Amiga, and Atari ST fit this one.

Seems like a no-win situation, doesn’t it? It was, until now.

Apple’s recent announcement of the Apple IIIGS, the latest addition to its original line, puts both those criticisms to rest. The IIIGS is first and foremost an Apple II, and as such it runs nearly all of the Apple II software on the market today. Yet it’s also a new computer that has its own advanced modes of operation—some of which eclipse the Macintosh in performance.

In short, the Apple IIIGS is two machines in one—a product that bridges the gap between the Macintosh and Apple IIe, and in so doing poses what may be serious competition for the Commodore Amiga and the Atari ST series.

The Newest Apple

GS stands for Graphics and Sound—areas where this computer is most noticeably different from its other Apple II namesakes.

Anyone who’s worked with the older II-series machines has had to contend with relatively primitive graphics and sound—capabilities that are a nostalgic remnant of 1970’s technology. For instance, if two areas of the hi-res graphics...
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The designers of the JIGS knew
This chip alone justifies the
existing Apple II software, but it is
tomaintaincompatibilitywiththe
ware on the market. The solution
was to use the 65C816—a 16-bit
user interfaces.

The purity of the IIIs color
display has to be seen to be appreci­
ated. Apple chose to use a noninterlaced screen and the resultant picture is very easy on the eyes. One side effect of the 16 luminance levels is the ability of the IIIs to display monochrome pictures with a true grey scale, rather than using halftoning techniques that trade off grey levels for resolution. As a result, digitized photographs look much better on the IIIs screen than they do on the Macintosh, where each pixel is either “on” or “off,” black or white.

Of course, the independent control of hue and luminance is not new to the personal computer industry—Atari was (to my knowledge) the first to introduce this scheme to personal computers.

An Ensoniq Sound Chip
If the IIIs graphics capabilities are
good, the machine’s sound capabilities are in a class by themselves. Rather than work with the (by now) ho-hum sound chips that provide simple ADSR (Attack, Decay, Sustain, Release) envelopes on sounds made from a small set of basic waveforms, the IIIs uses a custom 32-oscillator chip from Ensoniq similar to the one used in the $1700 Mirage synthesizer. This chip is capa­
ble of generating 15 voices of music, allows excellent speech syn­
thesis, accurately reproduces sampled sounds, and is provided with its own 64K of RAM so that music can be played in a background mode while other programs are running.

This chip alone justifies the price of the IIIs to many music fans and fanatics.

All This With A 6502?
One of the reasons that the 68000-based computers like the Macintosh, Atari ST, and Amiga have become so popular is because the older eight-bit chips were running out of steam—especially when program­mers wanted to create new user interfaces.

The designers of the IIIs knew the 6502 and its slightly bigger brother, the 65C02, were inad­quate for the task, but they wanted to maintain compatibility with the massive amount of available soft­ware on the market. The solution was to use the 65C816—a 16-bit processor that can emulate a 6502. The 65C816 forms the heart and brains of the IIIs and, like the Roman god, Janus, looks backward—
to the days of the 6502—and for­ward—to capabilities that go bey­
ond the limits of the 8-bit world.

As a result, IIIs not only runs existing Apple II software, but it is
You smirk. Your opponent winces.

You bow. So does he.

The World Karate Championship begins.

Slowly, ever so slowly, you approach. He flinches, and you make a combination front punch and kick. You spin, then do a reverse kick. A forward flip. You kick again, only higher. Bang. It connects. Lights out. This time, you survived in one piece.

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Throw them from the ring. Crush their heads. Slam them to the mat. Pulverize their puny bones. You’ll have over 25 moves to pin your man. You’ll need over 250 stitches if you don’t.

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EPYX

One to eight players. Apple II & compatibles. Atari ST, C64/128.
also made the Macintosh so popular.

Easily Upgrade Your Ile
Lift the hood on the IIGS and you’re treated to a view of a circuit board identical in size to the one inside the Apple Ile. This lets Apple offer a special upgrade for Ile owners. For a modest price you can take your Ile to your dealer and upgrade to a IIGS. Only the power supply, case, and keyboard are retained—the circuit board and basepan are replaced.

A closer look at the circuit board reveals a familiar set of seven peripheral card slots that accept the same plug-in cards used by the Apple Ile. But unless you have a lot of old cards lying around, you probably won’t have to use any of these slots.

That’s because the back panel already features a game/joystick port, a disk drive port (which accommodates up to six drives in either the 5¼-inch or 3½-inch format), two serial ports (including support for the AppleTalk network), composite video out, audio out, and the analog RGB video output. The remaining back panel port is the Apple Desktop Bus—up to 16 keyboards and mice may be connected via this bus. (The IIGS is the first computer in the II line to be shipped with a mouse.) Expect to see a lot of interesting peripherals on the market that take advantage of this Desktop Bus.

The circuit board contains 256K of RAM that can be expanded (through a built-in connector) to eight megabytes. The on-board 128K ROM can be expanded to one megabyte, another indication of the possible third-party support for this computer.

Several custom chips fill out most of the remaining real estate on the IIGS’s circuit board. One of the most interesting is the “Mega II”—a chip effectively duplicating the entire Apple Ile or IIC. Don’t be surprised to see this chip used to create a three- or four-chip Apple Ile someday soon.

Sound, graphics, and the Apple Desktop Bus are each controlled with dedicated chips, shifting the burden from the micro-

Software Support

While Apple Computer may not have announced any programs specifically designed for the Apple IIGS, the company has gone out of its way to support the development of programs by third-party vendors.

Apple’s position is easy to understand. In the first place, the IIGS runs existing Apple II applications and runs them at three times their normal speed. This alone breathes new life into old products and relieves some of the pressure for creating software to justify the purchase of a new computer. At the same time, Apple wants to make sure that people know that the IIGS is more than a very fast Ile—that it has many features of its own which justify the creation of new programs. Rather than dilute internal programming efforts to create one or two special programs, Apple has seeded many developers with systems on which to create programs of their own.

More than 40 companies have announced, or will announce, products specifically geared to the Apple IIGS. Some of these companies are familiar names (Broderbund, Electronic Arts, Scholastic, and so on), while others are relative newcomers to the field. Because the IIGS supports both the Apple II environment and also supports the Macintosh style of programming, the list of developers includes names well known to Macintosh users as well as to owners of the Apple IIs.

The Development Path

Those developers who started early on the IIGS had to make use of the ORCA Assembler and frequent upgrades of the system software. High-level languages (like C) were made available late in the product-design cycle. This presented challenges to developers, some of whom took advantage of their prior experience to leapfrog their way through what would otherwise be a very tedious development process. Typifying this latter approach is Electronic Arts, a company known for an assortment of creativity software that is seen on almost every Amiga computer ever sold. From its beginning, Electronic Arts was committed to creating software with high-level languages such as C. The company’s goal was to be as machine-independent as possible, thus simplifying the porting process to new machines (like the IIGS). As a result, Electronic Arts has converted (or will convert) its stellar Amiga programs to the IIGS and thus take advantage of the rich colors and sound available from this newest addition to the Apple family tree. According to Electronic Arts president, Trip Hawkins, the company has developed more high-level language programs for the 68000 than anyone else. The task of converting these programs to run on the IIGS is a lot easier than designing programs from scratch. Upwards of 25 programs for this computer are in development by this one company alone.

Desktop Publishing

Broderbund has virtually defined the home desktop-publishing market with its popular program, The Print Shop. A new version of this program, along with a host of other products, could help cement Broderbund’s reputation as a premier supplier of home-based productivity software.

Education

The education market for the IIGS is probably going to take some time to develop, simply because of the limited budgets of most schools and their reluctance to part with their present computers. But Apple’s upgrade policy to convert Ile’s to IIGS’s will help. In the meantime, companies well known for their interest in this market are actively developing programs for this computer. Among these are such familiar names as Scholastic, Spinnaker, and Tom Snyder Productions.

The Buyer’s Guide

The companies listed in this article are but a few of many firms who are creating programs specifically for the Apple IIGS. The next few months will be accompanied by a flurry of activity as others jump on the bandwagon for this computer.

The programs for this new computer will open a new world of computing for us, and it’s most heartening to see so many developers quickly moving to support it.
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processor. The result is a computer that provides tremendous room for software development.

**Turbo II**
The IIGS clock runs at 2.8 MHz, almost three times the speed of the Apple IIe. As a result, programs designed for the older II-series machines run at close to three times their normal speed. This is an advantage for some programs, but not for others. Most players would be truly hard-pressed to set new records if games ran at three times their normal speed. To compensate, you can set the computer’s speed to the “old” value with the IIGS’s on-screen control panel. Games written for the IIe or IIc will then play at the correct speed.

The control panel also lets you set the color of the text and the background, as well as the pitch and volume of the internal “beep.” Again, while this kind of control is familiar to owners of Atari and Commodore computers, it’s a welcome addition to the Apple II line.

**What About Software?**
At the time of this writing well over one hundred outside developers were actively engaged in creating software for the IIGS. By the time you read this, the number is probably triple that, with new entries being announced every day.

Apple itself, however, is conspicuous in its absence from these announcements. The company appears to be content to provide support for outside developers rather than dedicating its resources in aggressively developing its own programs for the IIGS.

There’s good reason for this approach. Unlike the Macintosh—a computer released with no immediate third-party software support—the IIGS runs the vast library of Apple II programs. The IIGS is a machine that you can use from the moment you unpack it and set it up. As new products are developed to take advantage of the IIGS, people will move away from the pure Apple II software and toward the newer titles with their improved performance.

David Thornburg is an associate editor with COMPUTE! magazine, a frequent contributor to other publications, and the designer of Calliope—an idea processor for the Apple IIe, IIc, the Macintosh, and now the IIGS. He may be reached in care of this publication.
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Cutting Telecommunications Costs

Kathy Yakal, Assistant Features Editor

Learning to keep your telecommunications costs as low as possible is one of the secrets of online success. Here are a few tips to help you conserve your money while still enjoying the pleasures of telecomputing.

There’s probably no other personal computer application that can be as costly overall as telecommunications. The initial costs are low: a modem, a cable, perhaps, and terminal software. And if you limit yourself to calling local electronic bulletin board systems (BBSs), your expenses can end there.

An Exciting And Varied World
But it’s a rare computer owner who can resist moving out to explore the exciting and varied world of telecommunications. Your first taste of online activity usually leads to the desire to find out what’s happening online across the country. So you start calling out-of-state BBSs, and maybe subscribe to an online service or two. Soon, you’re facing startup subscription fees, monthly service and hourly online charges, and steadily climbing telephone bills.

However, there are ways to economize online.
• Familiarize yourself thoroughly with whatever system you’re on before attempting to accomplish anything there. Obviously, familiarizing yourself with the system is accomplishing something, but don’t even attempt extensive online chatting before you understand the command system and menu structures. Fortunately, most systems offer a lot of help in this area, and encourage the user to spend some time getting acquainted. For example, the Delphi telecommunications system requires each new user to go on an online tour at the first sign-on. QuantumLink, a Commodore-specific service, offers guided tours to new users at regularly scheduled times. In fact, most of the major telecommunications networks attempt some sort of introductory orientation for new users, whether it’s through written instructions or online tours.

When you’re using a system where this kind of automatic help isn’t available, it’s a good idea to download (have sent from the host...
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CH Products new MACH IV JOYSTICK is two controllers in one. A high-precision mouse replacement and joystick combined. This means you can use it with any program that requires a mouse or with any program that requires a joystick.

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<th>Model</th>
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<tbody>
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<td>MACH IV Apple II/IIC</td>
<td>$89.95</td>
</tr>
<tr>
<td>MACH IV Macintosh (works as a mouse only)</td>
<td>$89.95</td>
</tr>
<tr>
<td>MACH IV for IBM PC/XT/AT and compatibles</td>
<td>$119.95</td>
</tr>
<tr>
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computer to your disk drive) Help menus (usually accessed by typing H or a question mark symbol at a command prompt), and later print them out and study them offline (disconnected from the host) until you know them well.

These menus often contain detailed explanations of each command, and give you a good idea of the quickest, easiest ways to get around the system. It may seem a lot of trouble, but learning them will save enormous frustration, time, and money. The system operators (sysops) at each network are usually available if you really get stuck, and most are quite happy to help. But remember, if you're trying to get help while online, you're generally paying for the connect time.

• Once you've learned a system fairly well, consider using its Expert mode. Most systems, and even many BBSs, offer a mode for experienced users that allows them to bypass many of the menus and go straight to the desired area. You need to be sure you know your way around well before you start using this, or you could find yourself locked out of the menu structure and unable to go anywhere.

Switch To A Faster Modem
• If you do a lot of downloading, seriously consider getting a 1200-baud modem. While 300 baud is a good speed for socializing, it can be frustratingly slow when you simply want to download a program into your computer. At the same time, 1200-baud is often too fast for chatting, if several people are participating online. There's no simple formula to help you determine whether or not the savings from fast downloads will justify the expense of a 1200-baud modem. While it's true that you're getting the information four times faster, most systems have a higher hourly charge for 1200-baud use. In the long run, however, computer users who opt for 1200-baud service generally don't choose to return to 300-baud.
• Speed up your log-on time by using a more sophisticated terminal program. Many terminal programs let you create macros, small user-definable routines that set up an automatic log-on procedure. If there is one area where you always go first, or one task you always perform (such as checking mail), you can add that to the macro and save some time and keystrokes. Here again, the savings may or may not be worth the extra expense of a new terminal program. But the extra convenience may play a part in your decision.

Use Off Hours
• Try to confine the bulk of your downloading to times when the system is relatively quiet. Systems that operate on a 24-hour basis charge lower rates for off-peak hours (evenings and weekends), thus offering substantial savings. But even off-peak hours are busier at some times than at others, usually from about 8:00 until 11:00 in the evening. At those times, a system sometimes suffers from short delays, pauses between the time you type commands and the time they're executed. You'll save some money if you steer clear of those hours.

If telecommunications at off-peak hours, such as 2:00 in the morning, is impossible, there are programs that will automatically log you on to a system at a specified hour, do the tasks you've assigned them, and log you off when they've finished. This doesn't necessarily require you to leave your computer on all night. If your computer can be set to boot up automatically when the power comes on, you can leave your disk in the drive and get an automatic timer that will turn the computer on and off at predetermined hours.

Don't Edit Online
• Consider shopping for a new long distance telephone service that may have lower rates than your present system. This won't make any difference if you only call the major telecommunications services and live in an area with local-access numbers for services like Tymnet and Telenet, which act as connectors to the telecommunications services. But if you're calling a lot of BBSs long distance, you might be able to reap some fairly significant savings if you switch to a more economical long-distance service.

• If you're downloading messages at 1200-baud, dump all of them to disk and search through them later. Searching through messages and deciding which ones you want to keep can be quite time-consuming. If you're at 1200-baud, it might actually save online charges to dump a whole group of messages without stopping to read them and deciding which to save and which to discard. After you've logged off, you can go through the file and keep only the ones you want.

• Set an alarm clock near to your computer. This may sound rather silly, but it's easy to lose track of time when you're online, especially in your first few weeks of telecomputing. Even if you don't feel you need to set absolute limits for yourself, it will alert you as to when a set period of time has gone by. Some terminal software includes an alarm clock function.

There are no hard and fast rules when it comes to saving money online. The more experience you get in telecomputing, the more efficient you'll become. You'll also find that all of the telecommunications networks are trying to offer ways to increase their subscriber base and their percentage of online usage. As a part of this effort, rates are getting less expensive, systems are becoming easier and faster to use, and there are more services being offered within each network. Increasingly, the happy result is more telecomputing for the money.
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Sharon Zardetto Aker
$16.95 ISBN 0-87455-042-4 287 pages

Microsoft Works offers a system of four integrated modules for home and business Macintosh users. This comprehensive guide and tutorial shows how to use Works efficiently and easily. Works includes a word processor, database, spreadsheet, telecommunications, and graphics, and this book describes how to master Works—from creating form letters with the word processor to tax forms with the spreadsheet. Integrating the modules is explained and illustrated. More than a tutorial, more than just a reference, Mastering Microsoft Works is the complete guide to this state-of-the-art software.
The SIG Wars

It started in earnest when newcomer People Link became the first service to use the electronic-mail facilities and SIG message boards of its competitors to solicit new subscribers. While some telecomputing buffs appreciated both the irony and cleverness of this approach, People Link’s competitors were not amused. CompuServe even amended its user agreement to specifically forbid solicitation of its customers by its competitors. The CompuServe user-ID of anyone sending such messages will be subject to revocation.

The People Link response was to take advantage of the ability of MCI’s electronic mail to “gateway” to CompuServe’s E-mail system. CompuServe was effectively checked since the only way to stop the unwanted message flow would be to shut off all messages using the MCI/CompuServe connection.

Since that time, things have been steadily heating up in a series of online border clashes. One of the most popular services offered by the commercial services is Special Interest Groups (SIGs), areas where like-minded users can exchange messages, chat online, and access public domain programs. A high-quality public domain program library is almost essential to the survival and financial viability of a SIG. The SIGs are funded by system operators (sysops) who receive a share of the connect-time charges racked up by SIG users. The SIG response has been to set up shop on other services. In an effort to expand their public domain libraries, GEnie eliminated connect-time charges for uploading programs early this year. Within a few months almost every other information service followed suit.

Even purveyors of popular “shareware” have begun to form liaisons with commercial services. In return for a percentage of the download charges, the shareware author grants an information service semi-exclusive distribution rights for a month or so. The early availability of new releases acts as a drawing card for new users.

The most recent spat of SIG controversy concerned a user whose name we will change, in the tradition of “Dragnet,” to “Dash.” of a SIG on Delphi. Dash, a talented programmer, developed a great public domain terminal program for the Amiga called “DashTerm.”

Even purveyors of popular “shareware” have begun to form liaisons with commercial services. In return for a percentage of the download charges, the shareware author grants an information service semi-exclusive distribution rights for a month or so. The early availability of new releases acts as a drawing card for new users. The most recent spat of SIG controversy concerned a user whose name we will change, in the tradition of “Dragnet,” to “Dash.”

When offered a lucrative sysop position on CompuServe, Dash accepted. Dash also modified his terminal program to include a notice that it was available only via CompuServe and could not be uploaded to other services or otherwise distributed. This made perfect sense to Dash since he would get a “cut” of the connect-time charges used to acquire his program. Dash’s old crowd on Delphi strongly objected. Many who felt that they had helped find flaws in—or made suggestions that had improved—DashTerm felt that they were being given short shrift.

Enter another personality we’ll call “Lear.” Lear has been maintaining a set of public domain programs for the Amiga on disk, which he distributes to the public for a nominal media and copying charge. Lear asked Dash if his modification meant that Lear couldn’t include Dashterm anymore in his public domain library. Dash replied that it could not be included, which Lear really didn’t have any problem with. Lear was then informed by CompuServe that he is prohibited by the terms of the CIS User agreement from distributing any public domain software downloaded from CompuServe.

This touched off a tidal wave of messages within the SIGs of almost every commercial service. The populist argument: “If it’s public domain software, there is no copyright. An information service can’t claim rights to it and nobody can tell anyone what they can or can’t do with such software.” To be fair, there was a tendency on the part of the most vocal proponents of free exchange to characterize CIS as the Dark Side of the Force.

The Information Police Are At The Door

CompuServe’s argument was simply that redistributing material from CIS in any form was contrary to the CompuServe user agreement. This includes giving a copy to a friend, uploading it to another service, or submitting it to a user-group library.

What’s the bottom line of all this nonsense? As the legal eagles who joined in the online debate noted, CompuServe was within its rights. It’s hard for any service not to be, since they all reserve the right to make any changes they deem necessary to their user agreements. The barristers also noted that attempting to enforce such “shrink-wrap license” policies is almost impossible...wait a minute—there’s the doorbell; I gotta go. My wife says the information police want to ask me a few questions.

(Editor’s note: For CompuServe’s view on these topics, see “CompuServe and Public Domain” on the next page.)
**CompuServe and Public Domain**

Selby Bateman, Features Editor

(Founder's note: See “Telecomputing Today” on the previous page before reading this article.)

Philosophical differences have long existed between those computer users who favor free access to software and those software producers and distributors who see computer programs solely as a commercial market. Between those two points of view, however, lies a great deal of territory relating to software ownership, access, and distribution.

One of the most recent and heated debates, as noted in this month’s “Telecomputing Today” column, concerns the question of free access to public domain software and a telecommunications service’s right to control distribution of the programs and information it provides to its members.

**A Bum Rap?**

While some telecomputing enthusiasts have recently fired salvos at CompuServe for limiting distribution of the public domain programs it carries, the CompuServe organization believes it’s getting a bum rap. CompuServe officials say their policies—including the user agreement copyright of all material on the service—are a positive, contributing force in the distribution of public domain software.

What CompuServe wants to protect, says Rich Baker, director of corporate communications for CompuServe, is its members’ rights as well as the programs and information on the system. CompuServe’s user agreement copyright notice does say that the information and programs there are for the express purpose and use of the owner of a CompuServe identification number. That means no copies of any public domain software can be made legally for distribution without prior written permission from CompuServe, he says.

“The purpose of the [CompuServe] copyright is to protect the work that is on the CompuServe Information Service. That is for the benefit of our customers, so that if someone does indeed download some of the material and resells it for commercial gain, there’s some recourse that can be taken to protect our customers. That’s the whole purpose of the copyright. From that has spun off a number of opinions, some that I think are inaccurate,” he adds. “As it relates to public domain software, we encourage very much the use of CompuServe to post public domain software.

“First, we make a tremendous amount of storage available to hold those kinds of programs. Second, we turn off the clock for people who are uploading the programs to us now. So it doesn’t cost them anything to upload the programs. And third, we actually publish an electronic—and soon to be printed—column that’s called ‘The Best of the Uploads.’ We work with our system administrators and a freelance writer to collectively take a look at the software that’s been uploaded, and some of the more popular ones. Then we’ll write about them and bring them to our customers’ attention so that they can use them, too. So, we really encourage the use of public domain software an awful lot on our system.”

**Encouraging Public Domain Software**

One recent article in a Southwestern newspaper claimed that CompuServe’s copyright rules were, in effect, a claim of ownership of public domain software, says Baker.

“It was quoted there that our policy evades the spirit of public domain, and I took real exception to that because it really doesn’t. Everything we do encourages the public domain software concept, everything from our free uploads to the fact that we publicize the good programs for our customers.

“It can easily be summarized by saying that the copyright is instituted as a measure of protection, not necessarily as a measure of ownership. And it’s something we feel is important for the feeling that our customers have that they can use our service, and what goes on there is protected and is in their best interests,” he says.

Is such a copyright enforceable? Baker admits that, to his knowledge, no one has challenged the legality of the user agreement and the copyright.

“I think once people understand the intent, they don’t have a problem with it. And the term copyright—you know, this is just such a different medium. We’re applying rules, laws, procedures from different media onto this new medium. And therefore, in many ways, the opportunity for misinterpretation might be a little bit greater. But our goal is to continue to educate people and help everybody understand what it is the medium has to offer—and the rights that people have to the information and the rights that the people have who supply the information. It’s a continuing process.”

For those members of CompuServe who may wish to distribute copies of downloaded software, Baker says there is a procedure.

“It’s just like any other copyright. They would make application in writing to us, and we would review it and respond in writing with permission or denial.

“We look at every situation as a unique situation. And we follow pretty much the guidelines that are a part of the copyright policy. With very few exceptions, permission is granted,” adds Baker. “It very heavily reflects on whether it’s a program or whether it’s information. It really reflects on how it’s going to be used.”

November 1986, COMPUTE! 31
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A panel of well-known software developers, educators, and computerists explain where educational computing has been, where it’s going, and why.

**The Story Machine**
Children of all ages can write, read, and print stories up to 20 pages long with this easy-to-use word processor for all Apple II computers.

**Solarpix**
Educational software that entertains, this tour of the solar system is a dazzling display of the Apple’s graphics power.

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Look for the Fall/Winter 1986 issue of COMPUTE!’s Apple Applications Special on sale where you buy other COMPUTE! publications, or order directly from COMPUTE!. This special issue goes on sale October 7, 1986.

Send in the attached order card or call toll free 800-346-6767 (in NY call 212-887-8525).
One of the most rapidly evolving segments of the ever-changing personal computer field is telecommunications, connecting your computer to other computers through telephone lines. All you really need in order to get started is your computer, a modem that translates your computer’s signals into tones that can be transmitted via telephone lines, and a terminal program that coordinates the actual transmissions.

Once you begin telecomputing, you quickly find that among the most interesting and varied online pursuits are the different telecommunications services that offer you hundreds of different activities and access to thousands of computer users.

Individual services vary quite a bit, depending on what kind of computer user each is hoping to attract. Some services cater to business customers, but a growing number are trying to interest home computer users. The major consumer services listed below don’t include all of the systems you’re likely to run into. But, they have become the best-known major services among personal computer owners.

**American People/Link**
It’s been almost two years now since American People/Link went online with its combination of news, entertainment, conversation, electronic mail, CB simulation, and games. Among its variety of online clubs, the Commodore Club continues to be one of the most popular areas of use.

People/Link users are called Plinkers, and the emphasis is on interaction among members, ease of use, and low cost. Users receive regular printed information updates called LinkLetters. There is a Help system for beginners, as well as Advanced Mode, which lets more experienced members move around more quickly.

American Home Network, 3215 N. Frontage Rd., Suite 1505, Arlington Heights, IL 60004; 800-524-0100 (Illinois residents call 312-870-5200); prime time fees are $11.95 for 300 baud and $12.65 for 1200 baud. (Illinois residents pay $4.25 at all times.)

**CompuServe Information Service**
CompuServe remains the nation’s largest computerized consumer information service, and continues to add to its huge library of online offerings. The financial services area, in particular, has undergone extensive growth. Three brokerage services are offered for online transactions, and Wall Street financial information from 1973 forward is available.

One of the new financial services offered on CompuServe is COSCREEN, which lets investors screen information about companies through as many as 24 different search variables.

In addition, CompuServe has added greatly to its database library through the IQuest gateway link. An additional 700 databases have been added to the approximately 400 already available on CompuServe. The new databases are primarily in the reference and bibliographical areas for such professional fields as health, law, real estate, and many others. The new databases also include many national and regional newspaper files, as well as adding the UPI (United Press International) news wire. CompuServe already offers the AP (Associated Press) service.

Another service area undergoing major growth is the expanded travel information and transactions section. Using the Online Airlines Guide (OAG), you can book your own reservations anytime and anywhere. There’s even a ski reservations service called the Rocky Mountain Connection that lets you schedule an entire ski weekend or extended ski trip.
The popularity of CB-style communication has led to a new digitized database of users’ photos. Send in a photo of yourself to CompuServe, and the company will digitize the photo for free and include it in a database of all members who send them in. So, if you’ve been chatting online and made a new friend, you can call up the name of the person and see a digitized picture on your screen. This service is an offshoot of CompuServe’s earlier digitizing of photos of the FBI’s ten most wanted criminals.

CompuServe, P.O. Box 20212, Columbus, OH 43220; 800-848-8199; $39.95 registration fee; prime time access is $12.50 an hour at 300 baud and $15 an hour at 1200 baud, with non-prime time rates of $6 an hour at 300 baud and $12.50 an hour at 1200 baud.

Delphi

Delphi has added a variety of new services to its offerings, including Computer Express, an interactive shopping service that offers computer software and accessories at discount prices. Ordering is quite simple: If you see something of interest while browsing, you type the letter O. Information on that item is stored in a personal file, which is called up when you enter the command to exit. At that time, you can either cancel the order or place it.

Another new service is a classified advertising section, which allows you to receive responses to your own classified ads either via Delphi mail or through mail/telephone orders.

For those visiting the Boston area, Delphi Boston is a special online service offering hotel and restaurant guides, sports schedules, and other information of interest to residents of and visitors to the area. There’s also an expanded travel service on Delphi now, which allows you to shop online for the best airline rates and schedules and make your own reservations.

A new magazine and book order area lets you subscribe to various publications and even change mailing addresses online. In addition, you can correspond with the editorial staffs of participating publications.

Delphi, 3 Blackstone Court, Cambridge, MA 02139; 800-544-4005; $49.95 registration fee; prime time access is $17.40 an hour and non-prime time access is $7.20 an hour.

Dow Jones News/Retrieval

Dow Jones is considered the premier business and financial computer news service, and its databases carry extensive financial and stock market data as well as a growing array of other news and information.

Over the past several years, the subject areas included have broadened into many other areas. As with the other major services, users can find everything from general-interest news, weather, and sports to airline guides, college selection services, and an online encyclopedia. As with CompuServe, the number and variety of offerings are huge. Dow Jones News/Retrieval, P.O. Box 300, Princeton, NJ 08540; 800-257-5114; $29.95 registration fee, which gives you five free hours; $12 annual service fee that’s waived the first year. At 300 baud, prime time access fee is 90 cents per minute, and non-prime time rates are 20 cents a minute. At 1200 baud, rates are 2.2 times those at 300 baud. In addition, about 8 of the 40 online databases carry a surcharge.

GENie

After only a year of operation, GENie has developed a subscriber base of over 20,000, and plans to have 30,000 by the end of 1986.

Some of the newer services include the American Airlines Easy Sabre Travel Service, which lets you peruse fares and schedules, and make reservations online; 25 new SIGs (Special Interest Groups), ranging from computer-related areas to science fiction/fantasy to scuba diving; Hollywood Hotline, a database of movie reviews, both current and as old as 10–15 years; and suspension of the $5/hour surcharge while public domain software is being uploaded. Of the approximately 10,000 data files available on GENie, 75 percent come from users.

General Electric Information Services, 401 N. Washington St., Rockville, MD 20850; 800-638-9636, ext. 21; $18 registration fee; prime time access is $35 an hour, and non-prime time access is $5 an hour.

QuantumLink

The Source

In its first year of operation, this Commodore 64/128-specific service has received quite a bit of interest. Several months ago, new software for the system was released, adding features such as a new downloading mechanism that speeds up downloads anywhere from 20 to 60 percent; a status report during downloads that tells you how much of the download has been completed as you go along; reorganization of the software libraries, making it easier to find programs; an overhaul of the message boards for easier use; and an auto-boot program for Commodore 128 users, as well as an auto-redial capability.

QuantumLink Customer Service, 8620 Westwood Center Drive, Vienna, VA 22180; 800-392-8200; no registration fee; $9.95 monthly charge (no additional charges except for certain selected services at six cents a minute).

The Source continues to add services for both consumers and business users. Among the new services are SIGs, including those for Commodore, Apple, and IBM computers. Like other telecommunications services that offer SIGs, The Source offers messaging capabilities, public domain software for downloading, E-Mail, and a variety of other areas of interest to personal computer owners.

There’s also a new service called USA Today Broadcast. This is a special feature offered to those employed in the field of broadcasting. Gannett, publisher of USA Today, makes editorial content available online prior to printing the actual publication.

The Source, 1616 Anderson Road, McLean, VA 22102; 800-336-3366; $49.95 registration fee, which includes 300-page manual. Billing is $10 a month or your usage, whichever is greater. At 300 baud, prime time access is 36 cents a minute and non-prime time is 14 cents a minute; at 1200 baud, prime time rate is 43 cents per minute and non-prime time is 18 cents a minute.
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X*Press Information Service

The Cable TV And Personal Computer Connection

Kathy Yakal, Assistant Features Editor

One of the benefits of computer telecommunications is that information from many different sources is instantly available. Traditionally, that process has involved using a modem and terminal software. But recently a new cable TV-based information service was introduced that offers personal computer owners immediate access to news from around the world.

X*Press Information Services of Golden, Colorado, recently began offering a new way to harness the power of satellite transmissions, combining cable television and a personal computer. This service, called X*Press, lets personal computer owners who subscribe to participating cable companies pick up general news, business news, financial information (including stock quotes from all major exchanges), weather, sports, feature articles, entertainment, and other information for a flat monthly fee. The same cables that bring in your TV programs carry this information service to your computer.

X*Press is a new approach to the efforts by various telecommunications firms to deliver everything from home banking and shopping to instant access to news and other information. Experiments in videotex and teletext, each of which brings information to your computer or television screen, have had generally limited success in attracting a mass consumer market. But X*Press, with its tie-in with cable companies, ease of use, and flat monthly fee, offers yet another potential market.

Teletext generally refers to the transmission of information to your television, computer, or a special receiver via a standard broadcast signal. On the other hand, videotex usually refers to a more interactive information process in which your computer talks to a company’s main computer. With videotex, for example, you might be able to buy stocks and bonds, select items to purchase, and engage in other interactive pursuits.

X*Press is closer to teletext service, delivering text on a multitude of topics instantaneously.

How Does It Work?

Satellite transmissions and other data are received at the X*Press Processing Center, where the information is coded to be read by the center’s computer software. From there, it’s sent to a telecommunications satellite, which then transmits the information to local cable systems. The cable companies relay the data via cable lines to a subscriber’s home or office computer. This information is available to subscribers at the same time the information is arriving at newspapers, radio and TV stations, and news networks.

The service works with a variety of personal computers, each with different requirements. Apple IIe and IIc subscribers will need 128K RAM and the X*Press Apple Software Module; IBM and compatible subscribers will need 256K RAM, MS-DOS version 2.0 or later, an asynchronous RS-232 port, and the X*Press IBM Software Kit; Commodore 64, 128, and Plus/4 subscribers will need only the X*Press Commodore Cartridge.

Information on X*Press is transmitted on each of these systems at the highest data rate a personal computer can now accept: 9600 baud.

After your system is set up and the software loaded, moving around within the X*Press system via menus is easy. You can choose to see stories in the three categories which follow.

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Central News Agency (Republic of China, Taiwan)
Deutsche Presse Agentur (West Germany)
KYODO Oapan
Notomex (Mexico; in Spanish)
OPECNA (Oil Producing and Exporting Countries News Agency)
TASS (Soviet Union)
XINHUA (People's Republic of China)

Exchanges
American Stock Exchange
Montreal Exchange
NASDAQ
New York Stock Exchange
Toronto Stock Exchange
Vancouver Stock Exchange

Launched in January 1986, X*Press is already being used on 76 different cable television systems across the country, with approximately 1000 subscribers. Subscribers purchase X*Press through their cable service and pay a monthly fee, as with other premium pay services offered by cable television systems. They can access the information 24 hours a day, seven days a week. The suggested price for the service is $19.95/month.

For more information, write to X*Press Information Services, 1536 Cole Blvd., Bldg. 4, Suite 250, Golden, CO 80401, or use the toll-free telephone number, 1-800-7PC NEWS.
Meeting new friends is what People/Link is all about; whether it's via live PartyLine chatting or in one of the popular special interest clubs. There are clubs for computer buffs, hobbyists, dating, sports, religion, lifestyles, and more. And, of course, they all have complete upload and download support. Our private mail system even allows "power" users to send binary or ASCII files of up to 192K.

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USE YOUR VISA, MASTERCARD OR AMERICAN EXPRESS CARD.
Here's a game guaranteed to bring out the daredevil in any computer owner. The original version of "Biker Dave" is written for Atari 400, 800, XL, and XE computers. We've added new translations for the IBM PC/PCjr, Commodore 64, and Amiga. The Commodore 64 and Atari versions require a joystick.

As the ramp nears, you focus your mind, tighten your grip on the handlebars, and accelerate the motorcycle for the final approach. The deep, throaty cry of your machine's powerful engine drowns the spectators' cheers, and the onrushing wind pushes against your body like a gigantic hand. If your speed and timing aren't exactly right, you may overshoot the ramp and lose control, or fall short into the line of cars.

Will you earn fame by surviving the jump or tumble into anonymity with a cartwheeling crash? As your speed mounts and the sidelines fade into a blur, there's no more time to wonder and no chance to turn back. Only the utmost in coordination and skill will bring you safely to earth on the other side.

"Biker Dave" is a realistic computer game that simulates the thrills and challenge of motorcycle acrobatics. Type and save the program listed for your computer, and be sure to read the general game instructions as well as the specific notes for your machine.

**Over The Ramp**

Biker Dave begins by asking you to select one of the two available skill levels: The rookie level is easier than the pro level. With this preliminary out of the way, the program displays the game screen. In the upper left corner of the screen is the garage where you begin the ride. The rest of the screen contains the racetrack, with a couple of tunnels along the way, and a formidable obstacle which consists of several autos flanked by launching and landing ramps. Press the joystick button to accelerate the bike. Your goal is to ride down the track, through the tunnels, and toward the final obstacle, gaining just enough speed to jump over the cars without crashing.

That may sound easy, but it's not as simple as you might think. For one thing, your bike is a specially built stunt machine with no brakes. Should you reach too high a speed, there's no way to slow down again. And if you accelerate too fast, the bike rises up into a wheelie. That's not bad in itself, but if you accelerate too hard from a wheelie position, the bike tips backwards and crashes.

As you approach the launching ramp, you need to go just fast enough to clear the parked cars, but not so fast that you lose control and miss the landing ramp on the other side. A successful jump requires precise timing and sure control of the throttle. The score you earn depends on the number of cars jumped and the number of attempts you made at that level.

Each time you jump over the cars, the racetrack crew moves the launching ramp and adds another car to the lineup. Unfortunately, the crew is somewhat unreliable and has been known to change the launching ramp's angle slightly when moving it. Thus, even though you may have jumped three cars with a speed of 100 miles per hour, there's no guarantee that the same speed will work every time.

At the pro level you must also jump a large hoop midway through the course. The hoop has a launching ramp, but no landing ramp. Each time a car is added to the final obstacle, the hoop's launching ramp moves farther away, as well.

**Atari Version**

This version of Biker Dave is written entirely in BASIC and runs on Atari 400, 800, XL, and XE computers. A joystick is required; plug it into port 1 before you run the program.

This program employs several techniques to compensate for the slowness of BASIC. Lines 1470-1610 position the P/M (Player/Missile) graphics at the same address as the string PO$. When a
Power—you know you love it.

You used to play RISK as a kid. Maybe you still do sometimes—whenever you can get enough people together.

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How to order: Visit your retailer. If you are unable to find the product at your local retailer, you can call 800-245-4525 for direct VISA or Mastercard orders (in CA call 800-562-1112). The direct price is $32.95 for the Commodore version. Apple and Atari versions coming soon. To buy by mail, send check or money order to Electronic Arts Direct Sales, P.O. Box 2330, San Mateo, CA 94403. Add $5 for shipping and handling (97 Canadian). Allow 4 weeks for delivery. There is a 14-day, money-back guarantee on direct orders.

For a complete product catalog, send SASE and a stamped, self-addressed envelope to Electronic Arts Catalog: 1610 Gateway Drive, San Mateo, CA 94404. RISK is a registered trademark of Parker Brothers Co. Commodore is a registered trademark of Commodore Business Machines. Apple is a registered trademark of Apple computer. Atari is a registered trademark of Atari. Borderlands and Cosmic Encounter are registered trademarks of EON Software. Lords of Conquest and Electronic Arts are registered trademarks of Electronic Arts. Lords of Conquest is based on the board game "Borderlands" by EON—the creators of "Cosmic Encounter."
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when the bike enters or exits the garage and tunnels, it goes in front of the blue opening, but behind the yellow or green walls. Similarly, the bike jumps through the hoop by going in front of the red portion, but behind the green. Line 1710 prepares for these three-dimensional graphic effects by putting a special value in the priority register (location 623).

Although the bike travels right, left, and then right again, the program itself doesn’t follow that flow. The code that performs the actual jump is located near the beginning of the program. Since lines with low line numbers run faster, this insures that the speed-critical portions of the program work as quickly as possible.

**Commodore 64 Version**

A joystick is required to play the 64 version of Biker Dave (Program 2), which includes a flaming hoop midway through the course. Plug the joystick into port 2 before you run the program. To accelerate the bike, hold down the joystick button. There is no rookie level in this version; the game ends when you crash your last bike or succeed in jumping nine cars at once.

**IBM PC/PCjr Version**

The IBM PC/PCjr version of Biker Dave (Program 3) requires cartridge BASIC for the PCjr, or BASICA and a color/graphics card for the PC. Press the space bar to accelerate the motorcycle. One skill level is provided; the game ends when you succeed in jumping nine cars at a time or run out of bikes.

**Amiga Version**

In this version of Biker Dave (Program 4) the left mouse button controls your speed. (Avoid the right button; pressing it may crash the program.) The game has no rookie level; it ends when you manage to jump nine cars at once or crash your last bike. You may wish to adjust the speed at which the left button responds by using the Preferences tool from the Workbench.

For instructions on entering these listings, please refer to “COMPUTE’s Guide to Typing in Programs” in this issue of COMPUTE.

**Program 1: Biker Dave For Atari 400, 800, XL, And XE**

```
140 GOSUB 140
200 GOSUB 200
590 GOTO 590
```

```
"Biker Dave" for Atari 400, 800, XL, and XE computers lets you vicariously experience the thrills of motorcycle acrobatics.

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```
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**Program 1:** Biker Dave For Atari 400, 800, XL, And XE
```
140 GOSUB 140
200 GOSUB 200
590 GOTO 590
```
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The Commodore 64 version of “Biker Dave” features a flaming hoop.

DQ 1510 DATA32,120,280,32,40,2,.128,0
EH 1520 DATA0,48,0,0,96,0,0,19,2
CA 1530 DATA0,1,1,1,1,1,0,0,0,3
DX 1540 DATA0,0,3,0,0,3,0,0
KJ 1550 DATA1128,0,1,128,0,0,0,192
RB 1560 DATA0,0,0,96,0,0,0,192
MM 1570 DATA0,0,0,0,0,0,8,0
GS 1580 DATA0,0,8,0,0,0,3,0
CJ 1590 DATA15,0,63,0,0,0,25,5
PR 1600 DATA0,3,255,0,15,255,0,.63
JS 1610 DATA255,0,255,0,255,0,255,0,5,255,0
XJ 1620 DATA0,0,0,0,0,0,0,0
CH 1630 DATA0,0,192,0,0,0,24,0
XA 1640 DATA0,0,252,0,0,255,0,0,0
HF 1650 DATA255,0,192,0,255,0,248,0,255,252
CM 1660 DATA255,0,255,0,255,0,255,0,5,192,0
MQ 1670 DATA0,0,0,0,0,0,0,0,0
KX 1680 DATA255,0,15,0,0,3,192,0,0,3
KJ 1690 DATA240,0,15,60,0,28,6,1,64
RP 1700 DATA85,125,80,105,246,144,130,216
XG 1710 DATA32,56,32,40,2,128,0
SF 1720 DATA3,192,0,3,192,0,3,0
XS 1730 DATA3,245,0,3,64,3,0
JB 1740 DATA22,128,3,216,32,3,248,32
SD 1750 DATA21,114,128,90,112,0,96,176
DF 1760 DATA20,32,128,0,10,0,8,0
KA 1770 DATA0,60,0,60,0,0,12
RB 1780 DATA0,5,252,0,21,12,0,6
QJ 1790 DATA76,0,138,124,0,130,0,252,0
FK 1800 DATA48,213,64,0,218,0,0,224
AD 1810 DATA44,0,32,128,0,10,0,8
QS 1820 XL£E"EIE+<CHR$(8)+"EX"+"CHR$(3)+"327X"+"CHR$(16)+"CHR$(248)+"LED"+"POKE35,0"
CD 1830 POKE316,280:POKE383,0:POKE316,POKE280:POKE289,56:POKE56334,0:POKE56:POKE334,0
GC 1840 POKE51,ML$="ML$="ML$="MN$="ML$="MNSYS(P$EE(51)+256*POKE(52)";POKE35;POKE56334,1

Press the space bar to accelerate the motorcycle in the IBM PC/PCjr version of “Biker Dave.”

KF 1850 FORI=12528TO12543:READJ:POKEJ,1:NEXT:POKE532170:PEEK(33272)AND2400OR 12
HG 1870 DATA15,16,32,127,183,127,48,48
KK 1880 DATA224,16,8,252,204,252,24,224
JP 1890 DATA2831,144,153,15,151,159
FE 1900 DATA13,16:FORI=0TO127:READAPOKEJ,1:AI:NEXT:RETURN
HI 1910 DATA81,64,0,1,112,69,0,1
HM 1920 DATA69,26,70,89,22,69,105
GQ 1930 DATA145,164,22,161,164,
1,65,144
KM 1940 DATA64,1,148,0,0,73,1,00,0
AE 1950 DATA25,100,0,36,24,6,0,6,4
QP 1960 DATA20,28,64,0,41,80,0,0
QA 1970 DATA100,0,36,25,0,164,
25,0
FA 1980 DATA0,6,128,0,1,64,0
HC 1990 DATA8,0,16,0,0,101,6
SK 2000 DATA9,102,78,89,166,0
1,64,144
GP 2010 DATA145,164,6,161,144,1,65,144
MG 2020 DATA0,60,100,0,5,24,0
PP 2030 DATA25,0,41,24,0,28,68
BP 2040 DATA25,0,8,0,0,5,100,0,2
QC 2050 DATA100,0,36,25,0,164,0,5,0
QR 2060 DATA60,128,0,1,64,0
PB 2070 FORI=1TO57:READA:POKEJ,
20+1,A:NEXT:SYST820:RET
UN
CR 2080 DATA0,120,169,65,141,20
1,65,139,141,21
BJ 2090 DATA3,88,96,173,27,21
2,41,1,77,254
AX 2100 DATA7,141,254,7,165,2
63,201,60,208,15
SJ 2110 DATA33,100,3,32,159,2
55,165,293,201,60
JA 2120 DATA288,247,32,103,3,
76,49,234,32,159
AF 2130 DATA255,165,283,201,6
0,246,247,96

“Biker Dave” for Amiga computers.

Program 3: IBM PC/PCjr Biker Dave
Version by Tim Midkiff, Editorial Programmer

IL 10 GOSUB120O:GET(288,1)-(312,17),T
FF 20 FORI=1TO250:NEXT:X=Y=-5:PUT(X,Y),D0
IM 30 FORI=1TO3:LOCATE6,15:PUTRINT8GET READY:"SOUND 1760","0,0,50 40 FORJ=1TO255:LOCATE6,15:PRINT"" 6,50 40 FORJ=1TO255:LOCATE6,15:PRINT""
1M50 FORJ=1TO255:LOCATE6,15:PRINT"" 6,15:PRINT""
IF K=MTHENPRINT"" 5M90 40 FORJ=1TO255:LOCATE6,15:PRINT""
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5F00 40 FORJ=1TO255:LOCATE6,15:PRINT""
IF K=MTHENPRINT""
5F00 40 FORJ=1TO255:LOCATE6,15:PRINT""
5F00 40 FORJ=1TO255:LOCATE6,15:PRINT""
IF K=MTHENPRINT""

"Biker Dave" for Amiga computers.
A-Z: DIM T(100), R1(49), R
X: Hlt(I) - Y: FOR 1 - 2 TO E: R
B* Y > 2: DIM H2(E): H2(0) - 
X: Hl(I) - Y: FOR 1 - 2 TO E: R
C: A(l) - Y: FOR 1 - 2 TO E: R
D1: FOR 1 - 2 TO 50: PRINT H1
E1: RETURN
F1: KEY OFF: DEF SEG = 0: DEF INT
G: DATA 0, 300, C0, 0, 300, C, 0, F60
H: DATA 401, 0, 300, 509, 0, FC00, 1400, 0
I: DATA F655, 5545, 0, AFA1, 0, DA, 0, ABE
J: DATA 0, F28, 0, 0, A00, 0, A
K: DATA 48, 12, 0, 0, 300, C, 0
L: DATA 0, 300, C0, 0, 300, C, 0, F60
M: DATA 401, 0, 300, 509, 0, FC00, 1400, 0
N: DATA F655, 5545, 0, AFA1, 0, DA, 0, ABE
O: DATA 0, F28, 0, 0, A00, 0, A
P: DATA 48, 12, 0, 0, 300, C, 0
Q: DATA 0, 300, C0, 0, 300, C, 0, F60
R: DATA A66, 0, 58F, A0B, 0, F00
S: DATA C07, 0, 300, COB, 0, F00
T: DATA 401, 0, 300, 509, 0, FC00, 1400, 0
U: DATA F655, 5545, 0, AFA1, 0, DA, 0, ABE
V: DATA 0, F28, 0, 0, A00, 0, A
W: DATA 48, 12, 0, 0, 300, C, 0
X: DATA 0, 300, C0, 0, 300, C, 0, F60
Y: DATA A66, 0, 58F, A0B, 0, F00
Z: DATA C07, 0, 300, COB, 0, F00
Program 4: Amiga Biker Dave
Version by Tim Midkiff, Editorial Programmer

GOSUB Initialize

Setup:
COLOR 3,8:CLS:RANDOMIZE TIMER
GOSUB InitScreen

IF y>8 THEN I=128 THEN PW(l,1)
ELSE PW(l,1)=128:NEXT l
GET(283,1)-(307,17),t

StartRun:
FOR i=1 TO 500:NEXT x=7:y=4:PUT(x,y),d0
FOR i=1 TO 3:LOCATE 6,15:PRINT"GET READY":SOUND 1760,24
FOR j=1 TO 250:NEXT LOCATE 6,15:PRINT
FOR j=1 TO 250:NEXT:NEXT FOR i=1 TO 150:NEXT
WHILE x<280 AND sp<24
x=x+INT(sp-.04)+l:IF MOUSE(0)<0 THEN sp=-sp
LOCATE 21,19:PRINT sp FOR i=1 TO 20-(sp MOD 25):NEXT
SOUND sp*.04,,34
IF sp<l THEN PUT(x,y),d1,PSET ELSE PUT(x,y),d3,PSET END
PUT(283,1),1,PSET

END4

IF sp=s2 THEN CrashRight4

JumpLeft4:
y=68:cl=c1=14+c*64
WHILE x<=c14
x=x+INT(sp-.04)+l:IF MOUSE(0)<0 THEN sp=-sp
LOCATE 21,19:PRINT sp FOR i=1 TO 20-(sp MOD 25):NEXT
SOUND sp*.04,,34
PUT(x,y),d2,PSET END
PUT(283,65),t,PSET

END4

dx=x-3:dy=INT(dx*.15):k=mp=INT((
 scarcely readable code...
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How would you like to have the ability to create sound effects and music in Atari BASIC without slowing down the rest of your program? “Sound Commander” offers the ability to program sounds that run in the background while other BASIC events are in progress.

One of the strongest features of the Atari eight-bit computer family is its outstanding sound capability. Programmers have done an excellent job of exploiting Atari sound, creating everything from simulated frog croaks to music in four-part harmony. Unfortunately, many of the programs used to create these sounds are written in machine language, which is less widely understood and more difficult to program than BASIC.

Instead of delving into the mysterious world of binary code, many Atari programmers work in Atari BASIC, the language supplied with the computer. Anyone who has created sounds in this language has probably realized that there are three major problems: Complex sounds are difficult to achieve, the timing of a sound loop varies depending on its location in a program, and sound routines occupy a major portion of BASIC’s processing time, thus slowing down the entire program.

“Atari Sound Commander” is a set of machine language subroutines for use with BASIC that solves all three problems. It allows quick and easy manipulation of sound without slowing down BASIC. All you have to do is set up a sound, turn it on, and let it run at the same time as your BASIC program. Best of all, you can use these routines without understanding machine language. Only one BASIC statement is required to activate each sound.

Setting Up
Program 1 is a BASIC loader that installs Sound Commander in memory. When you’re finished typing the program, store it on disk or tape with a LIST command (not SAVE) so that you can merge the code with other programs. For example, to list the program to disk with the filename SND.LST, type LIST “D:SND
Once a sound begins, it can't be turned off automatically. While the previous sound is playing, Sound Commander doesn't make a sound until it begins the new one.

Before Sound Commander can be used by a program, it must be initialized. This is accomplished with the statement GOSUB 30000, which installs Sound Commander in the proper memory location. The setup routine is intelligent, meaning that if you have already installed Sound Commander once, it bypasses most of the initialization.

Program 2 is a more complete demonstration, which also includes examples of complex sound effects. Type in and save the program; then reload it into memory. With Program 2 in memory, use ENTER to merge Program 1. When that operation is done, plug a joystick into port 1 and run the program. It displays six numbers and a movable crosshairs shape on the screen. Use the joystick to move the crosshairs onto each of the numbers in turn. Each number generates a different sound. Notice that you can continue moving the crosshairs even while a sound is in progress.

### Designing Sounds

Like any sound utility, Sound Commander can't make a sound until you tell it what sort of sound to create. Don't worry; that's not as difficult as it sounds. For this program, a sound is defined as a list of notes, each having its own unique frequency, distortion, and volume, which are represented as numbers. The Atari BASIC manual explains the significance of the frequency, distortion, and volume numbers, which have the same effect here as in the BASIC SOUND command.

It takes only two numbers to define a note. The first number in a note definition represents the note's distortion and volume. This value is computed by multiplying the distortion value by 16 and adding the volume value. For example, if you want a note with a distortion value of 10 and a volume of 8, the first number of that note's definition is 168 (10 * 16 + 8). The second number in a note definition represents the note's frequency. Thus, the numbers 168 and 50 define a note with a distortion of 10, a volume of 8, and a frequency of 50. The numbers 168, 50, 168, 60 define two notes, each having the same distortion and volume, but with different frequencies. The duration of the sound is determined when you actually call Sound Commander with USR (see below).

In order for Sound Commander to process a sound definition, it must be converted into string form. This may sound strange, since strings usually contain characters, but a string is actually nothing more than an array containing numbers in the range 0–255. Storing the values in string form saves space and allows Sound Commander to process the data efficiently.

Before you store a number in a string, of course, it must be converted into character form with the CHR$ function. For instance, the statement A$(1,1) = CHR$(6) stores the number 6 in the first character position of the string A$. For many notes, a program can READ values from DATA statements and store them in a string within a loop.

### Commanding The Commander

Once you understand how to define a sound, the rest is easy. One simple USR call causes Sound Commander to play the sound in the background while BASIC continues on its way. Here's a typical USR call for Sound Commander:

```plaintext
DUMMY = USR(SETSND,V,ADR($S)
```

The variable DUMMY is required to satisfy the syntax of USR, which takes the form of a BASIC function. Here is an explanation of the other elements in the statement:

- **SETSND**: Defines the location of the machine language routine that starts up the sound. This variable should be defined only once, at the beginning of every program that uses Sound Commander (see Program 1).

- **V**: Defines a voice number (from 1–255). A value of one equals the distortion value by 16 and adding the volume value. For example, if you want a note with a distortion value of 10 and a volume of 8, the first number of that note's definition is 168 (10 * 16 + 8). The second number in a note definition represents the note's frequency. Thus, the numbers 168 and 50 define a note with a distortion of 10, a volume of 8, and a frequency of 50. The numbers 168, 50, 168, 60 define two notes, each having the same distortion and volume, but with different frequencies. The duration of the sound is determined when you actually call Sound Commander with USR (see below).

- **ADR($S)**: Defines the address of the string containing the definition of the sound that you wish to play. Substitute the name of your string in place of $S.

- **LEN($S)**: Defines the length of the string to be played. Again, substitute your string name for $S.

- **NR25 FOR A=1 TO 8**

- **DATA 170,25,170,50,170**

- **STOP**

After you've saved the program, load it back into memory; then use ENTER to merge the lines from Program 1 with the program in memory. This brings Sound Commander into memory without disturbing the existing program lines. Turn up the volume on your TV or monitor; then run the program and notice that the sounds continue in the background while the program lists itself and returns to immediate mode.

Before Sound Commander can be used by a program, it must be initialized. This is accomplished with the statement GOSUB 30000, which installs Sound Commander in the proper memory location. The setup routine is intelligent, meaning that if you have already installed Sound Commander once, it bypasses most of the initialization.

Program 2 is a more complete demonstration, which also includes examples of complex sound effects. Type in and save the program; then reload it into memory. With Program 2 in memory, use ENTER to merge Program 1. When that operation is done, plug a joystick into port 1 and run the program. It displays six numbers and a movable crosshairs shape on the screen. Use the joystick to move the crosshairs onto each of the numbers in turn. Each number generates a different sound. Notice that you can continue moving the crosshairs even while a sound is in progress.
turned off until it finishes its entire duration. To remedy this, Sound Commander includes a second routine that immediately silences any designated voice or voices. Here is the format for the quiet command:

DUMMY = USR(QUIET, V1, V2…)

Again, the DUMMY variable is present solely for the sake of syntax. Like SETSND, the variable QUIET is predefined by the setup routine and should not be changed while the program runs. This value is followed by a list of the voices you want to turn off. For instance, DUMMY = USR(QUIET, 0, 3) turns off voices zero and three.

Keep in mind that Sound Commander doesn’t disable the normal SOUND command in Atari BASIC. However, it has to use the same sound hardware, so don’t try to perform a SOUND command while a Sound Commander sound is in progress. The END statement causes Sound Commander to skip a beat or two, but pressing the break key does not. Input/output activity such as using the disk or tape drive causes Sound Commander to pause. This shouldn’t come as a surprise, since not much else can happen during disk and tape I/O, either. The machine language routines used by Sound Commander are stored in page 6 of memory; you should take care that the rest of your program does not disturb that memory area.

For instructions on entering these listings, please refer to “COMPUTE!’s Guide to Typing in Programs” in this issue of COMPUTE!

Program 1: Sound Commander

```asm
; 30000 IF PEEK(1564) = 104 A
; ND PEEK(1565) = 162 T
; HEN 30020

30100 IF PEEK(1564) = 104 A
ND PEEK(1565) = 162 T
HEN 30020

30110 DATA 95, 189, 20, 6, 15
7, 16
9
30120 DATA 6, 189, 17, 6, 298
30130 DATA 189, 8, 6, 208, 13
157
30140 DATA 24, 6, 138, 10, 16
6, 169
30150 DATA 0, 153, 6, 210, 24
6, 66
30160 DATA 189, 0, 6, 133, 20
3, 189
30170 DATA 4, 6, 133, 204, 16
0, 0
30180 DATA 189, 273, 72, 138
10, 169
30190 DATA 184, 153, 1, 218,
2, S+4, 2, 0
30200 DATA 177, 273, 72, 138
10, 168
30210 DATA 184, 0, 6, 218,
165, 203
30220 DATA 24, 195, 2, 157, 0
6
30230 DATA 165, 204, 103, 0,
157, 4
30240 DATA 6, 189, 8, 6, 56, 2
30250 DATA 2, 157, 0, 6, 189,
12
30260 DATA 6, 233, 0, 157, 12
A
30270 DATA 282, 16, 145, 76,
98, 228
30280 DATA 104, 104, 104, 17
0, 169, 0
30290 DATA 282, 157, 24, 6, 104,
104
30300 DATA 6, 104, 157, 0, 6, 104
30310 DATA 157, 12, 6, 104, 1
57, 8
30320 DATA 6, 104, 0, 157, 20
6
30330 DATA 169, 11, 157, 16
6, 157
30340 DATA 24, 6, 104, 17
0, 169, 0
30350 DATA 284, 6, 169, 0
153, 24
30360 DATA 6, 152, 10, 168, 1
69, 0
30370 DATA 153, 1, 210, 202,
200, 237, 96
```

Program 2: Sound Effects Demo

```
N 100 GOSUB 5000
N 110 ST = STICK(0): IF ST = 15 THEN 110
N 120 TX = X + DX(ST - 4): TY = Y + DY(ST - 4)
N 130 LOCATE TX, TY, Z
N 140 IF Z = 42 THEN 110
N 150 IF TX = 0 THEN COLOR 32 : PLOT 0, Y; COLOR 17: PLOT TX, Y; COLOR 17: PLOT TX, Y + 1
N 160 PRINT 15, THEN COLOR 32 : PLOT 0, Y; COLOR 17: PLOT TX, Y; COLOR 17: PLOT TX, Y + 1
N 170 IF Z = 42 THEN PLOT 0, Y + 1; COLOR 17: PLOT TX, Y + 1; COLOR 17: PLOT TX, Y + 2; NEXT A
N 180 O = 15, THEN PRINT 15, THEN COLOR 32 : PLOT 0, Y; COLOR 17: PLOT TX, Y; COLOR 17: PLOT TX, Y + 1
N 190 IF STICK(0) = ST THEN 110
N 200 NEXT A
```

For instructions on entering these listings, please refer to “COMPUTE!’s Guide to Typing in Programs” in this issue of COMPUTE!

Program 2: Sound Effects Demo

```
DATA 95, 189, 20, 6, 15
7, 16
DATA 6, 189, 17, 6, 298
DATA 189, 8, 6, 208, 13
157
DATA 24, 6, 138, 10, 16
6, 169
DATA 0, 153, 6, 210, 24
DATA 189, 0, 6, 133, 20
3, 189
DATA 4, 6, 133, 204, 16
0, 0
DATA 189, 273, 72, 138
10, 169
DATA 184, 153, 1, 218,
2, S+4, 2, 0
DATA 177, 273, 72, 138
10, 168
DATA 184, 0, 6, 218,
165, 203
DATA 24, 195, 2, 157, 0
DATA 165, 204, 103, 0,
157, 4
DATA 6, 189, 8, 6, 56, 2
DATA 2, 157, 0, 6, 189,
DATA 6, 233, 0, 157, 12
DATA 282, 16, 145, 76,
DATA 104, 104, 104, 17
0, 169, 0
DATA 282, 157, 24, 6, 104,
DATA 6, 104, 157, 0, 6, 104
DATA 157, 12, 6, 104, 1
DATA 6, 104, 0, 157, 20
DATA 169, 11, 157, 16
DATA 24, 6, 104, 17
DATA 284, 6, 169, 0
DATA 153, 24
DATA 6, 152, 10, 168, 1
DATA 153, 1, 210, 202,
DATA 200, 237, 96
```

For instructions on entering these listings, please refer to “COMPUTE!’s Guide to Typing in Programs” in this issue of COMPUTE!
It's difficult to mistake the IBM PC for a home computer, since it's bigger, more expensive, and more complex than the typical home computer. But a lot of changes have been going on in the PC market lately, some of which are bringing IBM and its compatibles much closer to home.

The first change is in price. It's come to the point where you can buy a "generic" PC system with 640K of memory, two 5¼-inch-floppy drives, and a monitor for $600-$700, and prices may go even lower for Christmas. At these prices, such machines are cheaper than some traditional home computers such as the Apple IIc. The inroads the PC compatibles have made into the home market is reflected in the recent increase in nonbusiness-type software for the PC. As prices for PC compatibles spiral downward, there has been some speculation that IBM itself will soon make a serious entry into the home market—or drop out of lower-end retail sales entirely and concentrate on the higher-end AT line.

Even if the price is right, first-time users may not find the PC clones user-friendly enough. But help is on the way. Microsoft, the producer of the PC operating system, seems determined to "Macintize" the PC with its Windows software, which provides a mouse-driven user interface with window, pull-down menus, and icons. Microsoft has been lobbying strongly with the makers of graphics coprocessor chips, display adapter cards, and clones to include Windows as an integral part of the hardware design of future MS-DOS machines, and is said to have even included Windows' graphics kernel as part of version 5.0 of MS-DOS. Putting Windows into hardware would give it the power to run efficiently even on very inexpensive computers, and would help to make such systems accessible to a much wider audience.

The influence of the Macintosh can be seen in the two new computer models that Tandy recently introduced to replace its highly successful model 1000. The first, the 1000SX, is a lot like the old model 1000, only more powerful, and more IBM compatible. But the second new model, the 1000EX, is a more radical departure from the older machine. Designed specifically for the home and educational markets, it's the first true PC compatible that looks like a home computer. It comes in a small one-piece case that includes a nondetachable keyboard and a 5¼-inch disk drive on the side. But this little machine packs a lot of muscle. It comes with 256K RAM, and not only does it run IBM software, but also runs it faster than the XT, since its 8088 processor works at 7.16 MHz in addition to the 4.77-MHz speed that is standard with IBM machines. It has a lot of nice standard features, such as a display adapter, printer port, and a port for additional 5¼-inch or 3½-inch disk drives. There's even space inside for up to three special expansion cards that add features like an additional 384K memory, a clock calendar and mouse, a serial port, or an internal modem. Though the machine can't take full-size expansion cards, no doubt someone will find a way to fit a hard disk card into this little computer.

Just as exciting as the hardware is the Personal Deskmate software that comes bundled with the Tandy 1000EX. It includes a word processor, spreadsheet, database, appointment calendar, terminal emulator, and paint program. For ease of use, it features windows, pull-down menus, icons, and file-selector boxes, all of which can be manipulated by a mouse, joystick, or keyboard. Tandy even throws in "pop-up" desk accessories such as a calendar, calculator, notepad, and telephone directory. What's more, the Personal Deskmate software has been implemented according to the user-interface guidelines that Microsoft published for its Windows environment, making it a first step towards providing a windows-like environment on a home computer.

Manufacturers of the current crop of home computers aren't about to sit back and let PC compatibles take over their turf. Instead, they are readying new computers and adding improvements to older ones. For example, elsewhere in this issue, you'll find a report on the new Apple IIGS. This machine may well uphold Apple's bread-and-butter II series against the onslaught of 16-bit technology. Commodore is taking similar steps to pep up its 8-bit machines, by adding GEOS—a new operating system—and RAM-expansion attachments. GEOS does a surprisingly good job of adding a windowing environment to the Commodore 64, and Commodore 128 users can expect a version for their computer later this year.

You can now buy a 512K RAM-expansion pack for the 128, and you may well see a version for the 64 in the near future that will substantially upgrade the speed and capabilities of GEOS. Atari is rolling along with its ST series, and by the time you read this may have announced the 2080, a 2-megabyte machine that may also include a blitter chip for faster graphics. This machine is said to be the basis for a proposed desktop-publishing station, which will use the vast memory of the computer to drive an inexpensive laser printer. The Unix operating system may also be made available for this machine.
Last year, Activision introduced Hacker, a game which proved to be immediately interesting because it had no instructions. The player was faced with a screen that said, simply, “LOGON PLEASE,” with no hint of how logging on was to be done. Figuring out what to do—how the game worked and what it required—became as important and as interesting as solving the case.

Hacker II picks up where Hacker left off. Once again the cryptic “LOGON PLEASE” opens the game, and once again the transmission is interrupted as you are offered a mission. This time, the mission is to guide an MRU (Mobile Remote Unit) around an intelligence complex in Siberia, searching for a classified file that threatens the security of the United States. Not a very original plot, but Hacker II does contain some of the most exciting and harrowing scenarios you’ll find in a computer game.

High Security
Once you’ve received your instructions, the main screen comes up. You see four small monitor screens, each with its own channel selector. At the bottom of the screen is a control panel with several buttons, which you control with mouse or joystick (depending on version). Apart from a bit of typing at critical moments, that’s all there is to operating the game. A simple interface, but with a wealth of options.

You choose which screen you want to see, then what you want to do with that screen. You can monitor one of 38 different security cameras scattered throughout the complex, or you can follow the building’s security monitoring as it cycles around the cameras. Successfully maneuvering your MRU demands that you bypass the security cameras. To do this, you must make use of the MRU’s videotape system. You select the camera, turn on the tape, and synchronize the tape’s time to realtime. Once this is set, you hit the Bypass function, and you have fooled the camera by having it view a scene that is actually a few seconds in the past. Your MRU can then slip right by that camera on the way to the next destination.

Tricky Business
Even with the ability to bypass cameras, though, the MRU is far from safe. The building has a security guard who patrols the corridors predictably, but thoroughly. If either the guard or a security camera spots the MRU, an alarm sounds and the building sends an “annihilator” to crush the MRU into scrap metal. To make matters worse, some routes will demand that you bypass four cameras at a time, even though you only have three screens to work with (you use the fourth to see where you are going). This means you’ll have to stop in a corridor and switch the bypass from one camera to another, all while hoping you haven’t miscalculated the guard’s patrol route. As if all this isn’t enough, the MRU has a disturbing habit: Wherever into your journeys, the thing begins to break down.

At first, the MRU’s Telemetry Guidance System (TGS) shows the MRU’s position on a floor plan of the complex, making navigation easy. Shortly, however, the TGS ceases to function. At that point, you must use the security cameras to watch the MRU move. This sounds easy enough, until you realize that the building has blind spots where no camera can see. This means you cannot be spotted, but it also means you cannot see where the MRU is going. With the guard on patrol, getting lost in the corridors is a sure way of bringing on the annihilator.

Nerves Of Steel
Your goal is to find and open four filing cabinets, each of which yields part of the combination to the vault containing the file you’re after. Once you figure out the combination and shut off the vault alarms, though, the real work begins. Cracking the vault, the climax of everything you’ve been working for, demands a sound knowledge of all you have learned about your MRU. Here you must use all four of your screens to bypass the vault’s cameras, which means you have none left to watch the vault. You aren’t even able to bypass a fifth camera, which you must slip by on your way. After setting three cameras on bypass, you use the fourth to monitor the guard’s path and to keep watch on the pattern of the security cameras. Then, at that precise moment, you must bypass the fourth camera, blindly maneuver the MRU to the vault, get the file, and blindly maneuver back to safety. The hit on the vault demands planning, speed, luck, and perhaps more than all of these, nerves of steel.

Despite the fine graphics, the excellent interface, and the wealth of detail, what sets Hacker II apart is its ability to inspire paranoia and anxiety in the player. At every point, you wait for the sound of the detection alarm. The game is so intense that when the MRU’s movement is interrupted by a message telling you of problems with the machine, you are startled, thinking you have been spotted. Similarly, the attempt on the vault is so risky that for sheer excitement it is practically unparalleled in computer games.

I have a few quibbles, however. First, there is no Save Game feature, which means you must try the whole mission in one sitting. Second—and here I don’t want to give anything away—successfully retrieving the file
Chessmaster 2000

James V. Trunzo

Requirements: Apple II-series computers with a minimum of 64K, Amiga, Atari XLE-series computers, Atari ST, Commodore 64, IBM PC and compatibles, and Macintosh computers.

In late July, the United States Chess Federation held its annual competition to determine the top chess players and computer chess programs in the country. At the close of the grueling competition, Chessmaster 2000 claimed sovereignty over such established computer chess programs as Sargon III and MyChess 2.0. In the process of earning an unofficial rating of 2000 (Grandmaster ranking), Chessmaster 2000 also overcame the Cray Blitz mainframe chess program, long the standard in chess simulations. Perhaps Chessmaster 2000 accomplished this feat by virtue of its 71,000-move opening library, or perhaps its midgame play, allowing the program to think a dozen moves ahead, was the reason for its success. Whatever the reason, it should suffice to say that Chessmaster 2000 is a formidable opponent, no matter who sets up the pieces and issues a challenge. Still, I—you humble reviewer—with an unofficial rating of 0020 (Grandmaster ranking), beat it.

If the above seems to be a bit of a paradox, it should be noted that I had the difficulty of play to Level 0, EASY MODE, only slightly higher than the "Coffeehouse" level, which plays a very "relaxed and casual game" to be kind. The preceding examples of playing range represent, obviously, one of the best features of Chessmaster 2000: It truly can be played by the total novice or the consummate chess player with no loss of features or enjoyment. And while Chessmaster 2000 can make a move in as little as five seconds or as long as two hours, its average move at midlevel takes only two minutes, and it plays, at that level, a game of chess that only superior players will be able to beat.

Many Options

Containing all the features that are now accepted as standard in a chess simulation (take-back moves, computer as referee, computer-vs.-computer play, displayed list of moves, and so on), Chessmaster 2000 goes beyond the standards to give the user even more in the way of options. These include outstanding graphics in either the 2-D or 3-D mode, although it must be noted that on standard eight-bit machines, the pieces in the 3-D modes, while attractive, are difficult to distinguish when clustered together. No such problem exists on the Macintosh, Atari ST, or Amiga. Chessmaster 2000 also provides mouse, keyboard, or joystick input; an outstanding library of 100 classic games that can be viewed or replayed; ability to print the game while playing or after completion; 90-degree rotation of the 3-D board, enabling you to see the board from every angle; an extensive list of chess problems to solve; and even a coupon for a discount membership in the U.S. Chess Federation.

When you're using Chessmaster 2000 on an Amiga, Atari ST, or Macintosh, you'll find that no sacrifices have been made, the program giving the user every conceivable option and graphics feature possible. On eight-bit machines (64, Atari XL, Apple Ile and IIc, for example), one or two compromises were necessary. In the 3-D mode, for example, the helpful chess notation borders are not available. Software
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The Music Studio from Activision is among the first of what promises to be a host of sophisticated music programs becoming available for the Commodore Amiga and Atari ST computers. It's an easy-to-use program, featuring pull-down menus and icons which are selected with a click of the mouse. The documentation consists of a small booklet explaining the available features as they are offered on both the Amiga and the Atari ST versions. Although the documentation does not include an index, it's straightforward enough to guide you quickly through the software.

The program itself offers five basic screens from which to work. The Composition screen displays a treble and bass clef. Several icons appear along the border of the screen which allow you to adjust the volume, speed, time signature, and key in which the composition is to be played. You move the mouse to the note icon, select the type of note or rest to be placed on the staff, move the mouse pointer to the desired location on the staff, and fix the note in place with a click of the mouse. An ear icon in the lower left-hand corner will, when selected, play the piece as it is written.

The Composition screen allows you to use any of 15 different sounds, or presets, which are included with the program. The different sounds, including bassoon, French horn, harmonica, and jazz guitar, are each represented by a different color. When you select the bassoon, for example, the notes appear on the staff in green. The notes for the French horn appear in blue, and so on.

Since the Amiga allows you to play four different parts simultaneously, the color-coded notes help you to distinguish clearly among the four tracks being played. Lyrics can also be inserted within the score.

The Composition screen includes a pull-down menu with options which allow you to cut, paste, delete, copy, and otherwise rearrange what you have written. You can even hear the score played back in half-time or double-time.

Designing Your Own Sounds
If you aren't satisfied with the sound presets, you can create your own with the Instrument Design screen. This screen lets you create a library of your own sounds or alter any of the 15 sounds provided. On the Amiga, the Instrument Design screen displays the wave forms of any 7 of 33 possible harmonics, and these may be altered individually or as a group. (The Atari screen is slightly different, appearing more like the control panel on an early-model synthesizer.) The amplitude, decay time, and sustain time of each wave can be adjusted. The newly created sound can then be tested with the push of a button. If you like the sound, you can save it, and if you aren't satisfied with it you can either discard the sound or retain the sound you previously had.

If you don't read music and don't want to wrestle with standard musical notation, The Music Studio also offers the Music Paintbox screen. This appears as a music staff, but the mouse acts as a paintbrush laying down colors rather than standard musical notation. Each color represents a different instrument and the user simply paints each color on the screen as he or she sees fit. The graphics for this are not exceptional, however, and to be perfectly honest, users who can't read music will probably find creating music with standard notation to be of greater interest.

Using The Program With MIDI
The Music Studio can also be used with a MIDI (Musical Instrument Digital Interface) keyboard. An external MIDI keyboard (The Music Studio was written with the Casio CZ101 synthesizer in mind) requires a MIDI interface which, of course, is not provided with the Studio program. The Interface allows you to write a composition and play it on the Casio, for example, using the sounds provided with the Casio synthesizer. The Music Studio has also been tested with the Casio CZ3000 and Yamaha DX-7 keyboards, the RX-15 drum machine, and the TX-7 synthesizer.

When working with the Composition screen, you may also print out your score with any standard plotter or printer (one staff only). If you're using more than one instrument at a time, however, don't forget that the colors will not appear on a black-and-white printer. This is important since The Music Studio only prints one staff. And the color-coded distinction between the different tracks is lost.

If you want to get a feel for what The Music Studio is capable of, the software includes a number of prewritten tunes which illustrate its features. By selecting a tune from the song library, a transcribed version of the song will appear onscreen as the tune is played.

The Amiga version of The Music Studio does not include a drum sound in its library, and the absence of a noise generator makes it impossible to create one with the Instrument Design screen. (However, the program can be used with a drum machine through a MIDI connection.) Also, if you're interested in using The Music Studio as a real-time keyboard (that is, playing the keyboard and hearing the music when you press the keys), then look for another program. The Music Studio does not provide this option.

To briefly summarize, The Music Studio is an easy-to-use, full-featured music composition program that can be used effectively by both beginning and experienced musicians.

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Unnew

Dennis J. Jarvis and Michael L. Zinicola

This tiny, but powerful program for the Commodore 128 and 64 allows you to resurrect a BASIC program after an inadvertent NEW command or system crash. Although it's written in machine language, you can use "Unnew" even if you're not a machine language programmer.

It's happened to virtually every BASIC programmer. You type NEW and press RETURN without thinking, only to realize that you forgot to save the program in memory. If you don't have a backup copy, that small slip can mean hours of wasted effort. However, NEW doesn't actually erase the program from memory—it only resets the computer's BASIC pointers so that no program appears to be present. Nothing appears when you LIST the program, but all of the program lines still remain in memory. To resurrect the program, you need only reset the computer's BASIC pointers so that it recognizes the program's existence again.

"Unnew" automatically restores any BASIC program after an accidental NEW. It can also recover many programs which appear to be lost as the result of a system crash. We've included two versions, one for the Commodore 64 and one for the 128. If you have a 64, type in and save Program 1. If you have a 128, type and save both programs.

Both programs are BASIC loaders which write a machine language program to disk. To use either program, load it, type RUN, and press RETURN. Program 1 creates a disk file named UNNEW 64.OBJ. Program 2 creates a disk file named UNNEW 128.OBJ. If the loader program detects a typing error, it deletes the file from disk and displays an error message instructing you to check for errors. If no errors occur, the program asks whether you wish to create another copy of the machine language program. In this way, you can create as many copies of Unnew as you need. After you've created the machine language files on disk, you don't need the BASIC programs again (unless you need to make additional copies of the machine language files).

Resurrecting BASIC

Apart from an accidental NEW, there are many different ways that a program can seem to disappear. For instance, a programming error may cause the computer to lock up, or fail to respond to the keyboard. When this happens, you can often regain control and return the computer to BASIC ready mode by pressing the RUN/STOP and RETURN keys together. If you can list the program after pressing RUN/STOP-RESTORE, you may not need to use Unnew at all. Save a backup copy of the program before doing anything else.

The instructions for using Programs 1 and 2 are different. We'll begin with the 64 version, Program 1. The 64 version works on the 64 and on the 128 in 64 mode. To use this program, you must be able to return the computer to ready mode. If the 64 seems to be locked up, try pressing RUN/STOP-RESTORE. If you're using a 128 in 64 mode and RUN/STOP-RESTORE does not work, press the reset button while holding down the Commodore key. Once the 64 has returned to ready mode, type this command and press RETURN:

LOAD "UNNEW 64.OBJ",8,1

When the program has finished loading, type this command and press RETURN:

SYS 828

After the ready prompt appears, you should be able to list and save the program as usual.

The 128 has a reset button that can be very useful in recovering a program. If the computer seems to lock up and RUN/STOP-RESTORE does not return you to ready mode, hold down RUN/STOP and press
the reset button located on the right side of the computer. This operation resets the 128 and places you in the built-in machine language monitor. To exit the monitor and return to BASIC, type X and press RETURN. Try to list the program; if it can be listed, save a backup copy immediately.

Unnew is needed only for cases in which nothing appears when you list the program. After you return the computer to ready mode, place the disk containing UNNEW 128.OBJ in the drive. Then type this command and press RETURN:

```
BOOT"UNNEW 128 .OBJ"
```

The 128 automatically loads UNNEW 128.OBJ from disk and runs it. When the process is complete, the computer prints READY as usual. List the program to confirm that it has been recovered; then save it as usual. This procedure should work even in cases when the 128 has relocated the program during graphics operations.

**How Unnew Works**

You can use Unnew to recover programs without knowing how it works. However, an explanation of the technique will also illustrate something about how the computer stores BASIC programs. The usual starting address for a BASIC program is location 7168 ($1C00) on the 128 or location 2048 ($0800) on the 64. The first location in BASIC program space must always contain a zero to mark the beginning of BASIC text. Commodore BASIC programs are stored in memory line by line, in ascending order. At the beginning of each line is a two-byte link address, in low-byte/high-byte format, which tells the computer where the next program line begins in memory. Among other things, this linking scheme allows the computer to quickly scan for the program when it performs operations such as GOTO and GOSUB, which refer to a specific program line.

The next portion of the program line contains the line number. The line number is stored in two bytes, also in low-byte/high-byte format. Following the line number are the tokenized BASIC keywords and other characters that make up the rest of the program line. The end of each line is marked with a byte containing zero. This sequence of links, line numbers, program text, and zero markers continues until the last program line is reached. The last line contains another special marker: Instead of a link address, you’ll find two zero bytes which indicate the end of BASIC program text.

When you perform NEW, the computer stores two zero bytes immediately after the zero that marks the start of BASIC. When it finds two zeros in these locations instead of a non-zero link address, the computer concludes that there is no program in memory (the end-of-program marker coincides with the start-of-program marker, so the program text consists of nothing). In addition, it resets separate pointers that mark the end of program text and the beginning of variables.

On the Commodore 64, BASIC variables are stored in the same general area as the program, beginning immediately above the end of the program. Thus, a single pointer is used to mark where program text ends and variable storage begins. On the 128 (in 128 mode), variables are stored in a different memory bank. However, the computer still maintains a pointer to the end of program text so that it knows where to stop when saving the program.

To restore a program after NEW, you must put a nonzero link address at the beginning of the program and reset the end-of-program pointer to point to the actual end of the program. In a nutshell, that’s how Unnew works. More specifically, it begins by turning on the ROMs and the character generator (just in case a program crash turned them off). Then it decrements the start-of-BASIC pointer by one and stores a zero in that location. This insures that the computer will find the first zero in the first byte of BASIC program space. Then it adds one to the pointer and stores a non-zero value in the two bytes that form the first line’s link address. Once this has been done, the program calls an internal ROM routine that corrects all the program’s line link addresses. Finally, it resets the end-of-program pointer to point to the true end of program text and ends by printing the usual READY prompt.

**Worst-Case Scenario**

Of course, there are some program crashes which Unnew can’t fix. The 128 can always recover from a crash via the reset button. But if the crash POKEs garbage values into the program area, the program text may be irreparably garbled. That’s why it’s important to list the program after recovering it with Unnew, to make sure that the entire program is intact. The 64 does not have a reset button, and may be unable to recover from a hard crash—when the system locks up completely and cannot be recovered with RUN/STOP–RESTORE. To see what is meant by a hard crash, type this line and press RETURN (before you do so, make sure that you save any program that’s in memory):

```
POKE 1,52
```

This POKE turns off the 64’s BASIC and Kernel ROMs, making it impossible to use the computer at all. Unnew cannot be used, since you must be able to enter direct mode commands to load and activate the program. Unless you’ve installed a hardware reset switch, you have no recourse but to turn the power off and on. Once the power is turned off, the contents of memory are lost completely.

For instructions on entering these listings, please refer to "COMPUTE!’s Guide to Typing in Programs" in the issue of COMPUTE!.
"EDIT for Apple II" eliminates the need for such contortions by adding a new command to DOS 3.3.

Typing The Program
Type in the program and save it with the filename HELLO on a disk containing DOS 3.3. When you boot the computer with that disk, the HELLO program automatically installs the EDIT command in DOS 3.3. (Note that any previously formatted DOS 3.3 program will already contain a HELLO program. This program will replace any existing HELLO program, so you should not store this program on any disk which contains a HELLO program you wish to keep.)

To edit a line, simply type EDIT followed by the desired line number. The computer sets the screen width to 33 columns, lists the line, and positions the cursor on the first digit of the line number, ready for editing. If you follow the EDIT command with a range of line numbers (for instance, EDIT 100-120), it displays the range of lines indicated for your reference.

Adding A New DOS Command
One advantage of this program is that it doesn’t decrease the amount of memory available for programs. Rather than add a new command, it replaces INT, an existing DOS command. To accomplish this, it’s necessary to substitute a new command name for the name INT in the command name table, change the address of the command handler routine in the command handler entry point table, and change the keyword flag bytes in the command valid keywords table.

Perhaps the greatest obstacle faced in making EDIT a DOS command is that the DOS syntax checker doesn’t accept any DOS command followed by a number in the range required for line numbers (0-63999). A few commands, such as PR# and MAXFILES, can include numbers, but only within a restricted range.

How, then, to trick DOS into accepting a command followed by a number like 1000? The solution used in this case is to make EDIT a DOS command that is the DOS syntax checker doesn’t accept any DOS command followed by a number in the range required for line numbers (0-63999). The new command stored in the command name table is EDI when the command parser sees the command EDIT 1000, it interprets it as the command EDI followed by the filename T 1000. Since the first character isn’t a numeric digit, the parser lets it pass. The reason for selecting INT is that its three letters can be replaced by EDI without disturbing the rest of the DOS command table.

The simplest way to pass control to the BASIC LIST command handler, along with the line number, is to fool BASIC as well. Before
passing control to BASIC, the EDIT program scans the input buffer ($200-$2FF) where the characters EDIT 1000 are located, and changes the command EDI to LIS. Then control is passed to BASIC, where the BASIC syntax checker sees LIST 1000 and proceeds to list the line.

The following table lists the DOS 3.3 and monitor subroutines used in the program. The machine language code for the EDIT command is stored in an area that otherwise contains most of the DOS INIT command. As a result, you can’t initialize an unformatted disk when EDIT is in place.

DOS And Monitor Routines

| $3DA | DOS 3.3 entry point vector for routine that updates monitor I/O routines. |
| $A012 | Exit DOS command parser if command not found in DOS command name table (command must be BASIC). |
| $A22B | Alternate entry point to DOS command handler for PR# command. Executes PR#S (5 in A-register). |
| $FC22 | Monitor subroutine to perform VTAB to row specified in cursor vertical ($25). |
| $FD0 | Monitor subroutine COUT1. Prints character in A register to screen. |

EDIT For Apple II

For instructions on entering this listing, please refer to “COMPUTE!’s Guide to Typing In Programs” in this issue of COMPUTE!.

```
10 REM :GREETING PROGRAM TO INSTALL EDIT
20 POKE 43249,69: POKE 43250,68: POKE 43251,201: REM : EDIT
30 POKE 40268,147: POKE 40269,174: REM : ADDRESS
40 POKE 43319,32: POKE 43320,112: REM : VALID KEYWORD
50 POKE 40222,287: POKE 40223,3: REM : DISABLE INIT CO
MPLETEDLY
60 FOR X = 44692 TO 44796: RE AD C1: POKE X, C1: NEXT
90 DATA 4,76,240,253,169,48
A0 DATA 100, DATA 197,253,240,17,133,253,166,255,178,37,202,286
B0 DATA 251,165,37,16,15,169,23,133,37,169,48,133,33,169,8,32,43,152,208,217
C0 DATA 130, DATA 76,34,252,261,196,19,7,211,201,284
```

SpeedView, COMPUTE!’s popular word processor, becomes an even more useful resource with this program. “SpeedView” lets you preview your text file in 80 columns so you can see precisely how a printout of your document will look.

Typing It In

Program 1 is a BASIC loader which creates SpeedView. Type in and save the program; then run it. When the program asks for a filename, enter the name you wish to use for the machine language program.

To use SpeedView, load SpeedScript but do not run it yet. Next, load SpeedView with the command

```
LOAD "SPEEDVIEW",8,1, replacing SPEEDVIEW with the name you used when creating the program (tape users should substitute ,1,1 for ,8,1 in this command). Finally, type SYS 9480 and press RETURN. This command activates SpeedScript with the SpeedView enhancement.
```

Two For One

If you plan to use SpeedView regularly, you have the option of creating a combined file which contains both SpeedScript and SpeedView. Like SpeedScript, the unified file loads and runs just like an ordinary BASIC program. To create this file, type in and save Program 2. Reset the computer by turning it off and on; then enter this command and press RETURN:

```
POKE 44,48: POKE 48*256,0: NEW
```

Load Program 2 back into memory and insert a disk containing copies of both SpeedScript and SpeedView. When you run Program 2, it asks you to enter the names of the SpeedScript and SpeedView files on the disk in the drive. After you’ve entered these
filenames, you are prompted to enter a name for the new, combined file. Program 2 reads both files into memory, modifies the BASIC portion of SpeedScript, then writes the unified package back to disk using the filename you selected.

To use this combined program, load and run it as you would any BASIC program. You now have a copy of SpeedScript with SpeedView permanently installed.

**SpeedView Operation**

To use SpeedView, press CTRL-SHIFT-P, followed by S, the command sequence to direct SpeedScript’s output to the screen. Instead of the usual jumble of scrolling lines, SpeedView presents a neatly formatted representation of the document’s first page. Press RETURN to view succeeding pages. SpeedView shows exactly how each page will look when printed on paper. When the last page has been displayed, press any key to return to SpeedScript. The screen preview option is the only SpeedScript command changed by SpeedView. All others function normally.

You should never press RESTORE while previewing a document with SpeedView. If you must exit SpeedScript, press RETURN until you have reached the end of the SpeedView display and return to SpeedScript; then press RESTORE to exit. If you do not use the combined file, remember that the proper sequence is to load SpeedScript, load SpeedView, then activate SpeedView with the SYS command described above.

Some printkey values may not show up during the 80-column preview. SpeedView displays only those characters whose Commodore ASCII values are in the range of 32–90, or 193–218, inclusive. This includes the upper and lowercase alphabets, numerals, and punctuation marks. The SpeedView program code occupies 1.5K of space that’s otherwise available for text memory. As a result, you may not be able to preview a very long document without breaking it into two smaller files. SpeedView behaves erratically if you change the page length to any value other than 66, or the right margin to any value greater than 80. To obtain the best results, make sure to use those settings.

For instructions on entering these listings, please refer to “COMPUTER’s Guide to Typing In Programs” in this issue of COMPUTER.

### Program 1: SpeedView

```plaintext
SB 100 OPEN15,B,15
FX 110 INPUT "FILENAME FOR SPEEDVIEW FILE":FS$:IF LEN( 38,4,37,32,38
" )<8 THEN "PRINT [SPACE]";FILE":GOTO190
DG 120 OPEN 2,FS$+",P,W
XP 130 INPUT#15,A,AS,B,CIF A=0 THEN "PRINT [SPACE]";FILE": 133,255,160,0
CS 150 PRINT "FILE EXISTS. REPLACE LAC IT? (Y/N)"
FM 160 GET X$:IFX$=" " THEN 160
MR 170 IF X$<>"Y" AND X$<>"N" THEN 170:PRINT SPACE():CLOSE15:END
DK 180 PRINT#15,SB:+IFS:CLOSE 2:GOTO120
GD 190 READ BYT:IF BYT<>256 THEN 190
CX 200 CLOSE 2:CLOSE 15:PRINT [SPACE]"DONE"
GQ 210 DATA 0,37,0,0,0,0,0,0,0,0,162,196
MC 220 DATA 160,37,142,38,3,14 0,39,3,169,38
KQ 230 DATA 141,169,9,169,203,141,177,9,169,0 160,39,142,110,23
EH 250 DATA 148,111,23,162,163,160,38,142,137,24
EM 260 DATA 140,138,24,169,32,141,136,24,76,13
RJ 270 DATA 8,169,0,141,2,37,1 41,3,173
PF 280 DATA 4,37,24,105,3,141, 4,37,239,5
PP 290 DATA 37,173,5,37,201,66 208,32,32,28
DX 300 DATA 255,201,13,208,249 32,181,37,76,248
EH 310 DATA 169,23,141,24,21 0,169,27,141,17
SG 320 DATA 208,169,151,0,221 169,0,141,0
EQ 330 DATA 37,136,0,141,0,0,221,169,59,141
EF 340 DATA 17,208,169,56,141, 24,208,141,0,37
HH 350 DATA 169,224,141,166,37 169,0,141,27
AC 360 DATA 141,165,37,141,2,3 7,141,3,173
SE 370 DATA 4,37,170,138,157,0 224,232,280,250
PM 380 DATA 238,166,37,173,166 208,241,169,16
QP 390 DATA 157,0,204,157,0,20 5,157,0,206,157
EA 400 DATA 0,207,232,208,241 96,72,141,1,37
SD 410 DATA 152,72,138,72,173 77,37,248,45,173
FR 420 DATA 0,37,208,3,32,122, 37,173,1,37
GP 430 DATA 201,13,208,3,76,61 37,201,32,208
GR 440 DATA 3,76,18,38,144,12 201,219,176,8
```

### Program 2: Unified File Maker

```plaintext
RJ 180 IPA=4:THENPRINT(CHR$(4))"NAME OF SPEEDVIEW":SS$=I 5
PO 190 IPNAME=INPUT(CHR$(I)):IF IPNAME="":GOTO200:NEW 9
AP 200 DATA 3,76,18,38,144,12 201,219,176,8
QA 300 DATA 141,2,173,3,37,1 06,0,141,3
JQ 500 DATA 37,76,248,37,141,246,165,2
CD 510 DATA 133,255,173,4,37,4 1,7,24,101,254
KS 540 DATA 133,255,173,4,37,4 1,7,24,101,254
CD 530 DATA 133,255,173,4,37,4 1,7,24,101,254
```

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Previous installments of this series of articles have explained some fundamentals of machine language programming on the Commodore 128. In this session, we'll look at ways that a program can get information from various parts of the 128's memory architecture.

**Banks Or Configurations**

Figure 1 shows the memory configuration called bank 15. As you can see, it's a varied assortment of memory elements: RAM, ROM, and I/O chip registers. The bank 15 configuration is usually the most comfortable setup for machine language programming.

Sometimes a program needs to get information from an area that's not visible in the current configuration. When this happens, the configuration must be switched to allow access to the desired data. The switch may be very brief indeed—just long enough to allow the data to be read or stored—or it may be a semipermanent reconfiguration.

**Types Of Bank Switch**

Data may be read from or written to any standard configuration (bank) by using one of a set of Kernal subroutines. The routine named INDFET ($FF74) gets a byte, INDSTA ($FF77) stores a byte, and INDCMP ($FF7A) compares a byte...
Your program may reside in one place, but may need access to information from an area that isn’t visible in the current configuration. To do this, you may use one of the following Kernal routines:

- **INDFET**: indirect FET ch $FF74
- **INDSTA**: indirect Store $FF77
- **INDCMP**: indirect CompPar $FF7A

Note that these routines are in Kernal ROM. If you call them, the Kernal must be visible, and that usually means that you’re in bank 15. Before calling the routine, you must set up an indirect address somewhere in the zero page of memory to be a pointer to the address you wish to access. Then you must tell the routine where this indirect address is located, and set the processor’s Y register with the offset from the address in the pointer to the one you actually wish to access. (Load Y with $00 if you wish to access the exact address in the pointer.)

Here’s an example. Suppose you wish to read the contents of address $2468 within bank 1 using the Kernal INDFET routine. The first job is to pick an indirect address somewhere in page zero to serve as a pointer. Locations $FB-$FC are free, so the desired location can go there (LDA $FB: LDA $24: STA $FB). In this case we set Y to zero (LDY $00). The bank number goes into the X register (LDX $01 for bank 15). Finally, we must tell the INDFET routine where to find the indirect address pointer we have set up. This is done by loading the accumulator (A register) with the pointer address: LDA $FB. Now we can call INDFET with JSR $FF74. Upon return from the ROM routine, the accumulator will hold the value read from address $2468 in bank 1.

The procedure for using INDSTA or INDCMP to store or compare a value in another bank configuration is similar, except that it takes a bit more work to indicate the direct address location. Suppose you want to store the value 7 into location $CDEF in bank 0. It could be done this way: Begin by storing the target address in $FB-$FC (LDA $7E: STA $FB: LDA $CD: STA $FC). Next, tell the system where the indirect address pointer is located by storing the pointer address directly in the INDSTA routine, at address $02B9 (LDA #$FB: STA $02B9). To use INDCMP comparison rather than INDSTA for a store, you should store the indirect pointer address in $02C8. Set up the Y index (LDY #$00) and put the bank number in X (LDA #$00 for bank 0). Now you can load the byte value to be stored into the accumulator (LDA #$07) and complete the store operation with JSR $FF77.

After having done the selected task, these ROM routines return you to the same configuration that was set up when the routine was called. By the way, if you’re wondering if there is a proper bank for addresses such as $FA or $02B9, don’t worry. Addresses below $0400 are always seen in block 0 RAM in normal operation.

If you’re using the bank 15 configuration, a shortcut is available for storing data in bank 0. Remember that bank 0 and bank 15 see the same RAM (block 0) in all addresses below $4000. In the bank 15 configuration, reading the contents of a ROM address ($4000-$4FFF or $E000-$FFFF) always returns the value from the corresponding ROM location, but writing to the address actually causes the value to be stored in the corresponding location in the underlying block 0 RAM. Thus, when you are programming in bank 15 (or bank 14), it’s not necessary to use INDSTA to place values in bank 0 unless you need access to a RAM address under the I/O block ($D000-$DFFF). For instance, the example above could have placed a value in location $CDEF of bank 0 simply using STA $CDEF. However, the INDFET and INDCMP routines are still required for reading or comparing bank 0 locations from the bank 15 configuration.

### Example Program

Here’s a program to illustrate these techniques. First, a word to explain what it does. **INPUT#** is a problem command in BASIC. It often works well and efficiently, but it misbehaves when it encounters certain characters in a file. The characters that cause the most trouble are the comma, the colon, and sometimes quotation marks. If any of these are
since many 64 programs use these same areas, it's hard to find a place for a new machine language program without consuming some of BASIC RAM, which in turn leaves less room for a BASIC program and variables.

Fortunately, there's another solution. The 64 has a full 16K (16,384 bytes) of RAM underlying the BASIC and Kernel ROM chip addresses. The BASIC language interpreter is located in the 8K section from 40960-49151 ($A000-$BFFFF), and the Kernel operating system is located in the 8K section from 57344-65535 ($E000-$FFFF).

To use this extra memory from BASIC, however, is not easy—one reason why it's often called hidden RAM. If you SYS to an address in this area from BASIC, the computer executes the instructions recorded in the ROM addresses, ignoring the contents of the hidden RAM. For instance, SYS 59626 calls the Kernel ROM routine that scrolls the screen up one line. SYS 58726 calls the ROM routine to home the cursor, and so on.

"64 RAM Expander" opens up new programming space by allowing you to SYS to a machine language program stored in underlying RAM. It doesn't really expand your 64's memory (the RAM has been there all the time), but the effect is the same as if you suddenly gained 16K of extra memory space.

**Expand Your RAM**

Type in and save a copy of 64 RAM Expander (Program 1). To use the program, simply load and run it. Now you can install any machine language program designed to reside in the hidden RAM. Use the statement SYS 920 to tell the computer that subsequent SYS statements will use the hidden RAM area. To return SYS to normal, use the statement SYS 931. These two commands allow you to switch the hidden RAM in and out at will.

When you SYS to hidden RAM, 64 RAM Expander switches out the ROM overlaying the area where the program is located. If your program doesn't call BASIC or Kernel routines, that poses no problems. But BASIC ROM routines are not available when you SYS to a program located under BASIC (however, you may still call Kernel ROM routines). If your program is located under the underlying ROM, neither BASIC nor Kernel routines are available, since switching out the Kernel ROM switches out BASIC as well.

This program occupies the cassette buffer area from memory locations 920-1018 ($0398-$03FA). Do not use those locations when 64 RAM Expander is installed.

**A Short Demonstration**

Program 2 is a short BASIC loader which demonstrates 64 RAM Expander. Load and run 64 RAM Expander; then load and run Program 2. It POKEs a short machine language routine into the RAM underlying BASIC ROM, activates 64 RAM Expander with SYS 920, then activates the hidden ML program with a SYS to location 41000 (SA in line 90). The program cycles the screen border colors until you press a key.

If you're not familiar with bank switching on the 64, you may well wonder how one writes a program designed to live in the RAM under ROM. Most machine language monitors see only ROM at those addresses, since the monitor itself typically needs ROM routines to function. One way is to write fully relocatable code, which executes the same way no matter where it loads into memory. The longer the program, however, the more difficult it becomes to preserve full relocatability. Another way is to write the program in a more convenient area, then adjust all the absolute addresses by hand. Again, that's a tedious business for all but the simplest programs. The best solution is to use a good machine language assembler which allows you to assemble object code to a disk file rather than to memory. Once the object file has been created, you can load it with .,1. Like POKEs from BASIC, a relocating load stores data in underlying RAM rather than ROM.

For instructions on entering these listings, please refer to "COMPUTE!'s Guide to Typing in Programs" in this issue of COMPUTE!.

**Program 1: 64 RAM Expander**

KE 10 PRINT "[CLR]":T=0:FOR I=9
20 TO 1018:READX;T=T+X:P
OKEI,X: NEXT

**Program 2: RAM Expansion Demo**

CS 18 REM POKE PROGRAM INTO RAM UNDER BASIC ROM
GB 20 ADR=41000:SA=ADR:CHR=0
EF 30 READ BYTE:IF BYTE<256 THEN PRINT T
HEN POKE ADR,BYTE:ADR=ADR+1:CHR=CHR+1
RD 40 IF CHK=1577 THEN PRINT X:EXIT
QE 50 SYS 920:REM TURN ON RAM EXPANDER
BG 60 PRINT:PRINT
DX 70 PRINT "NOW RUNNING ML PROGRAM UNDER BASIC ROM."
ED 80 PRINT "PRESS ANY KEY TO QUIT."
EA 90 SYS SA:REM START OUR PROGRAM
CD 100 DATA 238,32,208,32,228,
185,105,32,144,8
PG 32 DATA 216,141,9,3,96,169,228,14
185,105,32,144,8
EM 33 DATA 48,32,115,8,3,141,9
3,96,32,1
EM 30 READ BYTE.IF BYTE<256 THEN PRINT
END

**Attention Programmers**

COMPUTE! magazine is currently looking for quality articles on Commodore, Atari, Apple, and IBM computers (including the Commodore Amiga and Atari ST). If you have an interesting home application, educational program, programming utility, or game, submit it to COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. Or write for a copy of our "Writer's Guidelines."

PC 20 IF T<9573 THEN PRINT "ERROR IN DATA STATEMENTS II"
END
PM 30 PRINT "EASY 16K IS NOW READY TO USE!":END
ES 31 DATA 169,174,141,9,3,169
3,141,9,3,96,169,228,14
1,8,3,169
PG 32 DATA 167,141,9,3,96,32,1
165,8,201,158,248,4,46,
76,231,167
EM 33 DATA 48,32,115,8,3,138,
173,32,247,183,24,165,21
105,32,144,8
RD 40 IF CHK=1577 THEN PRINT
(OS="ERROR IN DATA STATEMENTS II"
END)

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Whatever Happened To Logo?

Five years ago I predicted the demise of BASIC and its eventual displacement by Logo as a programming language for neophytes. In the intervening years I have spoken in defense of Logo to thousands of school teachers interested in educational computing, written numerous articles about Logo (including a monthly column that appeared in COMPUTE!), written seven books on the topic, and used Logo as my own programming language of choice and as a language for a successful course for graduate students in design.

As I look back on the past five years, I see that my own vision was clouded by my enthusiasm and that what I saw was largely a dream, not an accurate reflection of the world of educational computing. BASIC, for all its warts (and it has plenty), is as firmly entrenched as the QWERTY keyboard. Far from being dead, it is as popular as ever. Its original developers have even breathed respectability into BASIC by providing it with features found in other programming languages.

The Vision

Logo burst into public view with a one-two punch that seemed to gather momentum among computer-using educators who saw the computer as a tool for developing a new curriculum in problem solving. Based on the notion that children learn best by discovery, Logo was seen by its creator, Seymour Papert, as a language that children could use to make discoveries about mathematics. His views, developed over years of study and research at MIT and elsewhere, were published in the book Mindstorms—Children, Computers, and Powerful Ideas (Basic Books, 1980). Shortly after his book appeared, versions of Logo were developed for just about every computer to come along.

Logo was presented as more than a programming language; it was inextricably linked to an educational philosophy—a philosophy that placed the child in an active role in the learning process. However wonderful Papert's ideas may be, many of them run counter to education as it is practiced in this country. Educational reform is a lengthy process and, while the philosophy associated with Logo points in a direction that appeals to some of us, it apparently lacks the "critical mass" of a Sputnik needed to shift our educational system.

LISP For Mortals

Logo is based on the artificial intelligence programming language, LISP. Like LISP, Logo supports symbolic (as opposed to purely numerical) computation. It was Logo's ability to support the creation of programs that touched the reaches of modern computer science—not its philosophical underpinnings—that attracted me to it in the first place.

But, because Logo was treated by many as a geometry language for kids that would let them create pretty pictures, the remainder of this language lay hidden from view. Of the authors whose books are still in print, Brian Harvey and I are among the few who have explored the spectrum of Logo programming in any depth.

A problem encountered by many who try to use Logo as a programming language is that it supports powerful computational concepts (such as recursion) that are hard for neophytes to grasp. Most beginning Logo programmers quickly master the descriptive graphics programming aspects of the language and then give up when they encounter the more difficult domain of Logo's symbolic computation. For example, Logo makes little distinction between programs and data. This allows Logo programs to be written whose output is other Logo programs, but this requires some skill to master. Most teachers lack the time needed to learn the nongraphic aspects of Logo, and this has helped perpetuate the myth that Logo is a picture-drawing language only to be used by young children.

Slow And Big

Even those who have mastered "the rest of Logo" have found the going rough. Most interpreted versions of this language are slow and big. This has two consequences for those who use Logo on 64K- or 128K-based computers. First, Logo programs run much slower than their BASIC counterparts. Second, users can't write very large programs. These two defects, however, are the result of Logo's implementation, not defects in the language itself.

A few years ago, those of us who saw Logo as more than a playground for young minds started a campaign to encourage the development of a Logo compiler. A compiler solves both the speed and size problems at once. It is interesting to note that none of the Logo language vendors within geographic proximity of Papert's MIT responded to this challenge. Instead, the first commercial Logo compiler for a microcomputer was developed by Expertelligence in Santa Barbara, California. Recently, Coral, an East Coast company, announced a compiler-based Logo.

While these are steps in the right direction, Logo deserves to be widely used. And it will die unless its base is broadened.

David Thornburg is a regular contributor to this magazine and is the designer of Calliope™, a nonlinear idea processor for the Macintosh and Apple II series of computers. He can be reached in care of this magazine.
Computer Pop-up Books

My seven-year-old son Eric is a highly visual thinker, as evidenced by the intricate and elaborate drawings he makes of bridges, underground mines, space stations, buildings, and mazes. Eric is fascinated by books with detailed, complex pictures like Noah's Ark by Peter Spier, and Cathedral and Pyramid by David Macaulay. On the other hand, he struggles with books which have lots of words but whose pictures are simple and spare. And, unfortunately, in school the tendency is to wean Eric from pictures and to force him to use words instead.

Eric may not love books and words, but he does love stories, and he has a rich imagination. He likes to do his storytelling visually by dressing up and acting out parts and by creating concoctions and inventions out of things like string, rubber bands, play dough, balloons, food coloring, and water. This interest in storytelling through manipulation of real objects carries through to Eric's love of Lego building blocks and robot GoBots and Transformers. Eric will spend hours designing a Lego spaceship or transforming his little robots, but he won't spend ten minutes with a book. For Eric, the environment of the book is too frozen, abstract, and visually impoverished, compared to the rich, dynamic, visual environment of his favorite toys.

Eric is not particularly interested in books in general, but he loves “pop-up” books where the emphasis is less on words and more on manipulating the characters and objects in the stories. I recently discovered a new series of pop-up books for Apple computers that I think Eric will love. The books are part of the Explore-a-Story series being published by D.C. Heath, the school textbook company. There are eight different titles in the series, including “The Bald-Headed Chicken,” “The Lima Bean Dream,” and “What Makes a Dinosaur Sore?”

Transformable Software Books

The books themselves are nice enough; they are similar to other children's picture books. But it is the software “books” that are unique and exciting. Children can page through the software book on the computer display screen just as they would page through the picture book.

Then the real fun starts.

Using a mouse, joystick, or keyboard, children can transform the original story into something completely new. They can move any character or object in the story, or change the entire background. They can add dozens of new characters and objects to each illustration. They can add their own text to each story page, erase the old text, or create entirely new text. The story can then be saved to disk or printed out as text or as a coloring book.

There are several features of Explore-a-Story books that appeal to me and which I think will appeal to Eric. First, unlike standard printed books, the Explore-a-Stories are not immutable. They are like sand in a sandbox—“story starters” which give children a micro-world in which to concoct stories of their own.

Second, Explore-a-Stories are like good pop-up books because they combine three great elements which appeal to children: mystery, surprise, and animation. Built into the stories are all sorts of surprise characters and character actions. Whenever you set a character down, it “comes to life”: rabbits hop, frogs bounce, eagles soar, lima beans dance and flop. Mothers turn flips. Fathers somersault.

Third, Explore-a-Stories are like transformers because they let children manipulate the stories and transform them into something new and personally meaningful to each child.

“Create your own story” software is hardly new, but Explore-a-Stories have eliminated many of the defects in earlier programs and elevated the genre to a new level. And children like Eric might be coaxed away from a purely visual orientation to the world. This software gives them the ability to manipulate words almost as easily as pictures.

Each Explore-a-Story package costs $66 and comes with a doublesided disk, a backup disk, a teacher’s manual, and five copies of the story. The disk runs on an Apple IIC or Ile with 128K. For more information, write D.C. Heath at 125 Spring Street, Lexington, MA 02173.
BASIC Slide Show For NEOchrome And DEGAS

Nearly every ST owner has used NEOchrome, the graphics program supplied with the computer, or Degas, the excellent drawing program written by Tom Hudson. Both programs allow you to create stunning graphics, but how can you incorporate such pictures in a BASIC program of your own? This month's program demonstrates one way to display NEOchrome and Degas pictures in any screen resolution, on color or monochrome 520ST or 1040ST systems. It adjusts automatically for the differences between Degas and NEOchrome pictures. However, you must set the correct screen resolution with Set Preferences before you run the slide show. (No harm is done if you display a picture in the wrong resolution, but the picture will be jumbled because the screen's bitplanes don't match up correctly.)

The program begins by asking for the filename of the picture you want to display. Enter the full drive-path and filename, including the extension. For instance, to display the NEOchrome file MYPIC.NEO located on the disk in drive A:, type the filename A:\MYPIC.NEO and press RETURN. To display a Degas file named MYPIC.PI2 from the subdirectory BASIC in drive B:, use B:\BASIC\MYPIC.PI2. Don't confuse the backslash (\) character with a normal slash (/) when typing filenames. The backslash indicates a subdirectory and is not interchangeable with a slash. After you've entered the filename, the program displays the picture and waits for you to press either mouse button. When you press the button, the screen clears, the original palette colors are restored, and you're invited to enter another filename. To exit, press RETURN at the prompt.

Behind The Scenes
Since column space is limited, this program includes only the bare essentials needed to get a filename and display a picture. If you want to transport these techniques to a program of your own, you'll probably want to refine the input routine and perform some checks for disk errors. Here's an nutshell description of how the program works. Lines 150–170 save the original palette colors in the array SAV%. Lines 180–190 call a VDI routine that hides the mouse pointer (so it won't spoil the picture). Lines 200–300 get the filename, adjust for the file type, and set the color palette for the new picture. The routine called in line 310 clears the entire screen surface with a VDI system routine. Lines 320–330 BLOAD the file into screen memory, and line 340 calls a routine that waits for a button to be pressed. Line 350 restores the previous palette so you can see what you're typing. Line 360 clears the last picture from the screen and goes back for another filename.

When you exit the program, lines 440–460 make the mouse pointer visible again. Notice that BASIC's menu titles don't reappear, although the menus still work as usual. ST BASIC is intelligent enough to redraw its windows when needed—unless you're rash enough to close all the windows at once—but it never refreshes the menu bar. The assumption seems to be that nobody would ever want to display full-screen graphics from
BASIC.

Handling Picture Files
Regardless of screen resolution, NEOchrome and DEGAS files always contain 32,000 bytes of actual screen data preceded by a short header. The header records the picture’s resolution and color palette; it’s 34 bytes long for DEGAS and 128 bytes long for NEOchrome. The palette data occupies 32 bytes. NEOchrome files also contain extra data for color cycling (this program doesn’t do color cycling; it uses the palette that was in effect when you saved the picture).

To reconstruct a picture, the slide-show program reads the palette portion of the file into the string COL$, then directs the computer to use the bytes in COL$ as the new palette. Then it BLOADs the file into the ST’s screen memory, using an offset to prevent the header portion of the file from going into the screen.

Location &H44E is a pointer that tells you where screen memory begins. Location &H45A, which ordinarily contains a zero, is a flag that lets you switch to a new palette. The ST scans this location as a background task during every VBI (vertical blank interrupt) interval. When you POKE a nonzero value into &H45A, the computer uses that value as the address of the new color palette. The program discovers the current palette by PEEKing the video display registers at 16745024. If the new version of ST BASIC includes ASK RGB and RGB (see last month’s column) you should be able to read and change the palette with BASIC commands instead of fiddling with hardware registers.

System Variables
Locations &H44E and &H45A are “official” system variables that Atari has promised not to change in future system updates. Another interesting variable is location &H45E, a screen pointer flag that’s scanned during the VBI like the palette flag. When you put a nonzero value there, the ST uses the value as the new address for screen memory, making it possible to page-flip between alternate screens.

If you incorporate these methods in a program of your own, be sure to use double-precision variables when dealing with system addresses. The DEFDBL A statement in this program defines all variables starting with A as double-precision, which in turn causes BASIC to use longword (four-byte) values when you PEEK or POKE with those variables. POKEing a byte-length or word-length (two-byte) value into a place like &H45A usually causes a crash known as a bus error when the processor tries to address a nonexistent memory location.
More About PRINTing

We started exploring the PRINT command last month. Let’s now move on to look at ways to format text. Some of the commands we’ll discuss are not identical on all versions of BASIC, so you’ll need to experiment to see if they work on your computer, and, if so, what parameters (numbers and limits) are allowed. Try them out; it won’t hurt the machine if it doesn’t recognize a command. Your computer will just reply that you’ve made an error.

WIDTH is a command in some versions of BASIC that controls how many characters can be printed on a line across the screen. On some computers (such as an IBM PCjr), this command also determines the size of the characters or the resolution of the screen. For example, WIDTH 40 is a 40-character line with larger letters and medium resolution, and WIDTH 80 is an 80-character line with smaller letters. On the IBM PCjr, WIDTH 20 is a 20-character line in the low-resolution screen. Note that on the PCjr, changing the WIDTH also clears the screen.

On other computers (such as the Amiga and Atari ST), WIDTH n specifies n number of characters in the printed line, where n can be any number you wish to use to control margins. The size of the letters does not change. On computers with windows, it’s possible to print beyond the visible portion of the window, so WIDTH is handy to keep the printing within the window. Here’s an example using the WIDTH command:

```
10 A$ = “1234567890”
20 WIDTH 18
30 PRINT A$ + A$ + A$ + A$
40 END
```

Specifying Location

Many versions of BASIC include commands for specifying where printing will be positioned on the screen. In BASIC for the IBM and for the Amiga, use LOCATE row, column to position the cursor, followed by PRINT to start printing:

```
80 LOCATE 5,10 PRINT “TITLE”
```

In Atari ST BASIC, use GOTOXY column, row to position the cursor, and then PRINT. Notice that this computer specifies the column number first, then the row number, and the upper left corner of the output window is 0,0. Also, the position of the printing will be slightly different than if you PRINT blank lines and then TAB over to a certain column:

```
80 GOTOXY 10,5 PRINT “TITLE”
```

Commodore BASIC has no special statements for positioning the cursor, but you can use cursor control characters within quotes to move up, down, left, and right. You can also use the TAB function, such as:

```
80 PRINT TAB(168); “HELLO”
```

The maximum number of character positions you can move with TAB is 255.

Create A Template

PRINT USING can be a real timesaver in specialized situations, but not all versions of BASIC offer it. The syntax varies slightly with brands of computers, so refer to your manual and experiment a little to see how this command works.

The main purpose of PRINT USING is to format your output—line up numbers or strings or perhaps print money amounts. If you print large numbers, you can use PRINT USING to place commas every third column for place values. You can print plus or minus signs for positive or negative numbers. You can print leading asterisks. You can use this command to round off numbers or to print to a certain number of decimal places even if there are trailing zeros. Here are some examples:

```
10 A = 123.456
20 B = 64
30 C = 3
40 D = 8.25031
50 PRINT USING “###”; A
60 PRINT USING “###:###”; B
70 PRINT USING “###:###:###”; C
80 PRINT USING “###:###:###:###”; C
90 PRINT USING “#www.commodore.ca

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88 COMPUTE! November 1986
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I attended (and exhibited at) the Los Angeles Atari Computer Faire on August 15 and 16, and I would like to share a few things I saw and a few thoughts I had. The most significant part of this Faire was probably Atari’s presence. As far as I know, this was their first real participation in a user group-sponsored event, and they were there in force. Such Atari notables as Sam Trau- miel, Sig Hartmann, John Feagans, Neil Harris, Mel Stevens, and Sandy Austin (and others who will undoubtedly embarrass me by asking me why I forgot them) all made an appearance.

**Faster ST Graphics**

Most important were the products being shown there for the first time. Atari’s new blitter chip for the ST was being put through its paces. This chip takes over some of the graphics processing (such as moving sprites that must be done in software on current ST machines. Depending on the type of processing, this chip should make graphics-oriented programs run from two to six (my estimate) times faster.

The 80-column adapter for the eight-bit machines was also on display, as was a new word processor for the ST: Microsoft Write. Although it is another nice, solid word processor, I did not see any really exciting features. But the presence of Microsoft in the Atari world is expected by many to lend respectability to the ST machines.

The real battle for attention, though, was among the various purveyors of music software for the ST machines, particularly by the MIDI-oriented companies. Sounds ranged from exotically electronic to a guitar so realistic I thought it was a live accompaniment.

The Catalog’s official name) people were showing off animated 3-D graphics, which wasn’t too surprising, given the capabilities of Tom Hudson’s CAD 3-D program. But then they added liquid crystal “shutter” glasses for true 3-D vision and a glimpse into some fascinating future possibilities. Liquid crystal glasses are not exactly a convenience store item (they usually go for hundreds or even thousands of dollars—mostly to the military), but you can expect to buy a pair sometime early next year for $150 or so, according to the exhibitors.

Significantly missing, though: the game companies. No Broderbund, no Sierra On-Line, and so on.

What a turnaround from the early days of the West Coast Computer Faire. Most attendees probably didn’t complain, though, since there was a good deal of software for eight-bit and ST machines. There were literally hundreds of titles available in each category, even though some of the Faire organizers purposely limited the number of dealers at the Faire to four, and one of those sold no eight-bit software.

Finally, the show was put on by an association of user groups, and almost every member I talked to was pleased by the show and the turnout. Final figures were not in as I left, but John Tarpanian, president of both HACKS and ACENET, estimated the crowd for the two-day event at 3000 people. It seemed at least that big. Atari is encouraging at least two more such shows that I know of: one right here in San Jose in September, and one in Portland in October. There’s another show in Virginia in November, though it’s not as closely tied to Atari as these other three. I suggest attending one of these if you can.

**Join Your Local User Group**

This is the first of my answers to readers’ inquiries, and it ties in neatly with the discussion above. Several people asked me where they could get (1) help with their hardware and/or software, (2) cheap public-domain programs, or (3) up-to-date news on events of the Atari world. My answer to all three? Join a user group.

I have pushed user groups in this column before, and I will probably do so again. At the Faire, for example, one person thanked me for getting him involved in a group—he had quickly gotten the help he needed. I asked him if he’s now returning the favor to newer members. He is. He’s the club’s librarian.

There are over 300 active user groups in the U.S. now, so there’s a good chance there is one near you. And if you join one, maybe you can help put on one of these Faires in the next year or two.

How do you find a user group? Ask a local dealer or look for announcements in newspapers. And user groups: Be sure to have a publication-oriented program run from two to six (my estimate) times faster faster.

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One of the problems of writing about technology in general and computers in particular is how fast one product surpasses another. So this month I'm going to revisit three past columns and update you on some new and better products.

In June of 1985 I wrote about the Hewlett-Packard LaserJet printer, which has since become an industry standard, although I take no credit for that. At the time I tested the machine, I asked the engineering types at Hewlett-Packard why they didn't make a combination office copier and computer printer, since the two technologies seem so similar. They told me that the machines were really incompatible and the cost would double. Having been raised to respect police and engineers, I made no mention of the copier idea in my column. Nor did I dwell on the limitation of only being able to use eight different type styles—after all, that was in 1985.

Last month Xerox sent me its 4045 Laser printer to test. It has an arm under which one can slip an original and—guess what?—out comes a perfect Xerox copy. The copier feature adds a couple hundred dollars to the cost of the printer, but it's worth it. The 4045 permits the use of up to 22 fonts on a single page, and best of all, the command sequences to establish fonts, underlining, bolding, and other special effects are much simpler than those used on the HP. For example, I wrote that the sequence to begin bold printing on the LaserJet was **Ec&100Ec(0UEc(s1p10v0 s1b5t;** the sequence for the 4045 is simply **\*b**.

Hewlett-Packard hasn’t been idle in the intervening 18 months, and it’s sure to have improved the LaserJet. But if you are looking for a high-quality laser printer, check out the Xerox 4045.

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**Second Thoughts**

My February 1986 column extolled the virtues of compiled BASIC and the then new version of the IBM BASIC compiler. If I told you to buy it (I can’t bare to look back), I apologize. After I wrote that column, Microsoft sent me a copy of its new QuickBASIC Compiler, which retails for $99. The IBM BASIC Compiler was priced at $495 in February of 1986—today it’s $539.

I don’t have the space to tell you why compiled BASIC is so much faster than the BASIC built into your PC (see the February column), but I do have the space to tell you that QuickBASIC is equal, even superior, to the IBM software. In all my tests, the Microsoft product compiled larger programs, produced smaller EXE modules, and did it in less time than the IBM product which costs five times more. QuickBASIC uses the same commands, files, and switches as the IBM compiler—and why not? Microsoft wrote the version sold under the IBM name.

If you’re thinking about a BASIC compiler, don’t think about IBM; just buy Microsoft’s QuickBASIC. (By the time you read this, version 2.0 of QuickBASIC will be available.)

**Online Thesaurus**

In writing about a RAM-resident spelling checker and a thesaurus in April of 1986, I noted that both products use the Random House dictionary. “Wonder what happened to Webster’s?” I joked. Simon & Schuster was quick to let me know that it markets Webster’s New World On-line Thesaurus and Webster’s New World Spelling Checker.

I’ll never give up IBM’s Wordproof for another spelling checker, but I’m open on thesauruses. I was fairly happy using Reference Software’s Reference Set, until I tried Simon & Schuster’s product. It sets a new standard for on-line thesauruses.

Like most RAM-resident software, Webster’s is called to the screen by pressing a preselected key combination—on my PC it’s Alt-T. The program then tries to match the word under the cursor with one in its dictionary; failing that, it strips the word of prefixes and suffixes and attempts to locate the root word in its dictionary. Type “readmitted” and the program displays 20 words similar to the root word admit” in a window superimposed on the screen. Now here’s the amazing part. Select the synonym “declare” and the program tries to add prefixes and suffixes to compose three choices: redeclared, redeclared again, and declare. By pressing down to a root word, the program is able to generate more than 120,000 synonyms.

Along the same line, the program changes articles to match the nouns they precede. Placing the cursor under “an automobile” and calling forth synonyms shows but one—“motor car.” When you select that synonym by pressing the F10 key, Webster’s not only replaces “automobile” with “motor car,” but also changes an to a.

One feature I particularly appreciate shows parts of speech and separates synonyms by meaning. For example, “fire” displays 19 synonyms for the noun, 13 for the verb, and 4 for the modifier “fiery.” In addition, any of those words may be looked up for even more synonyms by simply pressing a key.

Webster’s On-Line Thesaurus, at $70 from Simon & Schuster, is a must for anyone who writes.
Apple PowerKey
The key-definition program (Program 1, p. 67) for this powerful keyboard utility from the September issue has an error as listed. Our lister program trimmed a RETURN statement from the end of the very long line 340. The easiest way to correct the problem is to add the following line:

345 RETURN

Program 1 has an additional problem for Apple II+ users. The II+ keyboard doesn't include the backslash key used to append a carriage return character to a key-definition string. Reader George Teachman notes that changing the value 92 to 47 in lines 420 and 590 will allow II+ owners to use the regular slash (/) for this function.

The article states that Program 2 creates a file named POWERKEY.BINARY. Actually, the program creates a file named OMNIKEY.BINARY (see line 130). Thus, the instructions for loading the program in the “Putting It All Together” section of the article (p. 66) are incorrect. You can either change the name in line 130 of Program 2 to match the text, or change the name in the text to match the one currently used in the program.

Atari 130XE Automated RAM Disk
There is an error in line 360 of this program from the September issue (p. 68). The statement GOTO 460 in that line should be GOTO 470.

Amiga Tightrope
This Amiga game from the August issue (p. 47) suffers from the same problem as the “Hex War” game in the July issue: the use of lowercase l as a variable name. Unfortunately, our listing printer the characters for l and 1 are identical, making it nearly impossible to tell where to type l and where to type 1. In the “Tightrope” lines labeled 4, 5, and 6, the variables used are 1, 12, and 13, respectively. Variable II is also used in the line labeled 810. In the left column on page 49, you'll find statements that should read DIM 11%(L), DIM 12%(L), and DIM 13%(L), as well as 11%(I)=, 12%(I)=, and 13%(I)=. In the future, we'll do our best to eliminate the use of lowercase l as a variable name in Amiga programs.

On page 118 of the July issue of COMPUTE!, the price of the teacher's guide for Broderbund's Science Toolkit was incorrectly listed as $20. Actual cost is $30.
Computers are precise—type the program exactly as listed, including necessary punctuation and symbols, except for special characters noted below. We have provided a special listing convention as well as a program to check your typing—“The Automatic Proofreader.”

Programs for the IBM, TI-99/4A, and Atari ST models should be typed exactly as listed; no special characters are used. Programs for Commodore, Apple, and Atari 400/800/XL/XE computers may contain some hard-to-read special characters, so we have a listing system that indicates these control characters. You will find these Commodore and Atari characters in curly braces; do not type the braces. For example, {CLEAR} or {CLR} instructs you to insert the symbol which clears the screen on the Atari or Commodore machines. A complete list of these symbols is shown in the tables below. For Commodore, Apple, and Atari, a single symbol by itself within curly braces is usually a control key or graphics key. If you see {A}, hold down the CONTROL key and press A. This will produce a reverse video character on the Commodore (in quoted mode), a graphics character on the Atari, and an invisible control character on the Apple.

Graphics characters entered with the Commodore logo key are enclosed in a special bracket: [«A»]. In this case, you would hold down the Commodore logo key as you type A. Our Commodore listings are in uppercase, so shifted symbols are underlined. A graphics heart symbol (SHIFT-S) would be listed as §. One exception is {SHIFT-SPACE}. When you see this, hold down SHIFT and press the space bar. If a number precedes a symbol, such as {5 RIGHT}, {6 §}, or {70 Q}, you would enter five cursor rights, six shifted S’s, or eight Commodore-Q’s. On the Atari, inverse characters (white on black) should be entered with the inverse video key.
The Automatic Proofreader

Type in the appropriate program listed below, then save it for future use. The Commodore Proofreader works on the Commodore 128, 64, Plus/4, 16, and VIC-20. Don’t omit any lines, even if they contain unfamiliar commands or you think they don’t apply to your computer. When you run the program, it installs a machine language program in memory and erases its BASIC portion automatically (so be sure to save several copies before running the program for the first time). If you’re using a Commodore 128, Plus/4 or 16, do not use any GRAPHIC commands while the Proofreader is active. You should disable the Commodore Proofreader before running any other program. To do this, either turn the computer off and on or enter SYS 64738 (for the 64), SYS 65341 (128), SYS 64802 (VIC-20), or SYS 65526 (Plus/4 or 16). To reenable the Proofreader, reload the program and run it as usual. Unlike the original VIC/64 Proofreader, this version works the same with disk or tape.

On the Atari, run the Proofreader to activate it (the Proofreader remains active in memory as a machine language program); you must then enter NEW to erase the BASIC loader. Pressing SYSTEM RESET deactivates the Atari Proofreader; enter PRINT USR(1536) to reenable it.

The Apple Proofreader erases the BASIC portion of itself after you run it, leaving only the machine language portion in memory. It works with either DOS 3.3 or ProDOS. Disable the Apple Proofreader by pressing CTRL-RESET before running another BASIC program.

The IBM Proofreader is a BASIC program that simulates the IBM BASIC line editor, letting you enter, edit, list, save, and load programs that you type. TYPE RUN to activate. Be sure to leave Caps Lock on, except when typing lowercase characters.

Once the Proofreader is active, try typing in a line. As soon as you press RETURN, either a hexadecimal number (on the Apple) or a pair of letters (on the Commodore, Atari, or IBM) appears. The number or pair of letters is called a checksum.

Compare the value displayed on the screen by the Proofreader with the checksum printed in the program listing in the magazine. The checksum is given to the left of each line number. Just type in the program a line at a time (without the printed checksum), press RETURN or Enter, and compare the checksums. If they match, go on to the next line. If not, check your typing; you’ve made a mistake. Because of the checksum method used, do not type abbreviations, such as ▼ for PRINT. On the Atari and Apple Proofreaders, spaces are not counted as part of the checksum, so be sure you type the right number of spaces between quote marks. The Atari Proofreader does not check to see that you’ve typed the characters in the right order, so if characters are transposed, the checksum still matches the listing. The Commodore Proofreader catches transposition errors and ignores spaces unless they’re enclosed in quotation marks. The IBM Proofreader detects errors in spacing and transposition.

IBM Proofreader Commands

Since the IBM Proofreader replaces the computer’s normal BASIC line editor, it has to include many of the direct-mode IBM BASIC commands. The syntax is identical to IBM BASIC. Commands simulated are LIST, LLIST, NEW, FILES, SAVE, and LOAD. When listing your program, press any key (except Ctrl-Break) to stop the listing. If you enter NEW, the Proofreader prompts you to press Y to be especially sure you mean yes.

Two new commands are BASIC and CHECK. BASIC exits the Proofreader back to IBM BASIC, leaving the Proofreader in memory. CHECK works just like LIST, but shows the checksums along with the listing. After you have typed in a program, save it to disk. Then exit the Proofreader with the BASIC command, and load the program as usual (this replaces the Proofreader in memory). You can now run the program, but you may want to save it to disk. This will shorten it on disk and make it load faster, but it can no longer be edited with the Proofreader.

If you want to convert an existing BASIC program to Proofreader format, save it to disk with SAVE "filename",A.

Program 1: Atari Proofreader

By Charles Brannon, Program Editor

100 GRAPHICS 0
110 FOR I=1536 TO 1700:READ D: Viện POKE I, A=USR(1536)
120 IF C<19872 THEN "ERROR IN DATA STATEMENT. CHECK TYPING."
130 A=USR(1536)
140 ? A: "AUTOMATIC PROOFREADER NOW ACTIVATED."
150 END
160 DATA 153,160,0,185,26,3,201,69,28,7
170 DATA 208,200,192,34,20,8,243,96,200,169,74
180 DATA 153,26,3,200,169,6,153,26,3,162
190 DATA 0,189,6,228,157,74,4,6,228,157,74
200 DATA 208,245,169,93,14,1,78,6,169,6,141
210 DATA 79,6,24,173,4,228,105,0
220 DATA 1,78,6,169,6,141
230 DATA 0,133,96,247,74,253
240 DATA 244,241,115,241,16
250 DATA 0,0,0,0,0,32,62,2
260 DATA 155,240,13,201,32
270 DATA 240,7,24,161
280 DATA 203,133,283,184,4,8,6,72,152,139
290 DATA 72,160,0,169,128,145,88,200,192,40
290 DATA 208,245,169,203,7,4,74,74,24,105
300 DATA 161,168,3,145,08,
310 DATA 165,203,41,15,24
310 DATA 105,161,200,145,8,169,0,133,203,104
320 DATA 178,104,168,184,4,96

Program 2: IBM Proofreader

By Charles Brannon, Program Editor

10 "Automatic Proofreader Version 3.0" (Lines 205,206 added/d/190 deleted/468 changed from V2.0)
100 DIM LS(500),NUM(500):COLO R 0,7,7,KEY OFF:CLS:MAX=8:
110 IF ERROR LS,120:KEY 15,C
120 IF ERROR GOTO 650:PRINT PR INT"proofreader Ready."
130 LINE INPUT LS,INDEX,INT(LN(LS)/w)-1=LOCATE Y,1
140 IF ERROR GOTO 650:POKE E 1055,34:POKE 1054,0:POKE
170 IF LEFT$(LS,1)="v" THEN LS =MIDS(LS,2):GOTO 170

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www.commodore.ca
Program 3: Commodore Proofreader

By Philip Nelson, Assistant Editor

10 VEC=PEEK(772)+256*PEEK(773):LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADER FOR " ; IF VEC=4236 THEN [SPACE]PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI C-26"
40 IF VEC=35156 THEN GRAPHIC CLR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=46:GRAPHIC CLR:PRINT "128"
60 SA=(PEEK(LO)+256*PEEK(HI))+1
70 FOR J=0 TO 166:READ BYT:POKE A,BYT:AD=AD+1:CH=CH+1:NEXT
80 IF CH=255 THEN PRINT "ERROR CHECK TYPING DATA STATEMENTS" :END
90 FOR J=5 TO 5:READ RE,LF,HP:RS=SA+HF:INB=INB/256:LD=RS+INB*256
100 CHK=CH+16:IF HPPOKE SA+L,LF:POKE HB:NEXT
110 IF CHK<>22854 THEN PRINT "ERROR RELOAD PROGRAM AND RESTART"

Program 4: Apple Proofreader

By Tim Victor, Editorial Programmer

10 C = 0: FOR I = 768 TO 768 + 69: READ A: C = A: POKE I + A NEXT
20 IF C > 725B THEN PRINT "ERROR IN PROOFREADER DATA STATEMENTS": END
30 IF PEEK (190 * 256) < 76 THEN HEN POKE 56,0: POKE 57,3: CA
40 IF INKEY$ = "": THEN INKEY$=INKEY$: NEXT
50 POKE 34,0: Halt: POKE 34,1: YTAB 2: PRINT "PROOFREADER INSTALLED": END
60 NEW
70 DATA 216,32,27,255,261,141
80 DATA 286,68,158,72,169,0
90 DATA 72,189,255,1,261,160
100 DATA 240,8,104,10,125,255
110 DATA 1,105,6,72,282,208
120 DATA 258,104,176,4,15,9
130 DATA 48,281,144,2,233
140 DATA 57,141,1,4,138,74
150 DATA 74,74,74,15,9
160 DATA 48,281,58,144,2,233
170 DATA 57,141,0,4,104,170
180 DATA 216,169,141,56

November 1986
Most of the following suggestions serve to improve the speed and accuracy of publication. COMPUTE! is primarily interested in new and timely articles on the Commodore 64/128, Atari, Apple, IBM PC/PCjr, Amiga, and Atari ST. We are much more concerned with the content of an article than with its style, but articles should be clear and well-explained.

The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.
2. The following information should appear in the upper right corner of the first page. If your article is specifically directed to one make of computer, please state the brand name and, if applicable, the BASIC or ROM or DOS version(s) involved. In addition, please indicate the memory requirements of programs.
3. The underlined title of the article should start about 2/3 of the way down the first page.
4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number. For example: Memory Map/Smith/2.
5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not justify. Leave the lines ragged.
6. Standard typing paper should be used (no erasable, onionskin, or other thin paper) and typing should be on one side of the paper only (upper- and lowercase).
7. Sheets should be attached together with a paper clip. Staples should not be used.
8. If you are submitting more than one article, send each one in a separate mailer with its own tape or disk.
9. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. It is essential that we have a copy of the program, recorded twice, on a tape or disk. If your article was written with a word processor, we also appreciate a copy of the text file on the tape or disk. Please use high-quality 10 or 30 minute tapes with the program recorded on both sides. The tape or disk should be labeled with the author's name, the title of the article, and, if applicable, the BASIC/ROM/DOS version(s). Atari tapes should specify whether they are to be LOADed or ENTERed. We prefer to receive Apple programs on disk rather than tape. Tapes are fairly sturdy, but disks need to be enclosed within plastic or cardboard mailers (available at photography, stationery, or computer supply stores).
10. A good general rule is to spell out the numbers zero through ten in your article and write larger numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), etc. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: use "and" (not &), "reference" (not ref.), "through" (not thru).
11. For greater clarity, use all capitals when referring to keys (RETURN, TAB, ESC, SHIFT), BASIC words (LIST, RND, GOTO), and three languages (BASIC, APL, PILOT). Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word and it will be italicized during typesetting.
12. Articles can be of any length—from a single-line routine to a multi-issue series. The average article is about four to eight double-spaced, typed pages.
13. If you want to include photographs, they should be either 5×7 black and white glossies or color slides.
14. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.
15. COMPUTE! pays between $70 and $800 for published articles. In general, the rate reflects the length and quality of the article. Payment is made upon acceptance. Following submission (Editorial Department, COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403) it will take from four to eight weeks for us to reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. Rejected manuscripts are returned to authors who enclose a self-addressed, stamped envelope.
16. If your article is accepted and you have since made improvements to the program, please submit an entirely new tape or disk and a new copy of the article reflecting the update. We cannot easily make revisions to programs and articles. It is necessary that you send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing, "Revision" on the envelope and the article.
17. COMPUTE! does not accept unsolicited product reviews. If you are interested in serving on our panel of reviewers, contact the Review Coordinator for details.
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When you want to talk computers...
**MONITORS.**

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