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MAY 1988

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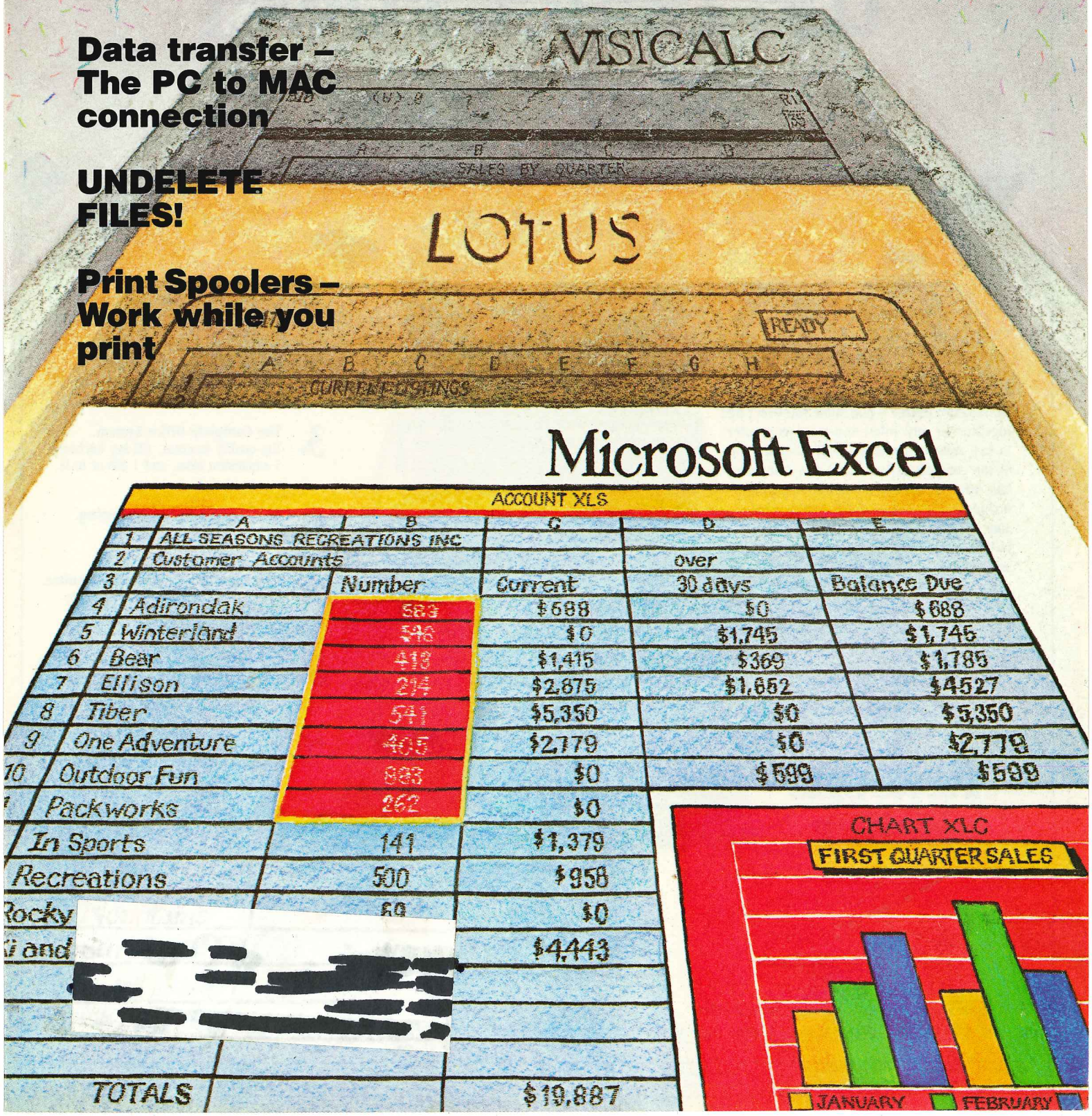

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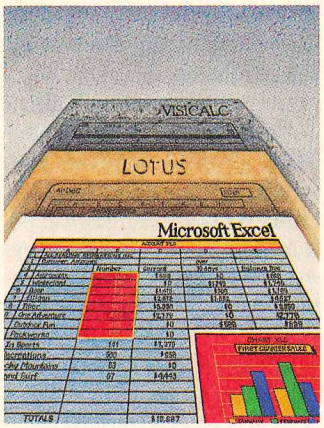

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RICHARD STARKMAN

AND THE WINNER IS...

There was just one prize to be awarded in *PROFILES*'s recent readership survey and contest. One survey response was picked at random from those we received, and that respondent, Scott Macmann of Ft. Knox, KY, is now the proud new owner of a Kaypro 2000+ laptop computer.

But from our point of view, Mr. Macmann was not the only winner. The response to our survey was overwhelming, numbering in the thousands, and that made winners of us all.

The surveys were sent to several thousand *PROFILES* readers during January, and then we decided to enclose the survey in the March issue to give *all* readers a chance to tell us what they like about the magazine—as well as to air their grievances. After all, *PROFILES* exists for *you*, and we want to give you what you want and need most.

The quantitative portion of the survey is still being tabulated, but we have read all your comments, and that's where the other winners come in.

The *PROFILES* staff were winners because they gained valuable insight into what readers want from the magazine. Never before has a survey of *PROFILES* readers produced more informative and positive results, and we thank each of you for taking the time to write.

More important, our readers win, too, because they will reap the benefits from this survey in coming months. Many of the ideas suggested had already been scheduled for the next several issues; others are now being acted on. In coming months, we will bring you even more of the practical consumer information you desire.

What *do* our readers want?

MS-DOS users—particularly the early PC users—are most concerned about upgrading their Kaypros. Having been promised "non-obsolescence," these users want information on upgrade possibilities. They are also interested in simple installation techniques for add-ons such as hard drives, 3.5-inch drives, graphics cards, and math co-processors. They also want to know about maintenance, diagnostics and repair, and compatibility.

Regarding software, MS-DOS users' requests ranged from articles on the basics of using MS-DOS to tutorials on specific applications to comparative reviews. Although the majority use their Kaypros in conventional business settings, many use them in the scientific, academic, and even household environments and want articles pertaining to such uses.

Our CP/M audience is a bit more homogeneous. These users want to know where they can go for repairs, where to buy parts, and how to put their bundled software to better use.

In general, all *PROFILES* readers want to be able to do more with their computers and to get the most out of the products they buy.

Finally, readers want more information on Kaypro's newest computers and peripherals (including prices), as well as Kaypro User Group listings.

So how will *PROFILES* respond to all these requests? A rundown of the articles in this issue and those planned for future issues will, we hope, convince you that we have listened to what you've told us and that we aim to please.

In this issue, look for Jack Nimersheim's article, "Spreadsheets: The Next

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Generation.'' Nimersheim examines the powerful programs that take up where Lotus 1-2-3 left off and compares three popular products.

In ''Don't Let Your Printer Tie Up Traffic,'' Marshall Moseley explains how print spoolers can free up your computer for other tasks while you print whole strings of files and looks at three such programs.

For the increasing numbers of both CP/M and MS-DOS computer users who find that they must be able to communicate with Macintoshes, Ted Silveira explains the problems involved and looks at various solutions in ''Overcoming the Language Barrier.''

Also, in this issue's ''CP/M Only'' column, Ted begins a survival guide for CP/M users—information to keep CP/M Kaypros alive for years to come. (Topics be covered in coming months: where to find parts, where to go for repairs, how to find software, and how to become your own expert.)

For nuts-and-bolts information on using MergePrint, WordStar 4.0's update of MailMerge, plus a rundown of the differences between MergePrint and MailMerge, see Jim Spickard's article, ''Using the New MailMerge.''

Finally, for all those who've accidentally sent files into the black hole of oblivion—and the many others who will sooner or later—T.F. Chiang offers a guide to salvation in ''File Recovery Utilities.''

And what about upcoming issues? For MS-DOS users, next month William Murdick begins a two-part article on the basics of using the MS-DOS operating system. Articles in the works range from broad topics such as the possibilities offered by ''hypertext'' to specific hands-on guides to interpreting MS-DOS error messages and creating stylesheets in Microsoft Word.

CP/M users can look forward to Ted Silveira's aforementioned CP/M survival guide, a tutorial on four ways to automate CP/M, and step-by-step tutorials on CP/M bundled and commercial software.

All readers will find invaluable information in our upcoming series of ''Buyer's Guides'' to various products, and they'll also continue to find answers to their technical questions in ''Q & A'' and ''On the Practical Side.'' We'll also respond to requests for information on Kaypro's newest computers and peripherals (including prices) and for listings of Kaypro User Groups.

We appreciate the support, suggestions, and criticism you've given us over the years and particularly in this latest survey, and as we near our fifth anniversary, we plan to continue to provide uncompromising support to every Kaypro user. Gwyn Price ■

TURBO PASCAL TRICKS

Thank you for Jim Spickard's article on error-trapping in Turbo Pascal ("Bullet-proof Your Programs," February 1988). I have incorporated his routines into my own work, and they're very effective.

In his description of the INTCHECK procedure (which allows the user to enter only valid integers), Mr. Spickard mentioned that a similar procedure could be constructed to handle real numbers. Having experienced INTCHECK's usefulness, I wanted that other procedure.

The result is a procedure I call REALCHECK. It is identical to INTCHECK except that it allows for a longer entry (to accommodate the larger range of acceptable values) and lets the user enter one period somewhere in the number (but not in the leading position).

The listing for REALCHECK is enclosed *(Ed. Note: See figure 1.)*. The bracketed comments should sufficiently explain what's happening throughout. I hope other readers—and especially Jim Spickard—will find it useful.

Bob Roden
Berkeley, California

Thanks for the information and the listing. Our readers can find the listing under REALCHK.ARC on the Kaypro bulletin board, Kaypro On-Line (619/259-4437).

NON-KAYPRO CP/M USERS

You may be surprised to discover that you have a number of subscribers who are not Kaypro users! *PROFILES* is about the only magazine that continues to support CP/M. I run CP/M on Apple IIs; many CP/M users in the non-Apple world seem confused by Apple CP/M. Although Microsoft started Apple CP/M with their "Softcard," it was not "plain vanilla" CP/M, and Microsoft did not enthusiastically support new Apple II hardware developments.

PCPI's "Applicard" does run "plain vanilla" CP/M 2.2 at 6 Mhz with a 56K [TPA]. PCPI does support new Apple II hardware with drivers to access the hardware ignored by Microsoft. A printer driver uses the Apple 6502 RAM for a printer buffer of 68K on a 128K //e. The

```
PROCEDURE RealCheck (VAR Result : REAL);

      {reads entered data one character at a time, rejects        }
      {non-numeric entries.  Allows: (1) corrections by means of  }
      {the backspace key; (2) a leading "-" sign; and (3) one "." }
      {in the number (but not in the first position).             }
      {Input ends with <CR>.  Returns a real number to the main   }
      {program.  It is invisible to the user. }

      {    You invoke it from the program like this:              }
      {    WRITE ('Enter amount spent: ');                        }
      {    RealCheck (Amount);                                    }
      {    (where Amount is of type REAL, of course)              }

VAR
  Ch, TestChar : CHAR;
  Code, I      : INTEGER;
  RealString   : STRING[39];

BEGIN
  RealString := '';
  REPEAT           {until <CR> (i.e., ^M)}
    READ (KBD,Ch);
    CASE Ch OF
      ^M : BEGIN END; { terminate entry if <CR> }
      ^H : BEGIN { if backspace key }
             IF LENGTH(RealString) > 0 THEN
               BEGIN
                 WRITE (Ch);
                 WRITE (' ');
                 WRITE (Ch);
                 RealString := COPY(RealString,1,(LENGTH(RealString)-1))
               END
           END; { case of ^H - backspace key }
      '+' : BEGIN END; { don't accept a + sign, go back to top of loop }
      '-' : BEGIN
              IF RealString = '' THEN  { accept "-" as first character o
                BEGIN
                  RealString := RealString + Ch;
                  WRITE (Ch)
                END
            END; { case of '-' }
      '.' : BEGIN
              IF RealString = '' THEN
                BEGIN
                END; { period not accepted as first character }
              IF LENGTH(RealString) > 0 THEN
                 { if an acceptable character already entered, then see
                 { if a period was already entered in another position
                BEGIN
                  I := 1;
                  REPEAT
                    BEGIN
                      TestChar := COPY(RealString,I,1);
                      I := I + 1
                    END
                  UNTIL (TestChar = '.') OR (I > LENGTH(RealString));
                  IF TestChar = '.' THEN
                     BEGIN  { reject entry, shoot back to top of loop }
                     END
                  ELSE
                    BEGIN  { accept the period }
                      RealString := RealString + Ch;
                      WRITE (Ch)
                    END
                END { of procedure if no period as first character }
            END; { case of '.' }
      ELSE
        BEGIN { if none of the special cases above apply }
          VAL (Ch,Result,Code);
          IF Code = 0 THEN
            BEGIN
              RealString := RealString + Ch;
              VAL(RealString,Result,Code);
              IF Code = 0 THEN
                WRITE (Ch)
              ELSE
                RealString := COPY(RealString,1,(LENGTH(RealString)-1));
            END { of if/then }
        END { of "else" case }
    END; { of CASE statement }
  UNTIL Ch = ^M; { i.e., repeat loop until user hits <CR> }
     Result := 0;
     VAL(RealString,Result,Code)
END; { end of procedure RealCheck }

{-------------------------------------------------}

{ This is a dummy program to test the RealCheck procedure.    }
{ Comment it out before including the procedure in a program. }

VAR
  Amount : REAL;

BEGIN
  CLRSCR;
  WRITE ('Enter the amount: ');
  RealCheck (Amount);
  WRITELN;
  WRITELN ('The number you entered was: ',Amount);
  WRITE ('(more conveniently known as ',Amount:1:2,')')
END.
```

Figure 1

real drawback to Apple CP/M is the miserly 128K Apple floppy disk. A good solution is finally available [with] Apple's "UniDisk," a 3.5-inch 720K drive (which Applicard supports for CP/M).

Finding CP/M software on Apple-format disks can be frustrating. Some CP/M software is not released on Apple CP/M format disks. Some companies contract with outsiders to make the Apple CP/M disks—but often not too well. Since Kaypro format CP/M disks are readily available, I order most CP/M programs in the Kaypro format. I then use a PC to transfer CP/M files from the Kaypro floppies to Apple floppies (via MicroSolutions' Uniform software and Matchpoint hardware).

Some software CP/M companies have given up on Apple CP/M, but there are still lots of us out here. I suspect that users of other CP/M machines are also reading *PROFILES*.

Dave Huffman
Longview, Washington

You're right in supposing that our readership includes users of several CP/M machines besides Kaypros. In addition to Apple II users, our CP/M audience consists of Morrow, Osborne, Commodore 128, and other CP/M machine users.

Also, in recent months we have found that our MS-DOS readers are not just owners of Kaypro equipment, but users of many brands of IBM-compatible computers who may be new to computing.

MORE WAYS TO FASTER COPIES

First a word of praise for the most readable and most useful computer magazine I've yet encountered. Every issue of *PROFILES* is devoured cover to cover upon arrival. I deplore only the pettiness of some of the criticism you receive. Keep up the good work!

Second, and more specific, a writer to the February "Q & A" column inquired about ways to speed up file copying. Your reply, though correct as far as it went, failed to mention the most useful method of handling large numbers of files. I refer to the utility program KCOPY, which comes bundled with MS-DOS Kaypros. The use of this versatile tool is fully explained in the User's Guide.

Finally, a word of thanks for your November article on task switching. Software Carousel and a 2 MB expansion board have transformed my PC-10 into an unbelievably fast, versatile, and powerful machine.

John Cooke
Berkeley, California

I have been an avid reader of *PROFILES* for a number of years and consider it to be an indispensable part of my computer library. I was very disappointed, however, in your answer in the February 1988 issue "Q & A" column to the person who was looking for a faster way to copy files. It was definitely not of the high caliber I have come to expect from Q & A.

While your answer was technically correct and useful, there is a better solution to the problem of endlessly typing filenames—NSWEEP3! This public domain program is the solution to the reader's problem and should have, in my opinion, been the focus of your reply. NSWEEP3 should be readily available in the reader's local KUG library for both DOS and CP/M users. Users of public domain software owe a huge thank you to Dave Rand for developing what is probably the most useful piece of software a user can have. When I recently converted from CP/M to DOS, NSWEEP was the first program I tried to obtain due to my experience with the CP/M version. Luckily for me, the DOS version was out and locally available. I wouldn't be without it.

Please accept this criticism in the friendly spirit in which it is intended. "Q & A" is always one of the first things I read in *PROFILES* and I have gained much useful information from it. I can only conclude that your reply was written early on a Monday morning before you were fully functional. Seriously, please keep the excellent info coming. I appreciate it very much.

J.R. Hicks
Lincoln, Nebraska

Technical Editor Marshall L. Moseley responds: "You are both quite correct. Any of three or four disk management utilities or backup programs could have been mentioned (though, unfortunately, not described in any detail in the space available).

However, I interpreted the question differently, so my goal was to explain the concept of wildcards in MS-DOS commands. That concept is used not only in the commands themselves, but in many MS-DOS and CP/M programs as well, such as WordStar, NewSweep, Xtree, and Lotus 1-2-3, to name a few. In fact, to use NewSweep to its full potential the computer user must first have a thorough understanding of wildcards.

To be more complete, though, my response could have included at least a mention of the programs you refer to."

(For a more in-depth look at the latest in backup technology, see the feature "Use It or Lose It" in our April 1988 issue.)

MONEY-SAVING TIP

I still work on a Kaypro II with single-sided drives, and with some tricks, it suits my writing needs. But I was about to say that *PROFILES* really doesn't have much for me anymore when I came upon a question by a reader with just the problem my machine had recently developed. The screen is often a mess when I first turn it on. The answer was to re-seat socketed chips. I did that, and so far, anyway, the problem is gone. The item saved me far more than the cost of a subscription, so I'll renew when my sub comes due.

Now since you have asked for article ideas for CP/M readers, how about running a piece on how to keep older machines going? Not the cutting edge, I realize, but useful perhaps to the readers who complain of abandonment.

Robert Seder
New York, New York

Funny you should ask. In this issue Ted Silveira is beginning a series on survival in the MS-DOS world for CP/M users. These articles will appear as installments of the "CP/M Only" column and will include information on keeping older machines alive, finding CP/M software, and so on. It should be just what you—and many other CP/M users—need. ■

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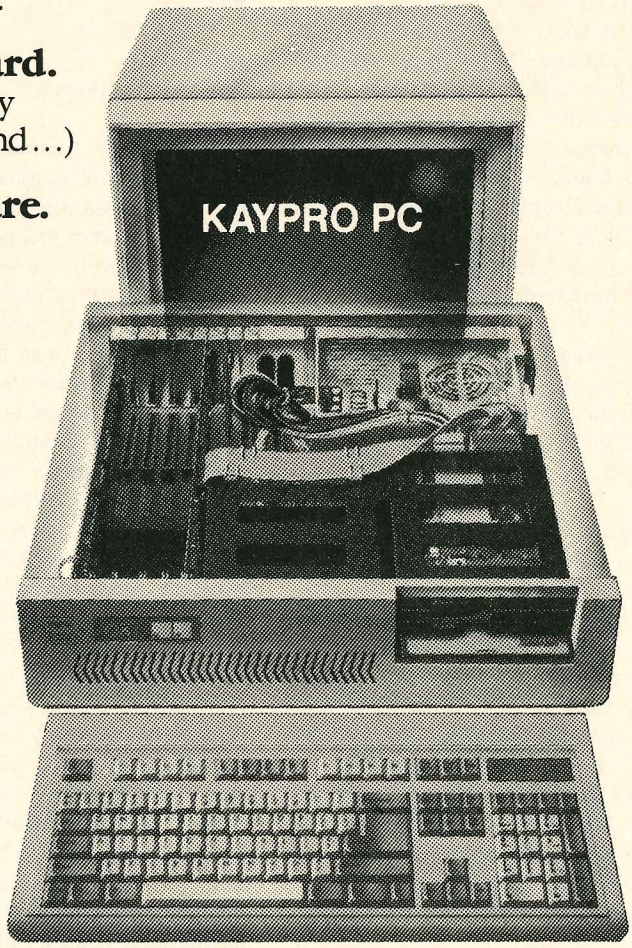

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BY MARSHALL L. MOSELEY

BATCH PROGRAMMING

I've been playing with batch files for the last few weeks, but I've yet to go beyond the stage where they simply execute a series of commands. I've messed with both the IF command and labels, but I'm getting nowhere (and the MS-DOS manual isn't much help). Could you please explain how these work?

The first half of the IF command examines any of four conditions and determines whether they are true or not. If the condition is true, the latter half of the command executes. There isn't enough room here to explain all of the conditions, but as an example let's look at one: EXIST. EXIST checks to see if a file is present and returns a true value if it is. It could be used in a batch file like this:

```
IF EXIST AUTOEXEC.BAT ECHO
The autoexec file is present
```

(Note that this would all be on one line—it's broken here to accommodate the magazine's column margins.)

The command processor (the part of MS-DOS that executes commands and runs batch files) will read this instruction and check to see if the file AUTOEXEC.BAT is on disk and in the current directory. If it is, the message "The autoexec file is present" will be displayed on screen.

IF runs special batch file commands as well as standard MS-DOS commands. One of these special commands is *GOTO Label*. A label is a name for a set of batch file commands set off from the rest of the file. On encountering a GOTO Label statement, the command processor skips over the ensuing commands until it finds the specified label. Then all the commands under that label are executed. Suppose you want a batch file to rename the AUTOEXEC file and display a message saying it has done so. The above example could be modified to read:

```
IF EXIST AUTOEXEC.BAT ECHO
GOTO ChangeIt
```

The rest of the commands in the batch file would be passed over until the ChangeIt label appeared:

```
:ChangeIt
REN AUTOEXEC.BAT AUTOEXEC.SAF
ECHO The autoexec file has been
renamed
```

Note the format for the label—it begins with a colon. All labels must begin in this manner. Also, commands under labels can send the command processor to other labels, so the logic of the batch file can quickly become convoluted. It's usually a good idea to group all the labels together at the end of a file, simply as a matter of form.

The IF command provides a good deal of power for batch processing. The person using it, however, crosses the line from user to programmer (IF is a simple form of the programming structure IF.. THEN..ELSE). Be warned: Play with batch files long enough and you'll catch the bug. You'll start asking yourself "I wonder if I could copy files without typing directory paths?"? or "Could I format disks in the A and B drive with one command?" Pretty soon you'll buy the latest compiler from Borland, your spouse will never see you, and you'll get a bad case of swivel chair spread. Aren't computers wonderful?

THE SCOOP ON VGA

I've been hearing a lot about the new VGA video adapters— that they have more colors and higher resolution than the adapter in my computer (Kaypro's version of the EGA Wonder). Is this so, and is VGA better?

Yes, VGA video adapters do have more colors and higher resolution, but they're not necessarily better.

VGA is an acronym for Video Graphics Array. It is the name of the video graphics standard introduced by IBM in April 1987, along with its PS/2 line of computers. With VGA, IBM departed from its previous designs by building the video circuitry right into the PS/2 mainboards. IBM also manufactures a VGA video board for the standard expansion slots found in its PC/XT/AT computers. (These boards cost $595 and should work in your Kaypro computer.)

There's a multitude of VGA boards manufactured by other parties. Compaq Corporation markets its Video Graphics Controller for $599. Oddly enough, it outperforms the IBM board. Samsung, Tseng Labs, and Paradise also have VGA boards, but they do not offer 100 percent hardware compatibility with the IBM.

Please note that Kaypro Engineering hasn't tested any VGA boards yet, so Kaypro Corporation does not guarantee that they will function in Kaypro products. Kaypro computers are very IBM compatible, however, so there should not be any problem.

The new video standard offers some distinct advantages over previous standards. First, VGA provides every previous IBM video mode: Monochrome, CGA, and EGA. This means that your old video-specific software will work under VGA. Second, the new video modes are absolutely stunning, offering a variety of types, colors, and resolutions.

VGA monochrome is a flat white instead of a glowing green. It's much easier on the eyes than the old monochrome video. The new monochrome offers a gray scale with 64 individual tones, allowing very subtle shading on screen. The text resolution is 720 by 400 pixels, much better than the EGA's 640 by 350. The VGA character box is 8 by 16 pixels, as opposed to EGA's 8 by 14. This makes the characters wider and more readable.

As for colors, VGA can display 256 of them on screen simultaneously. Each of these is available from a palette of over a *quarter of a million* colors. The previous front runner was again EGA, which displayed 16 colors from a palette of 64. Graphics resolution has also improved. Those 256 colors are available with a resolution of 320 by 200 pixels. The highest VGA resolution is 640 by 480 with 16 colors.

VGA is also fast, much faster than any earlier video standards. This is due in part to a more modern design—the VGA circuitry is simply better. Also, VGA's video memory (RAM devoted exclusively to holding video images) is configured in a very efficient way. Under EGA the video memory was inaccessible; programmers had to send individual instructions to the EGA board and let it handle the memory (and it handled memory slowly). VGA video RAM is not only accessible, it's

contiguous, meaning it is all in one place. Both of these facts make programming the VGA much easier than before.

Should you buy a VGA board? Not yet, and for two reasons.

First, VGA requires a new type of monitor called an analog monitor, and they cost bucks. The retail price for IBM's least expensive VGA monitor, the monochrome model, is $250. Its top-of-the-line color graphics unit is $1,550. Third-party monitors from Samsung and Princeton Graphics Systems are available for slightly less, but they still cost more than equivalent old-style monitors.

If there were popular software products that used VGA, you might be able to justify the purchase of a board and monitor. But as of this writing (February 1988) there are very few programs that take advantage of the high-resolution VGA modes. Certainly none is so powerful that you would buy $1,000 worth of video equipment to use it.

For now, IBM and Compaq are the only ones to offer true-blue VGA, but keep your eyes open and you'll see other compatible VGA boards on the market soon. Maybe even one from Solana Beach, California.

USE PIP TO STRIP

I have a Kaypro CP/M computer and I constantly exchange data disks with the MS-DOS computers at work via modem. The problem is that the office word processor can't read WordStar files. It does read ASCII files, though. Is there any simple way to convert a WordStar file to the ASCII format?

Yes, and the answer lies in that old reliable CP/M utility, PIP.

WordStar stores each character in the form of a byte, which is eight binary digits. The letter W, for example, is 01010111. Eight binary digits can be arranged in 256 ways, resulting in 256 distinct characters. Some characters control screen functions, while others control printer functions, and still others are simple letters and numbers.

The ASCII character set is a standard by which all characters are defined (ASCII stands for American Standard Code for Information Interchange). In ASCII, every character is represented by a byte. The bytes for all the printable characters—letters and numbers—begin with zero. The makers of WordStar noticed this leading bit (single binary digits are called bits) and thought, "Hey, there's an entire bit in each character doing nothing. We might as well make use of it."

Which is what they did. So, in WordStar, the leading binary digit in some character bytes is one instead of zero. It denotes different things—the end of the line, underlining, boldfacing—depending on the character's position in the document. To turn WordStar text back into standard ASCII text, that leading bit, called the "high bit," has to be changed to zero.

PIP (Peripheral Interchange Program) is the file transfer utility shipped with all Kaypro CP/M computers. Like most operating system utilities, it has parameters that allow it to operate in different ways. The "Z" parameter tells PIP to change the high bit of every character it encounters to zero. When you PIP a WordStar file using the "Z" parameter, every high bit is zeroed and the copy produced is standard ASCII. If, for example, you have a WordStar file named LETTER.WS, you could turn it into an ASCII text file named LETTER.ASC with the following command:

PIP LETTER.ASC = LETTER.WS[Z]

While this will convert all the printable characters to ASCII, it will not convert the non-printable characters such as WordStar's boldfacing and underlining commands (^PS and ^PB). Use Find and Replace to remove those commands before you convert the file.

Remember, the form for PIP is *destination = source*, meaning that you type the name of the file you want to create first (the destination), then type the name of the original (source) file. ■

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THE TECH CORNER

As a Kaypro service center we are often presented with a crashed hard disk which has not been backed up. Sometimes the customer is lucky and the data is recoverable, but usually it is not.

Our experience has shown these five causes of data loss: 1) Operator error, 2) Program error, 3) Hardware failure, 4) Theft, 5) Fire or water damage. Theft can be the most disastrous, affecting floppy and hard disk systems equally -- often the disks are stolen too. We have seen a church lose all its member and pledge records, and a Ph.D. candidate lose two years of research to computer theft. Back up your data, but keep a copy off premises.

Since most users have never have had any problems with their hard disk, proper data back up is often overlooked. Now that quality tape backup drives -- such as the Archive XL advertised above -- cost under $400, one can only be described as foolish if he does not protect his computer data.

UNDERSTANDING FILES: BEYOND THE 'FOLDER' ANALOGY

BY MARSHALL L. MOSELEY

Every beginning computer user learns about files with the same analogy: "A file on disk is just like a file folder—they both are used to store related information." That comparison is fine as far as it goes, but the analogy breaks down when you begin to learn how a computer really works. This month I'll describe exactly what files are and how they work under MS-DOS. The explanations provided are for those of you who are just leaving the ranks of the novices and are ready for a smattering of technical knowledge.

THE BUILDING BLOCKS

A thorough understanding of files requires that you first understand how information is stored on disk.

A floppy or hard disk is a *magnetic* medium; that means it retains a charge when it encounters an electric current. A single double-sided, double-density floppy disk holds almost 3,000,000 discrete electric charges. Under the computer's direction, the disk drive moves its read/write mechanism over specific places on a disk. Where a charge is detected, it is interpreted as either a one or zero, depending on the nature of the charge. These ones and zeros are called bits. (The drive can also generate electric current and change the charge that is present; that's what happens when data is written to a disk.) This method of numbering, using ones and zeros, is called the binary system.

Information about where file data is located on a disk is stored in the file allocation table.

Bits are further organized into groups of eight, called bytes. Each byte can have one of 256 possible values (there are two possible states for each digit and there are eight digits, so there are 2^8 or 256 ways to combine them).

Different bytes represent different things—numbers, letters, even instructions to your computer. For example, when you type a file name and press Enter, MS-DOS checks to see if it is a *program file*. If so, the bytes in the file are interpreted as instructions. The contents of all other types of files are interpreted as data, in which various bytes represent numbers, characters, or printer and screen commands.

DISKS AND FILES

To understand how files are written to disk, a quick digression concerning disk structure is necessary.

When a floppy disk is formatted, it is magnetically imprinted with 40 concentric circles. Each circle is called a track. Tracks are further subdivided into smaller areas called sectors, each of which holds 512 bytes. One or more consectutive sectors is called a cluster (the numbers are slightly different for hard disks, but the configuration is the same).

A file is a discrete area of a disk that has been given a specific name. If you list the files on a disk with the DIR command, you will see that each file's size is given in bytes. For instance, the file COMMAND.COM shipped with MS-DOS 3.21 is 23,612 bytes long. Because numbers like this are unwieldy, file size is usually measured in *kilobytes*. A kilobyte is 1,024 bytes. So COMMAND.COM is 23.05 kilobytes, or 23K long.

Every disk has two areas for storing information about files: the disk directory and the file allocation table (FAT). The disk directory is a table that contains every file's name, its extension, the time and date it was last altered, its size, its starting FAT entry, and some special file attributes. The only information not in the directory is the actual places on disk where the file data is located. That is stored in the FAT.

The FAT is a table that specifies the location of file data using tracks and clusters. If a file is divided into many parts and spread out over the disk (as is the case with many files), then the FAT specifies multiple locations. When MS-DOS wants to read a file, it deciphers the file's directory entry and notes the starting FAT entry. It then goes to that entry and finds out where on disk the data for that entry is and where the next FAT entry is. It goes to the correct track and cluster, reads the data, moves on to the next FAT entry, and repeats the process. The series of entries in the FAT for a given file is called the space allocation chain.

Two things happen when a file is deleted: in the directory the first character of the file name is changed to a "null character," and the space allocation chain is destroyed (note: the *chain* is destroyed, meaning each entry's relationship to the others is dissolved; the entries themselves remain). All the information is still there—the entire directory entry, the file's data—but the information pointing to it is gone. It is possible to un-delete files by replacing the first character in the file name and re-building the space allocation chain. If after the file was deleted no changes were written to disk, then both the directory and the FAT entries will be intact and it will be relatively easy to undelete the file. If changes were made then you face more of a challenge. For more information on this subject see "File Recovery Programs" in this issue.

When a floppy disk goes bad, the trouble is usually in one of the space allocation chains. Entries in a chain might reference earlier entries, or entries in a different chain. The MS-DOS utility program CHKDSK detects these circular or nonsensical references and reorganizes the FAT. CHKDSK also creates files containing the data specified by the suspect entries.

Knowing how files are stored on disk is important, but it is also important to know what types of files there are and the purposes for which they are used. There are two basic file types: program files and data files.

PROGRAM FILES

Quite simply, a program file is a list of instructions that the computer follows—"add two plus two," "sort these names alphabetically," etc. When you type a file name and press Enter, MS-DOS reads the file from disk into memory and executes the instructions contained within it.

There are three types of program files: COM, EXE, and BAT files. From the com-

Quite simply, a program file is a list of instructions the computer follows.

puter user's point of view, COM and EXE files are exactly the same—you type the program name, press Enter, and the program runs. Inside the computer, however, they behave differently because they handle memory differently.

In MS-DOS, memory is arbitrarily divided into 64-kilobyte chunks called segments. When a program operates within a single segment, referencing memory (instructing the program to go to different memory locations) is simple. COM files are limited in size to 64 kilobytes so all their memory referencing takes place within one segment. EXE files are usually larger than COM files and often exceed segment boundaries. For this reason memory referencing in EXE files is much more complex than with COM files.

BAT files, or batch files as they are commonly called, are text files that contain lists of MS-DOS commands. Type the name of the batch file, press Enter, and the commands contained within will execute just as if you'd typed them at the keyboard. In addition to running MS-DOS commands, batch files have a few of their own commands that give them pseudo-programming abilities. For more information see "A Beginner's Guide to Batch Files" in the August 1986 *PROFILES*.

DATA FILES

Any file that does not contain program code is a data file. Data files are typically used with application programs, such as Lotus 1-2-3 and dBASE III. In Lotus, for example, spreadsheet data is stored in data files with a WKS extension, while dBASE III data files have a DBF extension.

Data files aren't limited to spreadsheet or data base programs. Every program that generates information and stores it on disk uses some form of data file. The document files produced by WordStar are data files. So are the parameter files created by MITE and the index files used by dBASE III.

If you're a hard disk user, you are probably familiar with sub-directories, but you may not know that they are also data files. Each subdirectory file acts as filter, allowing MS-DOS and application programs to access only the files included in that subdirectory.

As a subdirectory accrues more files, the subdirectory file itself becomes larger. Like other files, it is limited in size only by the size of the disk; add more files to a subdirectory and it will expand. This can be deceptive because there is no direct way to determine how large a subdirectory file is. (The only way is to somehow trace its space allocation chain. Good luck.)

Subdirectories can't be re-named, copied, or deleted like normal files. This is a form of protection—delete a subdirectory and all the files in it disappear as well.

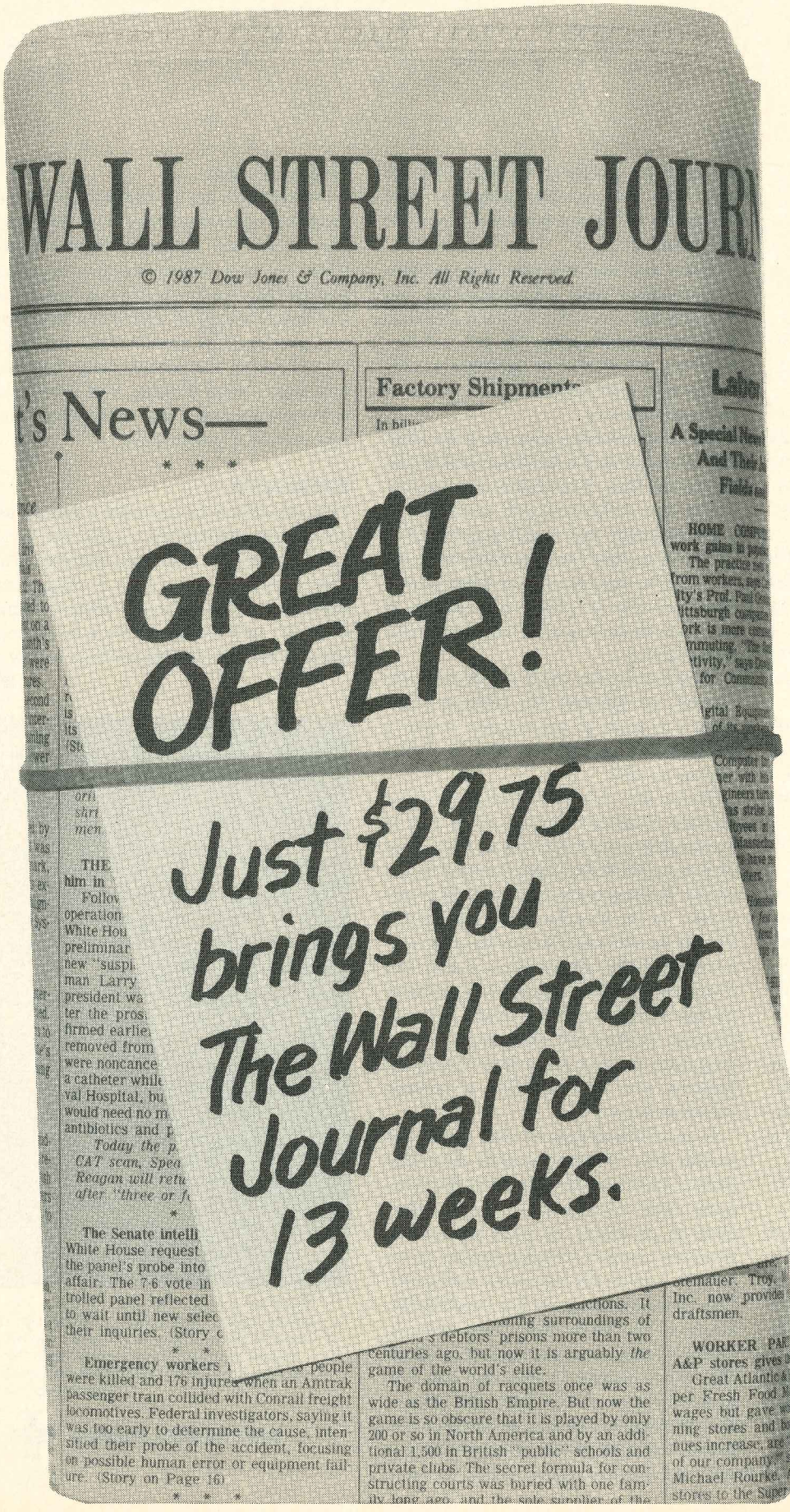
There are, however, certain public domain programs that do allow you to manipulate subdirectories as files. One of them is RENDIR.COM, featured in the article "A Program to Rename DOS Directories" in the October 1986 *PROFILES*. This is an assembly language programming article for advanced users only, but if you just want the program it is available on the Kaypro bulletin board, Kaypro OnLine. Some hard disk management programs, such as Xtree from Executive Systems, also let you delete or rename sub-directories.

A specialized type of data file is the overlay file. Where standard data files contain information utilized by the computer user, overlay files contain data used by programs. A good example is WordStar version 3.3 (this applies to 4.0 as well, but the file names are different). The WordStar program file is WS.COM. Much of the menu text, help screens, prompts, and error messages that WordStar needs cannot fit into that one file, so the program comes with two overlay files: WSMSGS.OVR and WSOVLY1.OVR. When WS.COM needs information that isn't in memory, it goes to one of these files for the data.

Overlay files are an integral part of the programs with which they work. Program files *must* have access to their overlay files. For that reason many programs require that you designate the disk drive and subdirectory in which the program and overlay files reside. This designation is called the search path. Ventura Publisher, Word Finder, and WordStar Release 4 are just a few of the programs that require a search path.

CONCLUSION

Files are almost as complex a subject as computers themselves. Learn the nuts and bolts of them, however, and you'll be able to repair or recover damaged or erased ones. The message "Error reading drive C" will no longer be a terrifying mystery, but just another problem to solve.



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DATELINE

BY BROCK N. MEEKS

NEWS FROM THE FIELD

RADIO-POWERED LAPTOPS

Atlanta, GA--A new device from Sonic Electric Energy Corp. converts RF radio frequency energy into direct current that is capable of powering small electric devices, such as laptop computers. Sonic president Ray Weilage told ''Dateline'': ''We're showing our prototype RF- powered computer at our headquarters this week.''

Weilage explained that the device and technology are part of Sonic's ongoing strategy to expand the use of RF energy into direct current. He said Sonic has successfully shown the device is capable of powering small color TV sets and other small devices such as portable radios. ''However, the expansion of the technology into computers and television sets opens a new field for making these units portable and power-source self- sufficient,'' said Weilage.

The conversion of RF signals to an energy source is a technology that NASA is currently working on. Weilage explained that Sonic's technology differs in that NASA is using microwaves and Sonic is using much longer wavelengths.

The actual device itself is ''very similar to the photoelectric cells that convert light to energy,'' said Weilage. ''It's the same thing, except that we're converting radio frequency to energy.''

To power a laptop computer would take a device ''about the size of a pack of Marlboros.'' Weilage added that the device, when onboard a computer, would add virtually no overall weight and will cost a manufacturer ''about $20.''

The Sonic device draws the RF frequency from an antenna based on the Tesla coil theory. The efficiency of the device, Weilage claims, stems from having reduced the Tesla coil to a microchip. ''Bell Labs was the first to implement the Tesla coil technology on a microchip,'' said Weilage, ''but they were using it for a 'what if we could do this' type of experiment. Apparently the engineers that split from Bell recognized the potential in the device and decided to try to commercialize it.''

The device is currently in the working-prototype stage, but Weilage says full production is ''expected by the endof 1988.'' The device was developed by a group of former Bell Labs engineers. ''These guys, entrepreneurial engineers, formed their own company and we took their project on in a joint development agreement,'' he said.

Last year several companies introduced elaborate photovoltaic systems capable of ending a laptop's ''battery bondage.'' However, these were mostly bulky systems and not very efficient. By using RF frequency, the Sonic device overcomes both size and weight constraints because it can be incorporated directly into the design of a laptop. ''Using this device, you'll never need batteries for your laptop again,'' Weilage said.

MORE THAN STYLE

San Francisco, CA—Spelling checkers have had a...well... checkered career. While these programs have generally improved the spelling of the masses, they've been woefully inadequate when dealing with grammatical and subtle stylistic errors.

Reference Software now says it has the ''next generation'' of grammar checking software. Reference calls its product, Grammatik III, the ''first true grammar checker.'' It will likely set the stage for a new trend in grammar checkers for the mass market. (Bell Labs has long had such a sophisticated program kept under lock and key for use only at its prestigious research site.)

Currently, grammar checkers run a piece of text and check it against a fixed set of improperly constructed phrases. Grammatik III, however, actually determines the parts of speech in each sentence in the text. The program then checks these parts of the sentence against a specific set of grammatical rules, using a type of artificial intelligence program to perform the checks.

Each piece of text is actually checked three times. First the program looks up each word in its dictionary, then analyzes suffixes (a la Bell Labs' Writer's Workbench), and then analyzes context and checks word usage against the previously mentioned set of rules.

The program finds stylistic errors such as ''all over again'' (redundant) and grammatical errors such as ''your going to the store'' (it should be 'you're'). There is also a

DATELINE

phrase database that alerts the writer to overworked phrases and colloquialisms.

The company is working on a RAM-resident version of the program that allows you to check grammar without leaving your word processor. The program should be available this month.

There's other "intelligent" grammar checking software on the way—look for a program soon from Proximity Technology. In addition, book publisher Houghton-Mifflin's Business Software division is working on "computer-aided proofreading," which it intends to market to word processing companies. Look for it to start showing up in commercial products in the next few months.

THE DREAM LIVES ON

Seattle, WA—During last year's CD-ROM conference, sponsored by Microsoft, Philips International stole the show by introducing a new technology called "Compact Disc-Interactive" (CD-I). The pundits praised it. But it was "vaporware" until this year's Microsoft CD-ROM conference.

Assuring the crowd that CD-I is "not vaporware" and claiming that "the future has arrived," Philips International gave its first public demonstration of a CD-I application. The demo was performed on a prototype CD-I player—without such a device, the technology is useless.

A single compact disc can store all kinds of data, including the text and graphics files computer users are familiar with, high fidelity sound, and standard television video images such as those stored on VHS video tape. Philips demonstrated that its product will work with all these types of data by using the CD-I in a multimedia presentation, which showed text, graphics, and interleaved audio and video under the control of a pointing device (joystick or track ball).

The technology was impressive, but there still is no commercially available product. Philips said that consumer products won't be ready until the summer of 1989. However, Philips spokesman G. Van Heeren said, "We expect to formally introduce the CD-I system—authoring systems, software tools, players, and the first software titles—to the hardware and software industries this fall."

There was a "Home Theater of the Future" demonstration that was also impressive. Van Heeren emphasized that CD-I is a home market product and "will be marketed as the ultimate extension of CD audio." Future CD audio units will be equipped with hookups to Philips' CD-I multimedia controller. Another alternative is to separate the Philips CD-I box as a self-contained unit.

OPTICAL DISC GETS READ/WRITE DRIVE

Hannover, West Germany—The Olympus Corporation unveiled the first commercially available read/write optical disc drive during Europe's largest trade show, CeBIT.

Optical discs are a computer data storage medium similar to standard floppy or hard disks (by convention, disc is spelled with a "c" when refering to optical discs and with a "k" when referring to magnetic disks).

Instead of using a mechanical arm with a standard read/write head on it, as most drives do, optical drives read data off their discs using either a laser or an infra-red beam. Optical discs can store far more data than regular disks, and because the only thing that ever touches them is a beam of light, they last virtually forever.

The Olympus drive uses an erasable optical disc medium developed by the 3M company. Although several other manufacturers have drives under development, Olympus' is the first unit announced for sale.

The 5.25-inch drive is called a Magneto-Optical (M-O) disc drive because of the way it reads and writes information on the disc. The drive is capable of reading, writing, and erasing information from an optical disc. Each of the removable disc cartridges is housed in a rigid plastic case and provides storage of up to 240 megabytes per side.

The drive itself uses a SCSI interface via a controller card sold with the unit, which you plug into your PC. Olympus says the drive will be available in the U.S. sometime around the fourth quarter of this year. Projected price: $2,000.

DATELINE QUOTES:

"People go through trash all the time. They don't have to at Apple. Information flows out the front door."
-- Freelance writer Chuck Farnham, who shocked Apple when he reported a possible new Apple Macintosh laptop computer from news leaked to him in a 300-page manual.

"As distributors scramble to nail down fast-evaporating memory chip supplies, dynamic random access memory chips (DRAMs), which early in 1986 retailed for less than $2.50, are currently soaring past $5-- even $5.50--with no end in sight. The increase in the price of DRAMs adds up to almost $100 for a personal computer selling for $600 or $700." -- Kenneth Flamm, an economist with the Brookings Institution, says the 1986 semiconductor trade agreement is causing the problem.

PROFILE

IN SEARCH OF SPEED FOR CP/M

While owners of MS-DOS machines are deluged with announcements of new and exciting products every month, CP/M owners stand at the docks, searching the horizon for any sign of a ship carrying anything new.

Last year the hopes of the CP/M faithful were kept alive by the news that a new, incredibly fast processor board from High Tech Research was in the works. The "UltraBoard," as it was called, would put Kaypro CP/M machines back on the "leading edge" once again.

And so they waited. And waited. Whatever happened to this product that, it was rumored, would embarrass Intel 80386-based machines and put a mind-boggling 16 megabytes of memory at the disposal of Kaypro CP/M owners? It's still waiting in the wings. "Dateline" talked to Bill Nesting, president of High Tech Research and developer of the UltraBoard about its future.

What is the status of the UltraBoard?

The UltraBoard, which is based on the Zilog Z280 chip, is on hold. We ran into problems because we spent so much time on the video processor circuit. We first went with an NCR chip set; but NCR spent $2.5 million on developing it when they should have spent $2.5 million [plus] $50,000. The chip set just didn't quite work well. We then went to a Hitachi chip set and that seems to be working fine.

The new video chip set will produce a resolution of 680 x 400 completely bit-mapped pixels. You'll get the same types of graphics now available on PCs.

But we spent eight months developing the board and still have no product. Our cash flow dried up; the project was put on hold.

"The Ultraboard isn't dead; CP/M isn't dead. If there's still a demand for it, we'll bring it out."

—Bill Nesting
High-Tech Research

What would the UltraBoard give the Kaypro CP/M owner?

Using the Z280 central processor, you have 24 address lines available. Quite simply it means that the UltraBoard will support up to 16 megabytes of main memory.

There's also something called "on-chip caching." This means the 280 chip itself stores 125 of your program's most often-used instructions so that it doesn't have to even address the computer's memory; it's like the computer knows what the program wants to do before it does it. This leads to definite speedups in computing time.

Then there's something called "three-stage pipelining." In consumer terms that just means the UltraBoard appears to have three CPUs working for you instead of one. That's about as easily as I can explain it.

Also, we'll have the board stuffed with one megabyte of memory. Expansion to 16 megs will come with an add-on board.

Bottom line: a system that will blow the socks off any processor in the market. And that includes the Intel 80386. We're running at 12 MHz.

But will it be compatible?

Yes and no. The UltraBoard will run fine under standard CP/M. By reassembling most programs, you should be able to run them with no problem.

However, to support the 16 meg memory capability there will have to be some sophisticated software written. This would be much easier to do if a replacement operating system were created.

An alternative operating system would also allow users to take advantage of two other areas

where the Z280 shines: multi-tasking and multi-user.

SLR Systems has expressed interest in writing just this kind of operating system. If that happens, the market would explode—it would be fat city.

How do you see the UltraBoard meeting today's computing needs?

The other aim for the UltraBoard is to actually turn it into a self-contained computer system. This will be developed for the desktop publishing market.

You don't need a 16-bit machine for DTP; everything you're doing is an 8-bit function. So what you really want is an 8-bit machine with lots of memory and lots of speed.

We've already been negotiating with two DTP software firms that are more than willing to modify their software to run on our machine. This will be the market we'll go after.

Is the Ultraboard the leading edge of a trailing technology?

That pretty much says what the UltraBoard is. But we know there's a CP/M market out there. Look at Micropro. They were extremely successful with WordStar 4. They've sold three times as many CP/M versions as DOS; but they came out with the DOS version eight months earlier.

Our big problem, and this is why almost everyone has bailed out of CP/M, is: How do you get your product before the customer? No one can afford to advertise in the major magazines.

Survival of the fittest: Will CP/M live?

Right now we're the only ones really doing any serious development and work in the CP/M world. We have a solid niche with the conversion side (putting 20-meg hard drives in Kaypro machines). So we'll stay in the CP/M world.

The UltraBoard isn't dead; CP/M isn't dead. We'll re-evaluate the project and if there's still a demand for it, we'll bring it out.

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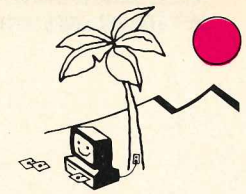

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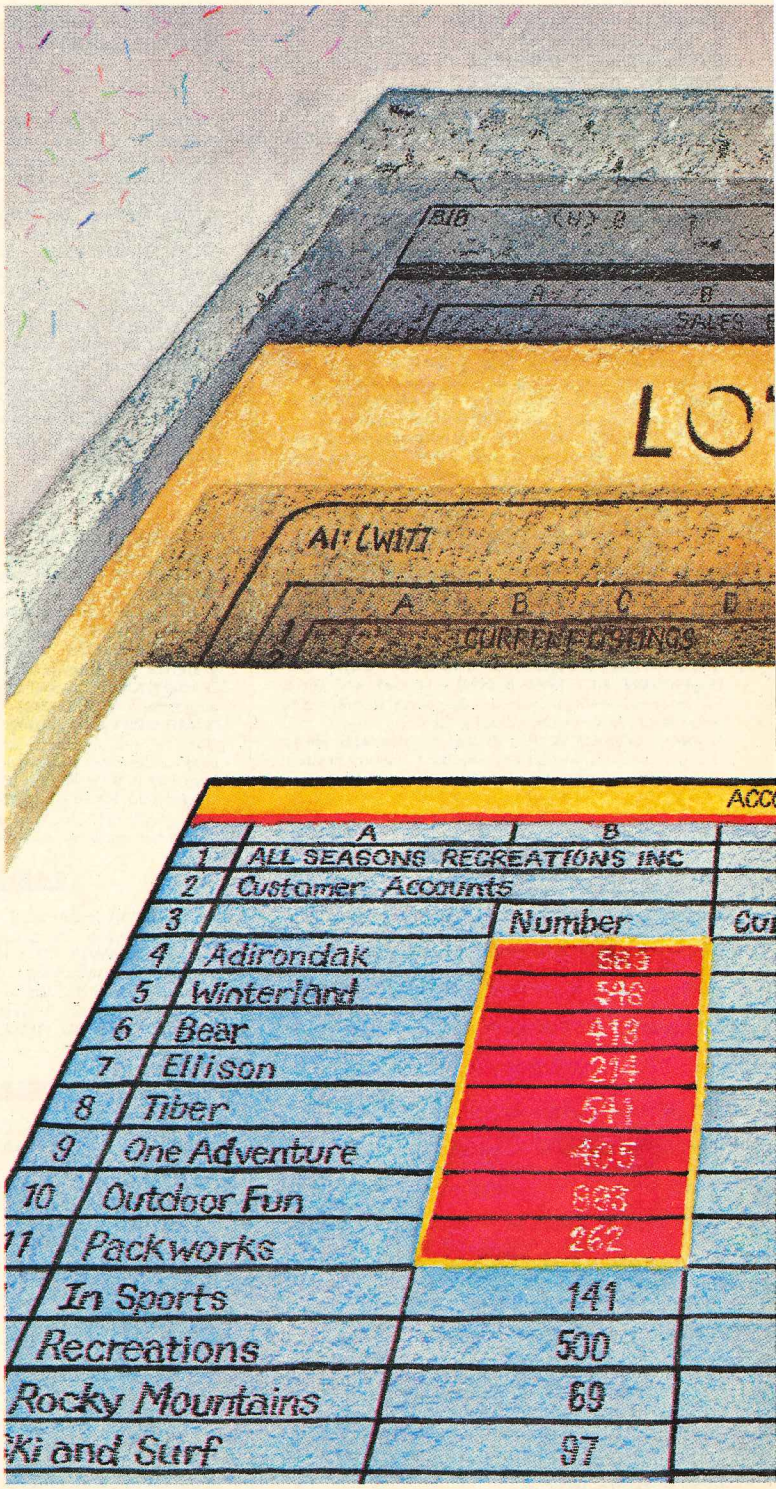
SPREADSHEETS: THE

Evolving technology heats up the competition.

When was the last time you read an article singing the praises of VisiCalc? Given the current popularity of Lotus 1-2-3, it's difficult to imagine anyone doing any serious number crunching with that old electronic warhorse. Lotus reigns supreme, as it has for years, and as it will for years to come. Or will it?

Second-generation spreadsheets have begun to appear that could supplant 1-2-3 as the king of the PC marketplace. That may sound like heresy to some, but read on and see if you don't agree.



IN THE BEGINNING

To understand the evolution of spreadsheets, you need to begin at the beginning. Back in 1979, the then-emerging home computer was still considered an esoteric toy, an electronic novelty better suited to the fantasies of hackers and hobbyists than to any serious professional application. Then, in October of that year, Personal Software introduced VisiCalc for the Apple II. The rest, as they say, is history.

With the release of this seminal spreadsheet program, "home computers" evolved into "personal computers," and these personal computers began migrating from kitchen tables and crowded dens to the corporate offices they populate today. For the next three years VisiCalc dominated the spreadsheet market. In the process, it also legitimized the personal computer as a valuable business tool.

This situation might have endured forever, were it not for two related incidents: IBM's 1981 entry into a PC market it had previously scorned, and the much-heralded appearance, in January 1983, of Lotus 1-2-3.

Much has been written about the reasons Lotus replaced VisiCalc as the spreadsheet of choice among PC users. At its heart, though, the issue boils down to one of evolving technology. Lotus 1-2-3 was designed to take advantage of the greater capabilities built into the newer IBM and compatible machines—640K of RAM, a 16-bit internal bus structure, dedicated function keys, higher density disk drives, and a variety of other technological and design nuances. VisiCalc, on the other hand, even when translated into the MS-DOS environment, still exhibited the constraints imposed upon it by age and its much humbler roots.

Whereas VisiCalc limited its spreadsheets to 16,012 cells (254 rows x 63 columns), 1-2-3 increased this number more than 30-fold, to an amazing 524,288 cells (2,048 rows by 256 columns). Lotus then added several new functions (sorting, search criteria, data filtering, etc.) that allowed the program to function as a rudimentary database manager. 1-2-3 also supported PC function keys and the creation and execution of macros, thus simplifying certain otherwise tedious operations. Per-

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NEXT GENERATION

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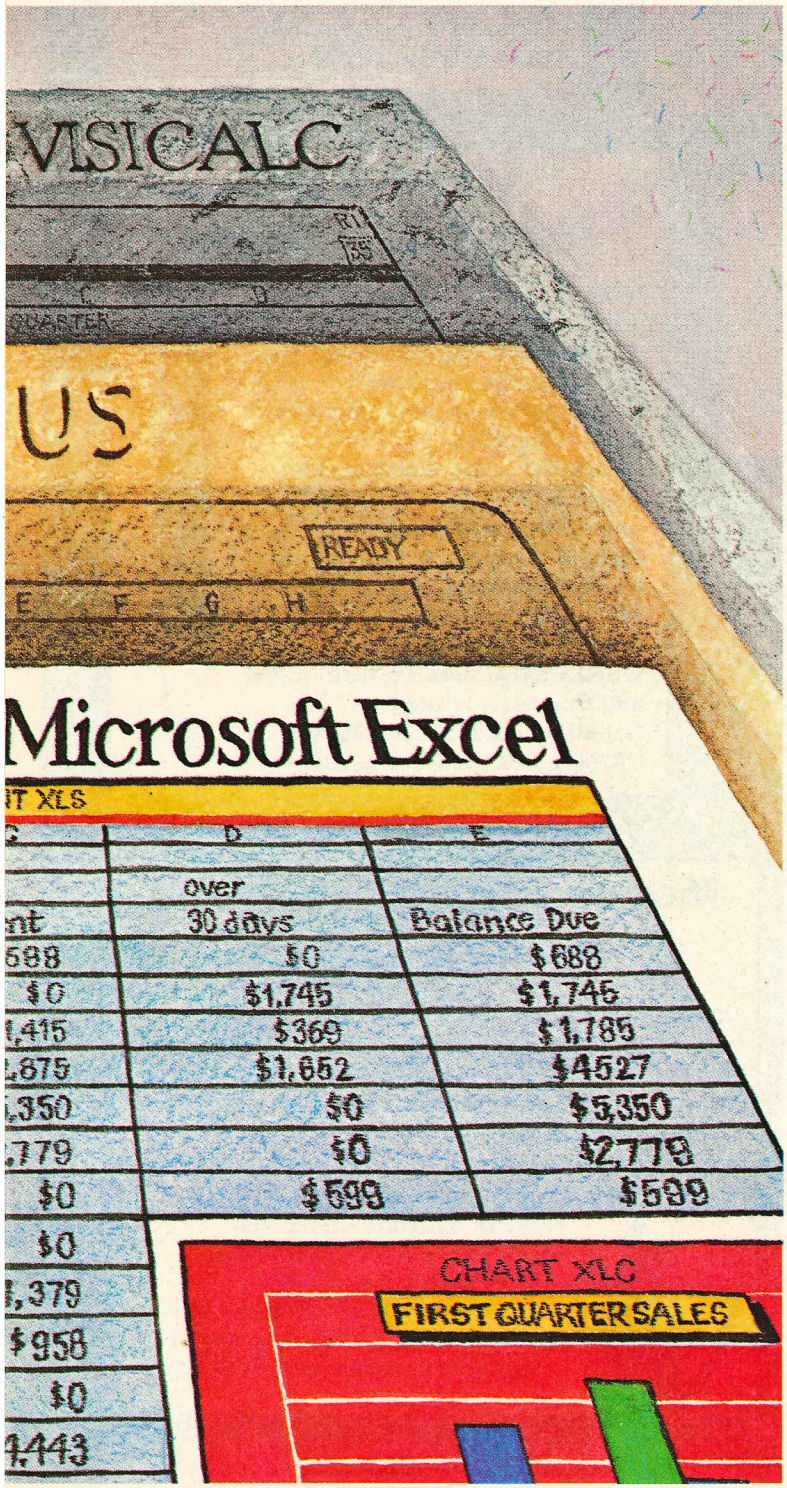

haps most important, 1-2-3 allowed generated graphics—bar graphs, pie charts, and the like. While admittedly primitive, 1-2-3's graphics capability added greatly to the program's appeal. Looking back, it seems inevitable that VisiCalc, once the paradigm of a successful spreadsheet, ultimately found itself playing second fiddle to Lotus as 1-2-3 captured an ever-increasing share of the spreadsheet market.

The time may be ripe for yet another major shakeup in the spreadsheet arena. And once again, it's evolving technology that's heating up the competition.

Desktop computers have changed greatly since the early days of 1-2-3's introduction. Consider, for example, Kaypro's own Model 386E. Using an Intel motherboard populated by that company's 80386 CPU, the Model 386E can be configured to address an astounding 10.5 MB of RAM. Moreover, these newer machines execute code anywhere from 15 to 20 times faster than their PC/XT progenitors. Video standards also have improved over the years, as have printer capabilities. Only now, though, are programs designed to take advantage of these hardware advances beginning to emerge.

A VISION OF TOMORROW...TODAY

Imagine a Macintosh-like spreadsheet program for the PC—where a mouse, icons, and a graphics interface replace the "slash" commands and menu bar Lotus has defended so vehemently in recent "look and feel" lawsuits. Or a program that allows you to design a spreadsheet containing more than *four million* cells (16,384 rows x 254 columns). And what if this imaginary program also supported a true "three-dimensional" structure, where a single cell in one spreadsheet represented the final calculations of a second, equally complex spreadsheet to which it was dynamically linked? Add to this additional features like built-in auditing, the ability to view, alter, and even print graphs without exiting a spreadsheet, forms-oriented data entry, and interactive tutorials (along with a myriad of other enhancements Lotus users could only dream about) and you get a feeling for the advances that second-generation spreadsheets portend.

Now consider the fact that the features outlined above are included in a program already sitting on store shelves: Microsoft Excel for the PC. Based in large part on its highly successful Macintosh counterpart, Excel has many experts claiming that a new age of spreadsheets has arrived.

One problem, however, is that Excel isn't accessible to every PC user. It requires an AT-class machine (or a 386-based system, like the Kaypro 386E), a hard disk, and DOS 3.0 or higher; PC/XT owners need not apply. In addition, a mouse and EGA board are recommended, if you want to take full advantage of Excel's graphics-based structure.

Does this mean that millions of PC/XT users, lacking such

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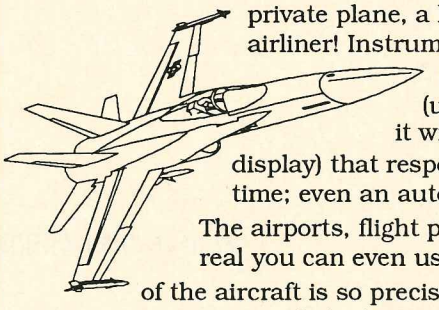

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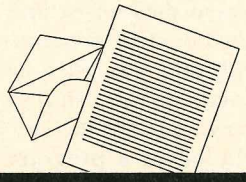

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state-of-the-art equipment, are left out in the cold? Not necessarily. Several other spreadsheets also have appeared that offer many of the performance enhancements available with Excel, and most of these newcomers run on a standard PC/XT machine. (Two of them—Quattro and Lucid 3-D—as well as Windows Excel are examined in more detail in the accompanying article on page **00**.)

Let's see how the new spreadsheets take up where Lotus leaves off.

FILLING IN THE GAPS

Even the most devoted Lotus supporter must admit that current versions of 1-2-3 leave room for improvement. As proof, consider the sizable vertical market in programs capitalizing on 1-2-3's long-recognized shortcomings. Macro languages, graphics enhancers, print controllers, spreadsheet auditors, screen formatters, file compressors: products in each of these categories perform some function absent from the original 1-2-3. Most newer spreadsheets incorporate such enhancements into their core programming.

Like Excel, for example, Lucid 3-D supports dynamic linking of multiple spreadsheets. Lucid also allows an unlimited number of notes to be attached to individual cells of its spreadsheets. This simplifies the process of auditing even the most intricate spreadsheet, since you can easily document the assumptions and procedures incorporated into your calculations.

Quattro takes auditing a step further with its Transcript utility. Transcript records and stores an entire Quattro session, keystroke by keystroke, as a disk file, which can then be reviewed and analyzed at your convenience.

Management of sparse memory and background recalculation are two other functions incorporated into this new wave of spreadsheets. The latter is an especially welcome option, since it eliminates the inconvenience of suspending data entry while changes to a large spreadsheet are recalculated.

But the new spreadsheets offer even more than these powerful new capabilities—they offer an enhanced user interface as well.

LOOK AND FEEL

Once touted as the ultimate user interface, the Lotus model of "slash" commands and their accompanying menus now seems almost antiquated. This situation takes on greater irony when you consider the resources Lotus has invested in "protecting" a "look and feel" it did not truly originate, but borrowed in large part from that program's electronic ancestor, VisiCalc. The end result of Lotus's litigious attitude is that several companies have either completely discarded or noticeably improved upon the 1-2-3 standard, simplifying spreadsheet operations in the process.

Lucid 3-D takes perhaps the most elegant approach to enhancing the basic Lotus menu format. Its fundamental user interface is the menu bar, much like 1-2-3. But Lucid then expands upon that concept by utilizing a kind of hybrid moving-bar/pull-down menu structure. When you enter a Lucid com-

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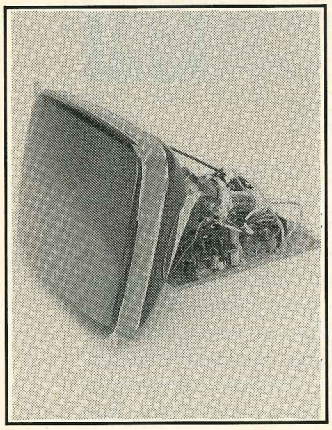

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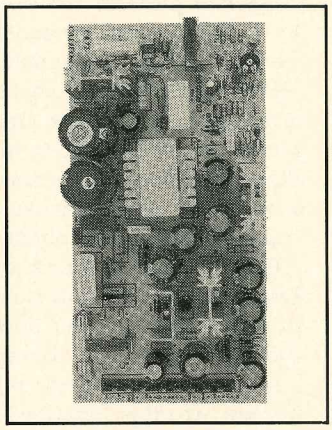

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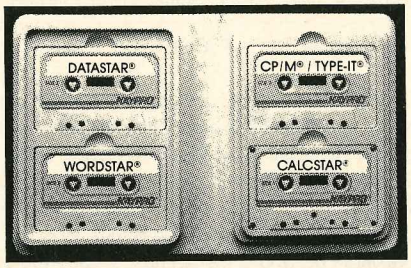

(Produced for the Kaypro models 2X and 4, but covers most other Kaypro CP/M applications.)

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mand sequence, all previous menu bars remain visible during the selection of subsequent operations. Highly intuitive, this tiered menu structure reveals the complete command path used to invoke whatever program function is being executed.

Once touted as the ultimate user interface, the Lotus model now seems almost antiquated.

The most flexible user interface might well be that of Borland International's 1-2-3 challenger, Quattro. (As in *uno, dos, tres*...makes you wonder if these guys watch "Sesame Street" during their coffee breaks.) Using Quattro's Menu Builder utility, you can design a menu structure perfectly suited to your needs. This kind of programmability seems to represent an emerging standard among newer spreadsheet programs.

MAXIMIZED MACROS

The ultimate approach to user-programmability, of course, is the creation of macros to automate specific operations. Perhaps more than any other capability, Lotus's early support of macros assured its popularity. Since that time, an ability to create and run macros has become the norm, rather than the exception, in software design. For a new program to succeed in today's overcrowded software market, it must include some form of macro language. As in other areas, newer spreadsheet programs not only support the Lotus macro standard, they improve upon it.

One major shortcoming of current 1-2-3 versions is their lack of a "smart" macro language, sometimes called a "learn" option, which allows the program to create and store a macro as you execute the commands you want that macro to contain. Whereas 1-2-3 requires an add-in module to accomplish this, the new crop of spreadsheets includes a learn option in the basic program. And the advantages don't stop there. With Excel, for example, you can specify that a macro be executed at a specified time each day, thereby automating critical, time-sensitive procedures.

SPREADSHEET...OR DATABASE MANAGER?

At its heart, the very idea of what comprises a spreadsheet is changing. Again, ironically, it was Lotus that initiated this trend. As mentioned earlier, one fact that contributed greatly to the original appeal of 1-2-3 was that program's ability to handle limited database management chores. Newer programs

expand upon this concept even further, to the point where it's often difficult to realize you're working in a spreadsheet environment at all.

While Excel's database capabilities closely emulate those of 1-2-3, Excel's graphics-based structure allows for the creation of true data-entry forms. This eliminates the tedious chore of entering data records into individual cells of a standard column/row grid. You can also use an Excel data-entry form to sort records, enter search criteria to select a subset of a database, delete records, and perform a variety of other data management operations. To all appearances, using the Excel data functions is analogous to using your favorite database program.

DOWN, BUT NOT OUT

Don't send 1-2-3 down for the count quite yet, however. Recognizing its fragile position in an evolving marketplace, Lotus recently has taken steps to ensure the continued success of its premier program. 1-2-3 Version 3, which should be available by the time you read this article, reportedly includes most of the program enhancements already incorporated into newer packages. Even more interesting is the impending release of 1-2-3/G, scheduled for mid-1988. By all accounts, this graphics version of 1-2-3, designed to run under the OS/2 Presentation Manager, will bear a much stronger resemblance to Microsoft Excel than any of its Lotus predecessors.

Whatever Lotus has planned, the next year could see dramatic shifts in the spreadsheet marketplace. If past experience provides any insight, the ultimate benefactor of such competition will be you, the user, as the old once again makes way for an improved new. ■

Jack Nimershim is an independent computer consultant and freelance writer living in Covington, Kentucky. His reviews and articles have appeared in several computer publications, including Business Software, Infoworld, *and* Creative Computing.

QUICK REFERENCE SUMMARY

Product: Windows Excel
Manufacturer: Microsoft Corporation
16011 NE 36th Way
Box 97017
Redmond, WA 98073-9717
Phone: (206) 882-8080 or (800) 426-9400
Sugg. List Price: $495

Product: Quattro
Manufacturer: Borland International
4585 Scotts Valley Drive
Scotts Valley, CA 95066
Phone: (800) 543-7543
Sugg. List Price: $195

Product: Lucid 3-D
Manufacturer: Personal Computer Support Group, Inc.
11035 Harry Hines Blvd., Bldg.206
Dallas, TX 75209
Phone: (214) 351-0564 or (800) 544-4699
Sugg. List Price: $199

A Closer Look At The Competition

To give you a better idea of the benefits the new generation of spreadsheets has to offer, following are capsule summaries of three major new programs. These products were chosen because they illustrate the range of features—and limitations—found in the new spreadsheets. Please note that these profiles are not full reviews and do not offer a complete picture of the products covered.

WINDOWS EXCEL

More than any other program, Windows Excel represents the new generation of spreadsheet software. Based in large part on its successful Macintosh counterpart, Excel is the first spreadsheet for the PC to rely heavily on the type of graphics-based design Apple introduced to the microcomputer environment.

This package requires 640K RAM, an AT or 386 machine, one floppy drive, a hard disk drive, and DOS 3.0 or later. It can be used with a Hercules monochrome, EGA, or VGA monitor, but EGA or VGA is preferred. A mouse is also recommended. Output options include a wide variety of popular dot matrix or laser printers. Excel is not copy protected.

As its name implies, Windows Excel comes bundled with a run-time version of Microsoft Windows. It can also be installed in a Windows environment, under Windows Version 2. Either one of these configurations makes your PC look like a Macintosh with color. But if Excel only painted pretty pictures it would hardly qualify as a revolutionary product. Luckily, the program's capabilities go far beyond this.

Excel comes with 131 built-in math functions (42 more than 1-2-3) and more than 20 standard number, date, and time formats. Do you want even more? No problem. Excel lets you design and program additional functions and formats as needed. Using a mouse, you can even "cut and paste" functions and formats directly into a specified cell, thus eliminating typographic errors.

The convenience of this kind of "point and click" mouse technique is perhaps the greatest advantage of Excel's graphics-based design. To dynamically link multiple spreadsheets, for example, you simply open the worksheets to be linked in separate windows, then use the mouse to "point" to a range of cells in the dependent sheet and "click" that range into the desired location of the second worksheet. What could be easier?

This same technique is used in specifying data to be graphed in one of Excel's seven basic chart types. The program automatically recognizes the difference between numbers and text and places each in its appropriate place on the selected graph.

Excel supports a "smart" algorithm that recalculates only those cells affected by a changed value, rather than the entire

spreadsheet. Even more impressive, the program suspends recalculations during keyboard input, thus allowing you to continue with your business even as Excel takes care of its own. Most spreadsheets do it the other way around, making you wait while they recalculate.

A complete listing of all the Excel extras would require more space than this profile allows. Suffice to say that if you own or can afford the hardware Excel demands, this is the program for you. Returning to your old speadsheet software after working with Excel is like driving home in an old, beat-up Volkswagon after taking a new Mercedes Benz out for a test drive.

QUATTRO

Although not as revolutionary as Excel, Quattro represents a substantial step forward from current versions of 1-2-3, the program Borland International seems determined to challenge. If past successes are any indication, Lotus would do well to keep one eye trained on Quattro.

Quattro requires 384K RAM, two floppy disks or one floppy and a hard disk drive, and DOS 2.0 or later. It supports Hercules monochrome, CGA, or EGA video adapters. Output options include a wide variety of popular dot matrix or laser printers. Quattro is not copy protected. Installing Quattro is a breeze. After copying four distribution diskettes to your hard disk, you simply type "Q" to start a Quattro session. The program audits your system for the presence of memory boards, screen adaptors, and a coprocessor and configures itself accordingly.

One area in which Quattro shines (excels?) is its graphics. Whereas an entire vertical market has flourished on enhancing the primitive charts and graphs generated by 1-2-3, Quattro lets you create screen images and hard copy of near presentation quality. Quattro graphs can even be saved to a disk file in PIC format. This lets you use Quattro graphs with any application capable of importing Lotus PIC files—Ventura Publisher, for example.

Quattro's Transcript utility lets you generate a separate disk file containing a keystroke-by-keystroke record of all operations performed within a given spreadsheet. This file not only provides an audit trail of your Quattro sessions, but can also be used to recover a spreadsheet lost through technical failure or even human error.

As mentioned in the main article, Quattro supports a programmable menu format. The program is shipped with two such "soft" menus: the default Borland menu structure and a second option that configures all commands to emulate their Lotus counterparts. Quattro also includes a utility program, The Menu Builder, that lets you create the menu format ideally suited to your needs.

Changing from 1-2-3 to Quattro is a simple proposition. Quattro can read and write both WKS and WK1 files. You don't even need a conversion utility, since Quattro is fully compatible with virtually all 1-2-3 commands, functions, menus, and macros. Quattro also imports files created by dBASE II or III, Paradox, or Symphony. The program includes a utility to translate any standard ASCII file into the Quattro format.

Many users are pretty satisfied with the Lotus standard, but they want extras 1-2-3 doesn't offer. Given Quattro's functional compatibility with 1-2-3, the operational enhancements it provides, and especially its $195 purchase price, it seems the perfect alternative for anyone who falls into this category.

LUCID 3-D

Lucid 3-D represents perhaps the most dramatic departure from traditional spreadsheet philosophy. Whereas in the past most people worked primarily in their spreadsheets, relegating other tasks to ancillary or memory-resident status, Lucid 3-D challenges this premise by loading itself as a memory-resident program. For all but the most dedicated power users, this seems a logical approach.

This package requires 128K RAM, one disk drive, and DOS 2.0 or later. It can be used with an MDA, Hercules, CGA, or EGA monitor. Output options include dot matrix, letter quality, and laser printers. Lucid 3-D is not copy protected.

Like Excel, Lucid 3-D allows you to create multidimensional spreadsheets. The program also supports a mouse, which reduces such tedious activities as range identification, sorting, function entry, and spreadsheet linking to a simple "point-and-click" operation. Unlike Excel, Lucid 3-D is a character-based program. In fact, Lucid does not allow the creation of graphs and charts. Since Lucid will save files in WKS or WK1 format, however, you should have no trouble importing your spreadsheet data to one of the many third-party charting programs that read Lotus files.

A Lucid 3-D screen can be divided into several tiled windows. This allows the display of multiple spreadsheets stored in different directories or disk drives. With multiple windows, you can make changes to one worksheet and immediately see how those changes affect any other sheets to which it is linked.

Lucid 3-D occupies approximately 75K of RAM, which makes it compatible with all but the most memory-hungry application programs. Using the program's resident screen-capture feature, you can even cut and paste columns and rows from your Lucid spreadsheet into your favorite word processing or database program.

In situations where tracking spreadsheet activities is critical, Lucid should more than fill the bill. The program offers five different levels of audit display and printout. Lucid also lets you attach multiple-page notes to any cell in a spreadsheet. When it comes to documenting a spreadsheet, even the big guys don't measure up to Lucid 3-D.

If you're looking for a simple but powerful spreadsheet program, look into Lucid 3-D. With an introductory price of $199, it's a hard package to beat. ■

OVERCOMING THE LANGUAGE BARRIER

How to make your PC talk to a Macintosh.

BY TED SILVEIRA

In terms of computers sold (not to mention magazine pages), MS-DOS dominates the marketplace, way ahead of its major competitor, Apple's Macintosh. And no one doubts that MS-DOS rules the corporate world, where the Macintosh has often been shrugged off as a toy—unbusinesslike ("Mice? I don't allow rodents on my desk.") and underpowered ("If it can't run Lotus 1-2-3, it's no good to me.").

But things change. In 1988, the new buzzword is *connectivity*, and lots of people are interested in bridging the communications gap between the PC and the Macintosh. Suddenly, it's important for MS-DOS to talk to the Mac. What happened?

Among other things, desktop publishing happened. And for the first two years, the Macintosh and Apple's Laserwriter laser printer were the definition of desktop publishing. The Macintosh found a home among freelance computer artists, designers, and desktop publishing people and soon began working its way into corporate offices through the art and publications departments. It gained popularity with engineers and others who do light-to-medium computer-aided drafting and design. And finally, it began to penetrate the heart of the business and professional worlds with powerful programs like the Macintosh version of Microsoft's Excel spreadsheet (which preceded the PC version by over a year).

As a result, the computing world, even the conservative corporate computing world, has become bilingual out of necessity. Certainly, if you have people in your business using Macintoshes, or if you have a publications department, for example, that contracts with freelancers who use Macintoshes, you don't want to isolate these people. You need the data that's on their computers, and you don't want to waste time retyping or redrawing it all.

But there are major barriers to swapping data between MS-DOS and Macintosh computers. First, you can't just exchange disks because the disk formats are incompatible. Though the Macintosh uses 3½-inch disks, just like many new PCs, its disk format is so different that a standard PC disk controller can't handle it. The Macintosh even uses a variable speed drive that runs at different speeds depending on whether it's reading the inner or outer part of the disk. Too strange.

Second, many Macintosh file formats are markedly different from MS-DOS file formats, at least partly because they include various type fonts and styles, typographical refinements like line spacing in points, and often graphics. So even if you get a raw Macintosh file onto an MS-DOS disk, most MS-DOS programs will choke on it.

Working in an uneasy alliance, though, the MS-DOS and Macintosh worlds have now produced a number of solutions, ranging from cheap, low-tech, and cumbersome to expensive, high-tech, and slick.

PHOTOGRAPH BY MARK SWEZEY

HOW TO GET FROM HERE TO THERE

Your first problem is getting files from the Macintosh to your MS-DOS computer, or vice-versa. To transfer the files, you have three basic choices:

First, you can connect the two computers through a modem or direct-wire (null modem) connection and transfer your files with standard communications programs. The advantage of this method is that it's cheap, as cheap as the price of a cable in many cases. The major drawback is that it's slower than other methods—often quite a bit slower—and also less convenient (hooking the machines together, checking all the settings, and so forth).

Second, if the two computers are in the same area (within about 3,000 feet), you can hook them together on a local area network (LAN) that accepts both PCs and Macintoshes, like TOPS. The network is an elegant solution that, at its best, is perfectly transparent. As long as both computers are on, you don't have to plan ahead to exchange files—you simply reach out and grab them when you need them. Best of all, even the slowest network is considerably faster than the fastest null-modem connection. The drawbacks are the proximity required and the expense (probably at least $400 to $500 to connect one PC and one Mac, more for others).

Third, you can invest in some extra hardware that will let one of the two computers read and write the other's disks. Neither the PC nor the Macintosh is capable of handling the "foreign" disks on its own, but a few adventurous companies have introduced add-on drives (with extra hardware) that make it possible to exchange disks. This solution doesn't require that the two computers be anywhere close to each other, and it makes multi-megabyte transfers easy, even across country (a box of disks sent UPS Next Day Air gives you a very respectable data transfer rate). The drawback, as with networks, is expense—anywhere from $350 to $700.

DIRECT WIRE AND MODEM TRANSFERS

Cheap and Slow. The cheap and simple method of transferring files is to connect the two computers with a cable or with two modems and a phone line, and then use standard communications programs on each end to send the files back and forth. On the PC end, you can use shareware programs, like Procomm and Boyan, or commercial ones, like SmartCom II and Crosstalk. On the Macintosh end, you can use the public domain FreeTerm or the commercial SmartCom II, Microphone, or Red Ryder.

With a direct-wire connection, you can use speeds up to 9600 bps (bits per second), allowing you to transfer a 56K file in about one minute. If you're transferring over a phone line using modems, you're limited to 2400 bps or even 1200 bps. It'll take about four minutes to transfer a 56K file at 2400 bps, eight minutes at 1200 bps.

More Elegant and More Expensive. If you're willing to spend some money, you can make your direct-wire or modem transfers run more smoothly by using one of several commercial programs that automate the transfers.

For example, MacLink Plus, from DataViz, consists of software for the PC, software for the Macintosh, and a cable to connect the two computers. Once you connect the two, the Macintosh takes over the session (the PC becomes a robot). From the Macintosh end, you can log into any directory on any disk in either computer, select files from a list, and transfer them by clicking the mouse on a few menu items. Transfers run at 9600 bps.

You can also use MacLink Plus over a phone line with modems. In this case, you tell the Macintosh what phone number to call, it dials the number, and the PC (which was waiting patiently) automatically answers at the other end. After that, the session proceeds exactly as with the direct-wire connection (only at a lower speed). One drawback here is that the PC user is locked out of the transaction and has to depend on the Macintosh user to make all the appropriate transfers.

MacLink Plus comes with an excellent set of file translators to convert various kinds of Macintosh files into PC files and vice-versa. You can translate MacWrite to WordStar, dBase to Excel, and so forth.

Other PC-to-Mac programs in the same vein include Mac-

Chuck, from Vano Associates, and the more expensive QuickShare, from Compatible Systems Corporation, which is considerably faster than the others because it uses the Macintosh SCSI port instead of its serial port.

Third-Party Transfers. One drawback to the direct-wire and modem transfers described so far is that both computers must be available at the same time. Suppose you're in New York, and your freelance computer artist calls to arrange a transfer just after your PC has started closing out the month's accounts. Or suppose your freelancer can't deliver the art until 5 p.m. California time (that's 8 p.m. in New York), but you need to have it at 8 the next morning (that's 5 a.m. in California).

One solution is to transfer your files through some third party, either an electronic mail service, like MCI Mail, or a commercial bulletin board or information service, like CompuServe. Here the third party acts as a holding service or mail box—your freelancer uploads the files when they're ready; you download them when you have time. Often, such third-party services limit your transfers to ASCII text files only, but some (like CompuServe) can transfer non-ASCII files, including graphics.

For example, MCI Mail is an electronic mail service set up primarily to deliver text messages. But recently, its capabilities have been expanded through two unique programs, Lotus Express for MS-DOS computers and Desktop Express for the Macintosh. Lotus Express and Desktop Express both automate the whole process of creating an MCI Mail letter, calling the local access number, logging on with your password, downloading any mail for you, and uploading any mail you have to send. On top of that, the two programs can now send binary (non-text) files through MCI Mail—formatted and compressed documents, graphics, even programs. The two programs can exchange binary files with each other for very smooth Mac-to-PC transfers. (Lotus Express is a memory-resident program that can check your mail in the background—automatically—while you work on something else.)

The drawback to using MCI Mail as a third-party drop-off is expense. First, to transfer binary files, you need to have Lotus Express and Desktop Express, commercial programs that work only with MCI Mail. Second, the standard MCI Mail rate is roughly $1 for each 7K.

NETWORKS: THE HIGH-TECH SOLUTION

Local area networks have been a hot topic for the last year, as businesses scramble to find some way to hook all their PCs (and Macs) together. Briefly, a network is a combination of hardware and software that allows a number of computers (2, 25, 100) to be connected so that they can share files and peripherals. On the network, each computer appears to the other simply as another disk drive. The Macintosh looks at the PC and sees a Macintosh disk with nested folders. The PC looks at the Macintosh and sees a PC disk with tree-structured directories. Both computers can share a laser printer even though it's in the office down the hall.

Local area networks are relatively transparent to the users, which means minimal disruption of your normal work habits, and they are considerably faster than the fastest null-modem transfer. But they are limited to a specific local area, usually an office or a building. They tend to be expensive, requiring special software and usually hardware for every computer, and sometimes a dedicated network computer besides. And the network marketplace is a battleground of competing products and would-be standards.

Enter AppleTalk. If you want to connect PCs and Macintoshes, and if you leave out the high end (i.e., *expensive*) solutions, there's only one network standard to consider at the moment—AppleTalk. AppleTalk is slow for a network, about 20K bytes per second under optimum conditions, which would transfer our 56K test file in just under three seconds (that's slow *for a network*, remember). But AppleTalk is relatively cheap to implement and, in the Macintosh world, it's ubiquitous because every Macintosh comes with AppleTalk built in. It's easier and cheaper to fit a PC with AppleTalk than to equip both the PC and the Mac with something else.

A number of companies offer AppleTalk hardware for the PC (in the form of add-in boards). Apple itself offers an AppleTalk PC board, as do TOPS, with its FlashTalk board, and Tangent Technologies, with its PC MacBridge AppleTalk Board. Hercules, maker of monochrome graphics cards, now offers its Hercules Graphics Card Plus with an AppleTalk port in place of the usual parallel printer port, a canny move considering how useless a second parallel port is for most MS-DOS users.

TOPS on Top. Just having the AppleTalk hardware connection isn't enough. You also need the network software on each computer to make the whole system work. Right now, the leader in connecting PCs and Macintoshes through AppleTalk is TOPS (Transcendental Operating System), from TOPS (who else?). The TOPS package provides the networking software required to get a PC or a Macintosh "on the net," though as mentioned above, the PC must also have an AppleTalk board to supply the hardware, either TOPS' own FlashTalk board or one of the others. TOPS doesn't require that one computer be dedicated to serving the network. That usually means that TOPS will slow down a little more than a network with a dedicated server when it gets heavily loaded. But it also makes TOPS cheaper and means that you don't have to worry about the network server crashing and bringing down the whole network.

In practice, TOPS is a joy to use on a small network. It's transparent when you don't need it. When you need to swap files with another computer on the network, you have two choices. You can copy the files to or from the other computer's disk very simply. Or you can *mount* the other computer's disk on your system, which will make it appear to be a new drive on your system, immediately accessible by all your programs in the normal way. On a PC, TOPS will run with memory-resident programs like SideKick, but the memory-resident network software does take a bite out of your RAM, 180K to 220K according to the company.

Normally, TOPS runs at the standard AppleTalk speed of 230 kilobits per second (that's kilo*bits*, not bytes). But with

TOPS' own FlashTalk card, a PC can run on AppleTalk at 770 kilobits/second, over three times the speed. And TOPS is now marketing an inexpensive add-on box that will let Macintoshes run at FlashTalk speed. TOPS also offers various support products to go with the network, including a file translation utility (provided by DataViz, makers of MacLink Plus), a network print spooler, a repeater for extending the range of the network, and TOPS networking software for Sun workstations and Unix-based computers. (A TOPS network, by the way, can be made up entirely of PCs; it doesn't require a Macintosh at all.)

Right now, the leader in connecting PCs and Macintoshes through Appletalk is TOPS.

TOPS is not alone in the field. Apple itself markets AppleShare PC, an AppleTalk card plus software that lets the PC join an AppleShare network (AppleShare uses AppleTalk, of course, but it requires at least one Macintosh dedicated entirely to being the network file server). Tangent Technologies markets its own AppleTalk board for PCs, along with various packages of networking and support software such as PC MacBridge Plus and TangentShare. And you can be sure others will join the fray.

THE DISK TRANSFER SOLUTION

A local area networking system like TOPS is wonderful when PCs and Macs need regular access to each other's files, even in an office with only two or three computers. But it's overkill if you only transfer files once a week, and it's useless if the Macintosh you want to communicate with is not local (within a few thousand feet). In these cases, look into disk transfers.

With the aid of add-on hardware, it's now possible for a Macintosh to read and write to standard PC disks, and vice versa. One of the first attempts at this was MacCharlie, an add-on that draped itself over the top and side of the Macintosh and actually added a fully functional MS-DOS computer to it. MacCharlie was never a success, but its creator, Dayna Communications, has come back with a hot new product, the DaynaFile. The DaynaFile, an add-on box with one or two MS-DOS floppy disk drives, plugs into the Macintosh SCSI port and lets the Mac read and write formatted DOS disks. The basic unit comes with a single 5¼-inch 360K drive, but you can add any other kind of MS-DOS floppy drive to it—a 5¼-inch 1.2M AT-style drive, a 3.5-inch 720K laptop or PS/2-style drive, or a 3.5-inch 1.44M PS/2-style drive. Dayna also offers a file translation pro-

gram (once again provided by DataViz, makers of MacLink Plus) to handle the most common conversions.

Apple offers an add-on PC drive and card, but it plugs into an internal slot instead of into the SCSI port, so it will only work on the Macintosh II and Macintosh SE, not the popular Macintosh Plus. In addition, the Apple product handles only one drive, in the standard 5¼-inch 360K format.

There's one new package that runs on the PC, rather than on the Macintosh. The product, called MatchMaker, is from Micro Solutions, creator of Uniform disk conversion software

CP/M Joins The Conversation

CP/M users, who have long had to deal with transferring files to MS-DOS, are no strangers to communicating with foreign systems. And though the Macintosh is a good deal more foreign to CP/M than MS-DOS is, there is still no reason for CP/M users to be left out of this growing conversation. They, too, can exchange files with the Macintosh in a number of ways.

First, CP/M users can exchange files with the Macintosh through a direct-wire or modem connection, just as MS-DOS users can. You'll need a communications program for the Kaypro—either one of the excellent free programs, like IMP or MEX, which are available from user groups and bulletin boards, or the commercial MITE program that was bundled with many Kaypros. You'll also need a communications program for the Macintosh (described in the main article) and either a null-modem cable (if the two computers are in the same room) or a modem for each computer and a telephone line.

The transfers can be made with the reliable Xmodem error-checking protocol at speeds of 9600 bps (bits per second) with a direct-wire connection or 2400 or 1200 bps with a modem connection. One tip—the Macintosh printer cable used to connect the Mac to the original Imagewriter will work as a null-modem cable to connect to the serial port of the Kaypro. Make sure you get the cable for the original Imagewriter (sometimes called the Imagewriter I), though, not the cable for the Imagewriter II.

Second, CP/M users can also exchange files through a third-party service such as CompuServe or MCI Mail, with the same benefits described for MS-DOS users in the main article. All you need in this case is a modem, one of the communications programs mentioned above, and an account on the service you're going to use. Because there is no CP/M equivalent of Lotus Express, you'll be limited to transferring ASCII text files through MCI Mail, but you can transfer non-ASCII files through CompuServe and some other services, using the Xmodem protocol for uploads and downloads.

Third, CP/M users can automate much of the file transfer process through a commercial product called xFer, from Software Resources, which is very similar to the MacLink Plus product available to MS-DOS users. Like MacLink Plus, xFer consists of software for the Macintosh, software for the CP/M Kaypro, and a cable to connect the two (through the Kaypro's serial port). When the two computers are connected, the Kaypro becomes a drone, and you run the file transfer session from the Macintosh. You can log into any disk or folder on the Macintosh and into any drive or user area on the Kaypro to see what files are available. To transfer files in either direction, you just select the files from a list, click a few buttons, and sit back while xFer does the work. The file transfers run at 19,200 bps.

The xFer package also includes a single volume file server demo, which supplies software for both the Macintosh and the Kaypro. With a file server, you can actually "mount" the Kaypro disk on the Macintosh system so that it appears as another local disk drive. Once the disk is mounted, you can access files on the Kaypro disk directly from the Macintosh, as if the files were on the Mac's own disks. You can even run Macintosh programs that will read and write to Macintosh files on the Kaypro drive. However, because the transfer speed is limited to the speed of the serial connection, I found it more convenient to use xFer to transfer the files to the Macintosh disk and work with them there.

File translation is where the CP/M-to-Macintosh connection begins to break down. Though you can transfer non-ASCII files between the two computers using xFer or a communications program, CP/M programs have no way of dealing with most Macintosh files. Generally speaking, you'll have to stick to transferring ASCII text files and tab or comma-delimited data files. If you use xFer, you gain some extra flexibility, as it can translate between WordStar and Perfect Writer on the CP/M end and MacWrite, Microsoft Word, and Edit on the Macintosh end. Also, if you have a file translation program like MacLink Plus on the Macintosh, it will be able to handle files from those CP/M programs that have MS-DOS cousins—WordStar document files, dBASE II data files, SuperCalc2 DIF files, and so forth.

—Ted Silveira

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GETTING THERE IS ONLY HALF THE FUN

Once you've transferred files from a Macintosh to your PC, or vice versa, you have another problem—making the files usable on the target computer. After all, a Macintosh file in some incomprehensible format is as useless to you on a 5¼-inch MS-DOS disk as it is on a 3½-inch Macintosh disk. Fortunately, there are a number of solutions:

First, a growing number of MS-DOS and Macintosh programs can read each other's files. The MS-DOS and Macintosh versions of Microsoft Word can exchange files easily, as can the MS-DOS and Macintosh versions of Word Perfect. The Macintosh version of Excel can exchange spreadsheets not only with the MS-DOS version of Excel but also with Lotus 1-2-3 and any spreadsheet that writes Lotus-compatible files. Macintosh database programs like 4th Dimension, dBASE Mac, McMax, and FoxBase Mac can exchange files with the MS-DOS dBASE III Plus and any program that writes dBASE-compatible files. Ventura Publisher 1.1 can now read both MacWrite-format word processor files (a quasi-standard in the Macintosh world) and MacPaint and PICT-format graphics files. The MS-DOS and Macintosh versions of PageMaker can read each other's files and read files from the MS-DOS and Macintosh versions of Microsoft Word. In other words, you may find that no translation is required, especially since major formats such as dBASE data files and Lotus WKS files are often supported.

Second, if you don't have a program that can read the "foreign" files, you can go back to basics—ASCII text files for word processors and tab or comma-delimited files for databases and spreadsheets. Almost every word processor, database, and spreadsheet can import such files, and most can also export them directly. For those programs that can't export these basic files, like the older versions of WordStar, you can usually find an external filter program to do the job instead. For example, you can convert document files from WordStar 3.3 into plain ASCII text files by using the MS-DOS shareware filter program WSCONV, available through most bulletin boards and user groups. When you resort to ASCII files and tab or comma-delimited files, though, you often lose valuable formatting and other information, though the data itself remains intact.

Third, you can use one of a number of file translation programs now available, written specifically to translate files between MS-DOS and Macintosh formats. As mentioned previously, MacLink Plus, TOPS, and DaynaFile all offer almost identical file translation software originally created by DataViz. This software, which runs only on the Macintosh, offers a fairly wide variety of translation options. It can translate Macintosh DIF files into MS-DOS WKS (Lotus), SYLK (MultiPlan), and dBASE files. It can translate Macintosh MacWrite files into MS-DOS text, WordStar, MultiMate, or DCA files. It can translate MS-DOS dBASE files into WKS files for Excel and Jazz, SYLK files for MultiPlan, DIF files, or tab or comma-delimited files. Some translations are rather roundabout, though: To transfer files between MS-DOS WordStar and Macintosh Microsoft Word, you have to go by way of MacWrite.

Tangent, creator of PC MacBridge and TangentShare, offers a more limited file translation program for the Macintosh, called PC MacTxt. And Apple includes Apple File Exchange, another translation package, with the system utilities of each new Macintosh. Apple File Exchange is open-ended so that Macintosh developers can add their formats to the list of available translations, a really excellent idea.

File translation software reflects the relative clout of the PC and the Macintosh. All the translators that handle word processor, database, and spreadsheet files run on the Macintosh—PC users don't worry about compatibility. But the only two translators written to handle *graphics* files run on the PC. The Graphics Link, from PC Quik Art, and Hijaak, from Inset Systems, can translate graphics files between various bit-mapped graphics formats, including MacPaint, the most popular Macintosh bit-mapped format. (All major Macintosh "paint" programs can read and write MacPaint files.) However, neither of these programs can handle object-oriented

graphics, the kind produced by "draw" programs such as AutoCAD (MS-DOS) and MacDraw (Macintosh). PC Quik Art has promised such conversions for a future version of the Graphics Link, but it has yet to appear.

FINAL WORDS

Considering how different the MS-DOS and Macintosh worlds are, you have a surprising number of options for transferring and translating files between PCs and Macintoshes. If you find the range of choices overwhelming, here are a few suggestions. If you need to transfer files only occasionally (less than once a week, say) and the files aren't very large, go the cheap route, using one of the direct-wire or modem connection options listed above. If you transfer files frequently, or if you transfer large batches of files, look at the more expensive solutions—either a local area network like TOPS (if the Macintosh is nearby) or an add-on disk translation system like DaynaFile or MatchMaker (if the Mac is not close by). Also, if the files you'll be exchanging will require translation, then look at the products that either include translation programs or offer them as an option—MacLink Plus, TOPS, DaynaFile, and so forth.

The most serious problem for the individual PC user who needs to communicate with Macintoshes is that most of the available solutions either run solely on the Macintosh (like the DaynaFile) or are controlled from the Macintosh (like MacLink Plus), with Micro Solutions' MatchMaker board being the only major exception. You can expect that situation to change in the next year or so, but not immediately. For now, tread carefully. ■

Ted Silveira is a remote editor for PROFILES. *This article was outlined on a Kaypro 10 with Thoughtline, drafted on a Macintosh SE with Microsoft Word, fleshed out on a Kaypro 286i with WordStar, edited on the Macintosh, and spell-checked and polished on the Kaypro 286i. The sidebar "CP/M Joins the Conversation" was written on a Kaypro 10 with WordStar. The whole package was crammed into an ARC file on the Kaypro 286i and sent to* PROFILES *via modem.*

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Princeton, NJ 08543
(609) 452-1511

The Graphics Link
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PC Quik-Art, Inc.
394 S. Milledge Ave., Suite 200
Athens, GA 30606
(404) 543-1779

Hercules Graphics Card Plus with AppleTalk port
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Hijaak
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Lotus Express
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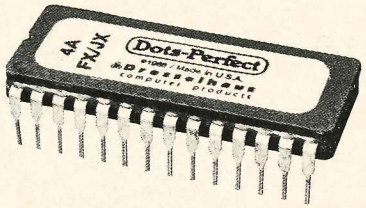

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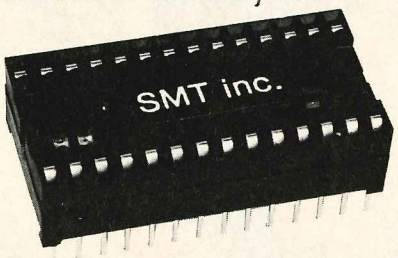

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Print spoolers keep the "fast lane" clear.

BY MARSHALL L. MOSELEY

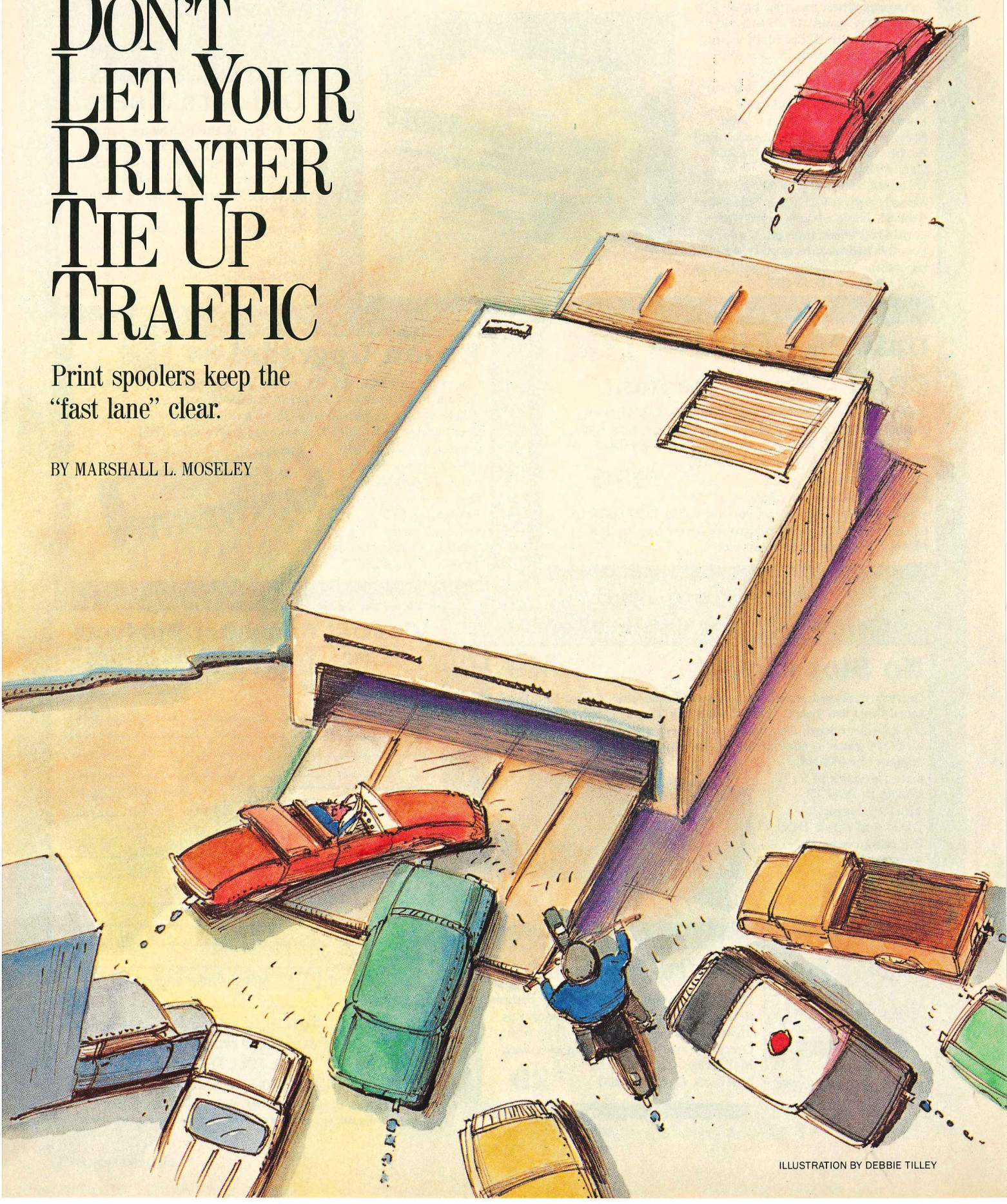


ILLUSTRATION BY DEBBIE TILLEY

Have you ever driven down a freeway and encountered a near-comatose person at the wheel of a '63 Rambler going 45 miles per hour in the far left lane? I think we all have. It's called a bottleneck. The top speed of your vehicle is effectively cut in half because a single aspect of the transportation system slows it down. Similarly, you may have a blazingly fast computer, but if your printer operates at a plodding 45 characters per second, that becomes the speed of your whole system. You can waste a lot of time twiddling your thumbs while the printer prints. On the freeway, the solution is to simply pass the slow car. In computing, the solution is to "pass" your printer by using a program called a print spooler. These programs let you get on with your work while your printer takes its sweet time.

This article will give you a working knowledge of print spoolers. It includes a general description of the product category and a detailed explanation of how spoolers operate. Also included are descriptions of three spooler products, two for MS-DOS and one for CP/M.

EVERYBODY INTO THE SPOOL

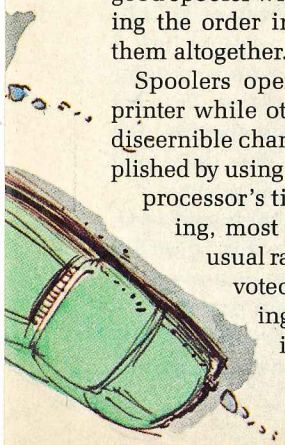
A spooler is a program that intercepts data being sent to an output port, usually the printer port, and places that data in storage, either on disk or in memory. Once the data is stored, the computer resumes normal operation. The spooler then operates in the background, sending data to the output port while work on the computer continues.

Most spoolers work by storing data on disk. The few that work with memory are unpopular because memory is a scarce commodity within a computer system, and allocating it for use as a spooler is considered wasteful. Disk space, on the other hand—especially hard disk space—is usually plentiful.

Spoolers are invaluable for those who must produce a great deal of printed output while continuing to use their computers. In effect they let you do things like print a 40-page document from WordStar in 30 seconds instead of 30 minutes. Of course the printer takes the same amount of time to print the document, but the spooler lets you exit WordStar and move on to a new program right away.

Which brings up a question. What if you want to print something from that new program? The printer is still printing the 40-page report. No problem. When data is sent to the printer while something is printing, the print spooler places that data in a *print queue*, a series of documents linked together by the spooler software. When one print job is finished, the next document in the queue is automatically printed. A good spooler will allow you to manipulate the queue by changing the order in which documents are printed or removing them altogether.

Spoolers operate transparently—that is, they control the printer while other programs run, and there should be little discernible change in computing performance. This is accomplished by using "time slicing," a technique in which the microprocessor's time is divided among different tasks. In spooling, most time is alotted to the application in use. The usual ratio is four to one: four times as much time is devoted to the application as to the background spooling task. Unless very processor-intensive software is running, the slight slowing of program execution caused by the spooler is barely noticeable.



THE DRAWBACKS

There are some reasons not to use spoolers. For one thing, they take up valuable RAM—between two and 60 kilobytes, depending on the spooler. This reduces the amount of memory available to application programs. Graphics environments, such as GEM or Microsoft Windows, demand a great deal of memory and are incompatible with some spoolers (Windows has its own). And under CP/M, memory space is so scarce that utilizing any RAM at all makes certain programs unusable.

The fact that spoolers are RAM resident can also cause problems. If you use other RAM-resident programs, they often vie for the same memory space. In MS-DOS, the spooler may usurp certain internal operating system functions, and when other programs try to use those functions, the entire system stops. This problem is characteristic of all RAM-resident programs, not just spoolers. (It can be avoided by loading RAM-resident programs in the correct order, though determining what this order should be is often a matter of trial and error).

There is more bad news. Spoolers work by trapping all the data headed for a given output port, but sometimes applications *insist* on accessing those ports directly. Again there is a conflict, and again the usual result is a frozen machine. Fortunately these applications are rare, and for many users they are easily avoided.

If your livelihood depends on writing, a spooler isn't a convenience—it's a necessity.

WHERE SPOOLERS WORK BEST

In certain areas of microcomputing, spoolers have proven themselves invaluable—word processing, data processing and computer-aided design (CAD), for example.

Spoolers and word processors are a match made in heaven, and if your livelihood depends on writing, a spooler is not a convenience, it's a necessity. In fact, the best word processors have spooler-like features. WordStar, for example, features "background printing," in which it prints one document while work continues on another. WordPerfect 4.2 has a full-fledged spooler built into it.

Spoolers are also very valuable if you work primarily with databases. One of the functions of database programs is to print reports, which can take a great deal of time. Spoolers help ease that time crunch by storing reports on disk and doling them out to the printer in bits and pieces, allowing data processing to continue. Unlike word processors, database programs do not have spoolers built into them. For that reason a good stand-alone spooling program is a valuable accessory to a database program.

CAD programs almost always send their output to a plotter, which is a mechanically controlled drawing device. Plotters are *slow*—so slow that a fairly complex drawing can take up to 45 minutes to plot. Again, the spooler's ability to absorb data and dispense it in the background allows the computer user to get back to work right away.

To gain an understanding of how spoolers operate, let's take

a look at three of the most popular ones: PrintQ and DUET for MS-DOS and Backgrounder ii for CP/M.

DUET

DUET is as much a printer control program as it is a spooler. It is intended mainly for spreadsheet users, but it's powerful enough for many different spooling applications. Like most spoolers, DUET works by trapping data sent to the printer. Consumer's Software, the creator of DUET, has seamlessly attached a host of features to this process.

DUET can read spreadsheet files directly and print them in the background. It understands files generated by Lotus 1-2-3, Symphony, Mosaic, and VP Planner. DUET can print ranges of rows and columns, rather than entire spreadsheets, and will also print sideways on dot-matrix and laser printers, a feature much appreciated by full-time spreadsheet users.

Different typefaces, or fonts, are used in sideways printing, and DUET comes with 12 of them. The program has a built-in font editor that allows the appearance of any font to be changed or new ones to be created.

Because DUET uses graphics, it must be configured for the individual printer with which it works. To accomplish this, 111 printer drivers for almost every popular printer are provided with the software. Once DUET is configured, it can send control codes directly to the printer. Depending on the printer's features, you can invoke or disable multiple line spacing, condensed print, underlining, proportional spacing, and much more.

But DUET is first and foremost a spooler, and it functions quite well in that capacity. When printer data is generated by an application program, DUET intercepts it and stores it in a file with a @*nn* extension (*nn* is a two-digit number designating both the order in which a file entered the queue and its precedence—TEST.@05, for example, will be printed fifth. The extensions don't change when files are rearranged within the queue). These files are linked together and controlled by a special queue file named DUET.QUE. You can change this name if you like, or create multiple queue files using different names.

DUET is a RAM-resident program. When it runs it is placed in memory, where it remains inactive until the key sequence Alt-F1 is pressed. This brings up a moving bar-menu, similar to the one used in Lotus 1-2-3. From this menu a file can be printed directly, command strings can be sent to the printer, or printing can be turned on or off. The print queue can also be managed, allowing print tasks to be added, deleted, or shuffled within the queue.

The configuration option on the DUET main menu allows you to install a new printer driver, change the key that invokes the program, change the speed at which the spooler operates, and change the output port from parallel to serial or vice versa. It also provides complete control over sideways printing. You can designate the font to be used, the number of columns per page, the page height and width, and the left, right, bottom, and top margins.

DUET's value lies in its power—it provides print spooling, direct spreadsheet reading, sideways background printing, and more—and its ease of use, which stems from an intuitive, widely recognized Lotus-like interface. For the beginning or intermediate computer user, or for the full-time spreadsheet user, DUET is a viable choice.

PRINTQ

PrintQ, from Software Directions Inc., is a powerful spooler designed to handle industrial-strength printing assignments. PrintQ is made for the computing professional whose job it is to juggle a multitude of printing tasks every day.

The program has some impressive features. It provides control over everything associated with sending data to the printer. You can override the print settings from the application, if you like, and change the number of lines per page or the number of copies to print. You can also change the order in which documents print or stop them from printing altogether. PrintQ will prompt you to change forms within the printer and to adjust those forms for alignment.

PrintQ will create multiple queues, keeping one active while the others wait to be printed. This comes in handy if you need to print something overnight: just create a print queue during the day, and before you leave for the day activate it and send it to the printer. PrintQ spools up to 64 megabytes of printer data (roughly 64,000 pages of printed material). If there is a power failure during printing, PrintQ can re-print the document starting from the page you designate. It handles graphic data as easily as text and will create ASCII text files from text-based printer data.

Whenever printer data from an application program is generated, PrintQ automatically creates a separate file, called a "printfile," in which the data is placed. There would be a separate printfile for data from WordStar, for example, and another for data from dBASE III. The print queue is composed of multiple printfiles, and each printfile has a unique identification number and an entire set of parameters (page length, etc.,) that goes with it. You can put the printing of various printfiles on hold, delete printfiles altogether, or shuffle them within the queue. You can also tell PrintQ to save the printfiles for retrieval at a later time.

Like DUET, PrintQ is RAM resident. Once installed in memory, it operates through a series of full-screen menus called displays. The program is called to the screen by pressing ^Alt P (Ctrl-Alt-P). This brings up the Status Display, which contains a list of the printfiles in the currently active queue. This list tells you what printfile is currently printing and specifies the time and date the files were created. It also lists their total length in pages, along with the number of pages printed.

At the bottom of the Status Display is the command area, from which you can access the other displays, stop printfiles from printing, delete printfiles, pause printing, resume it, or select the queue to be printed. The other displays provide control over other aspects of the printing process. From the Printfile Specification Display, for example, you can change the

default settings for a given printfile, which includes whether or not that file is printing, waiting to be printed, or on hold; the page length; the number of copies to be made; and whether or not the printfile should be deleted after printing. The Queue Specification Display can change the name of a queue and the number of data blocks the queue will be allowed to contain (each block contains 1,014 characters; 65,000 blocks is the maximum number allowed).

PrintQ is obviously built to handle many printing tasks in a commercial environment, such as a data processing or MIS department. If you drive a keyboard for a living and you spend any time at all waiting for your printer, PrintQ is worthy of examination.

BACKGROUNDER ii

Backgrounder ii, from Plu*Perfect Systems, is a command console processor (CCP) replacement for all Kaypro CP/M computers except those that use the 2.2u1 ROM. Backgrounder and its ancillary programs provide many useful utilities to the CP/M user, such as task-switching and keypad redefinition. Included with the software package is a print spooler. The Backgrounder spooler will not operate unless the Backgrounder CCP program is run first. It will not function under standard CP/M.

Unlike the spoolers described previously, the Backgrounder spooler is not designed for a specific market niche. It's a general-purpose program that works as well with spreadsheets as it does with word processing programs, and it is not oriented toward power computer users only.

The spooler itself consists of three programs: SPOOLER.COM, Q.COM, and REMOVE.COM. Running SPOOLER.COM places the spooler in memory (it takes up 2K). At that point it becomes an internal operating system command, like DIR or ERA; you can invoke it from any disk and in any user area. To activate the program, type **SPOOL** at the CP/M system prompt and press Return. All printer data will then be routed from the printer port to a file named SPOOL.$PL. Type a file name along with the spooler command and the file will be created and used to store the printer data. This allows multiple print files to be created. Type **SPOOL OFF** to disable spooling.

Q.COM is the print queuing software. It adds print files to the queue, prints them, and moves them around within the queue. Once you type **Q** and press Return, the Q prompt (= = >) appears. From here, print any file simply by typing its name. Type multiple file names and the files will be printed in the order you entered them. To see a list of files in the queue, type **Q** again and press Return. To shuffle files within the queue, type **CHANGE *n* to *n*** (where n is the number of a file within the queue).

Q.COM allows a great degree of printer control using any of 14 different parameters typed after the file name. These parameters tell the printer the number of lines per page, the number of copies to print, how to handle an end-of-file marker (^Z), and the column in which to place the page number. The D parameter is perhaps the most powerful. It will route printer data to any valid CP/M port, including the serial port.

REMOVE.COM removes the spooler from memory, freeing up the 2K for applications that require the extra space.

CONCLUSIONS

The differences between DUET and PrintQ stem from their disparate design philosophies. DUET is intended for the application software user, especially the spreadsheet user. Its Lotus-like interface lets people new to the program start using it effectively within minutes. It also has printer drivers that allow control codes to be sent to the printer without requiring that the user know the codes first. Though DUET does lack some of the features a powerhouse print spooler should have, it more than makes up for this in convenience and ease of use.

PrintQ is not a program for the beginning or casual computer user. It does little hand-holding and assumes you understand the computer terminology used in the various menus. Those menus, however, provide a great deal of control over the printed output produced by your computer. Once mastered, PrintQ is a powerful, complete, no-nonsense printer control program.

As for Backgrounder ii, at first glance you might think that it is less powerful than its MS-DOS brethren simply because it's divided into three programs, isn't RAM resident, and doesn't have a multitude of flashy screens. But if you examine all three programs feature for feature, you'll see that Backgrounder stacks up quite well against the MS-DOS programs. Considering the memory constraints of CP/M (64K versus 640K under MS-DOS), that's quite a feat.

Spoolers are productivity software. They can help make your day more constructive by freeing your computer and letting you work. They ensure that the "fast lane" is clear—so move into it, turn up the radio, and put the pedal down. Printer bottleneck is a thing of the past. ■

Marshall L. Moseley is the technical editor for PROFILES *Magazine.*

Quick Reference Summary

Product: DUET
Manufacturer: Consumer's Software Inc.
736 Chestnut Street,
Santa Cruz, CA 65060
Phone: (408) 426-7311
Sugg. List Price: $89.95

Product: PrintQ
Manufacturer: Software Directions Inc.
1572 Sussex Turnpike
Randolph, NJ 07869
Phone: (201) 584-8466
Sugg. List Price: $89

Product: Backgrounder ii
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Idyllwild, CA 92349
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OS/2—Is It For You?

A look at the writer's environment of the future

BY DICK CONKLIN

Your 500-page novel is packed into a single word processing file—with room to spare. Misspelled words are highlighted on the screen almost as you type them. Pictures and drawings are inserted directly into your manuscript. You select from among several type styles and sizes, and the display accurately previews the printed result. Critical files are saved to disk automatically, without interruption, as you work on them. Documents and mail are exchanged with a remote computer while you switch among several active projects.

This is the writer's environment of the future—and with the arrival this year of Operating System/2, the future is closer than you might think.

OS/2 is a multi-tasking operating system for use on 80286- or 80386-based computers, such as Kaypro's 286 and 386 machines. It requires a 20-megabyte hard disk and at least 1.5 megabytes of RAM. OS/2 was released in December 1987, and at this writing (March) there's little software available for it—*Infoworld* estimates that between 10 and 20 programs specifically written for OS/2 are actually being shipped, though other estimates run higher. But scores of products have been announced, and the pace of releases has stepped up, so many more are expected to be on the market by the end of this year and early next year.

The first release of OS/2, Standard Edition 1.0, is intended mainly for program developers to use in creating products, but a new version of OS/2 with a new user interface is due this fall (more on this later).

DIFFERENCES BETWEEN DOS AND OS/2

The operating system you're using now, MS-DOS, is a control program that serves as a built-in traffic cop between your word processing software and the PC's hardware: its processor, memory, display, disk drives, and printer. Most of the time, MS-DOS is invisible, doing its work behind the scenes while you concentrate on the work at hand.

But MS-DOS is a sequential operating system—it does one thing at a time, in serial, step-by-step fashion. Program A must finish before Program B can begin, and any typing or editing must wait while a file is saved to disk.

OS/2, the result of a major joint development effort between the IBM and Microsoft corporations, harnesses the untapped potential of today's new personal computers.

Unlike MS-DOS, OS/2 does things in parallel. This means that typing, calculating, printing, communicating, and disk activity can take place concurrently. It also means that multiple programs can share a computer's memory, processor, and other devices, sometimes performing unattended work in the background while you concentrate on a foreground job.

You can run multiple copies or sessions of the same program, so that one word processing session can be paginating your last literary effort while you start on the next one.

OS/2 lets you hotkey, or quick-switch between programs, like changing channels on a TV set, so you can check on the progress of a reformatting manuscript or look into your electronic mailbox.

The second release of OS/2, due this fall, will use a special program called the Presentation Manager to communicate with the computer user. This interface will run two or more programs at once and let you observe each via a "window"—a rectangular sub-division of the screen. Using the Presentation Manager, you could watch in one window as a long manuscript is telecommunicated to your publisher, while in another window you read some changes just received from a reviewer.

PARALLELISM AND PRODUCTIVITY

This parallel use of computer components makes it possible to get more work, or "throughput," out of a personal system. Many converted software packages will run faster under OS/2 than their predecessors did under DOS. That's because a programmer can convert a program's serial design to parallel architecture.

For example, DOS word processors today treat spell-checking as a separate task. When you finish typing a document, you start the spell-checker and wait while it compares each word with a dictionary file and highlights the mismatches. But what if the spell-checking portion of the word processor was allowed to run as a continuous, background task? Each new word could be spell-checked upon entering. Mismatches could be highlighted on the screen in a real-time manner. Of course, depending on the processing speed of your

computer and your own typing speed, the spell-checker might lag behind a few words at a time.

Have you ever turned off your computer wihtout first saving an important file? Have you accidentally erased a hard disk file with no diskette backup? An OS/2 word processor could automatically save a file to a hard disk or backup diskette every few pages without ever interrupting your typing. Parallel spell-checking and disk activity are obvious examples, but a skilled programmer can use many concurrent tasks to reduce the amount of time it takes to complete a job.

MEMORY: ANOTHER PART OF THE STORY

Parallelism is only part of the OS/2 story. MS-DOS was designed to handle no more than 640K (640,000 characters) of memory, and most DOS programs support data files of much less than that. OS/2 can run programs that are up to 16 megabytes (16,000,000 characters) in size. This means that a large program can reside completely in memory without time-consuming overlays.

Since an OS/2 program can contain many more instructions, it can offer more intelligence in the form of new features and functions, and new usability features like built-in help screens, graphic ilustrations, an online tutorial, and reference information. It also means more room for data: larger documents, spreadsheets, databases, etc. A DOS word processor limited to a working document size of 654K or 128K could be converted to OS/2 with an upper limit in the megabyte range. DOS word processors often require splitting large projects into smaller files, which sometimes get too big and have to be split again. OS/2 overcomes the old memory limits.

New OS/2 features will first have to be written into application programs before the end user can benefit; old programs written for DOS won't automatically take advantage of them. But these programs are beginning to appear—DisplayWrite 4/2, for example, is the first OS/2 word processor, supporting large documents and multiple sessions. Most old DOS programs will run under OS/2 without modifications, thanks to a built-in compatibility feature, but they won't do more than they did under DOS without conversion.

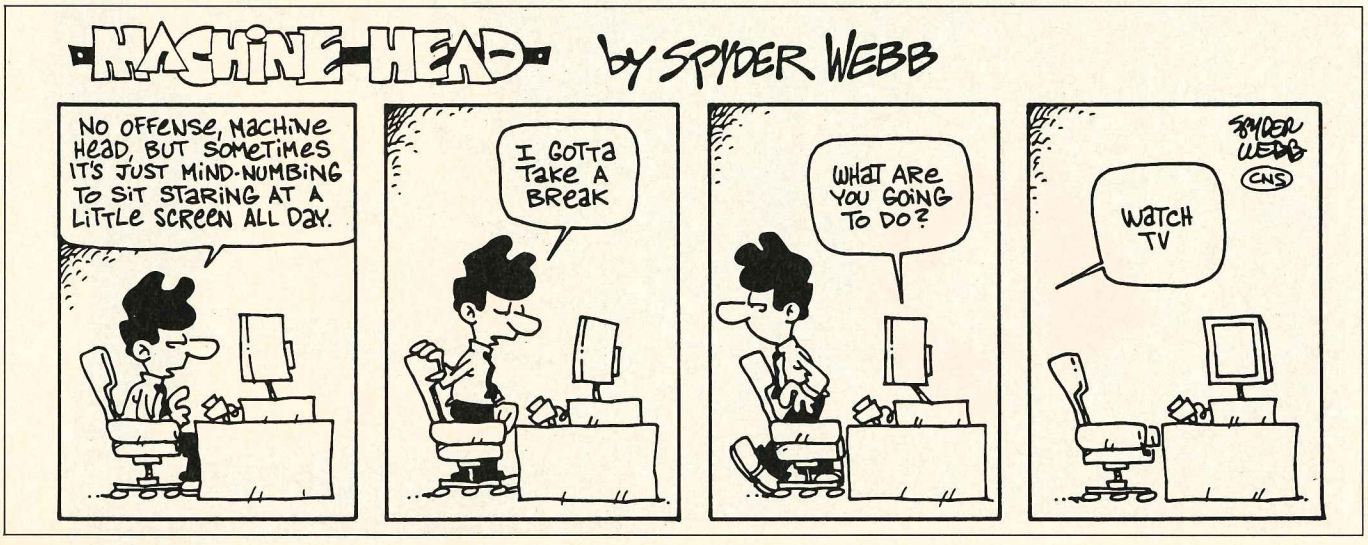
As mentioned earlier, OS/2 has a few requirements of its own: It will only run on a computer with an 80286 or 80386 microprocessor, a minimum of 1.5 megabytes of memory, and a 20-megabyte hard drive.

You can run programs in less than their rated memory (such as three six-megabyte programs on a four-megabyte system) and OS/2 will swap inactive memory segments to disk to make room for active ones. System performance depends on total memory and program activity, with the current foreground program (the one you have immediate control of) always receiving top priority. In early 1987 a new internal structure for MS-DOS and OS/2 computers was introduced: the Micro Channel Architecture (MCA). Newer 80286- and 80386-based computers featuring Micro Channel Architecture are designed especially for the busy multitasking environment of OS/2—the Micro Channel reduces many of the bottlenecks inherent in the design of earlier PCs.

WHAT LIES AHEAD

Operating System/2 is part of a long-range strategy for personal systems that is more evolutionary than revolutionary. During 1988, three new OS/2 releases will phase in enhancements to graphics, windowing, communications, and database management. Improved application programs will lag behind as software companies hurry to incorporate new OS/2 features in their products. Many will provide trade-ins or upgrade features for thier current DOS customers who switch to OS/2. ■

Dick Conklin is the author of a new book, OS/2: A Business Perspective, *(Wiley Press, March 1988, ISBN 0 471-63503-0), written for PC users curious about the new operating system. He has written two previous books for Wiley,* PC Graphics *and* Power Portable Computing.



FILE RECOVERY UTILITIES

Save your files from the black hole.

BY T.F. CHIANG

It can happen in a variety of ways: you're cleaning up your disk by erasing old files, and you accidentally type a filename incorrectly, zapping a file you wanted to keep. Or you're learning to use a new application program, and you accidentally reinitialize your data files, making them unreadable. Thankfully, such mistakes needn't be fatal for you. MS-DOS lets you delete files almost too easily, but it also lets you have a second chance, if you're willing to do the work.

You could use the DEBUG utility included with MS-DOS, if you're familiar with the details of MS-DOS, but for an easier and more reliable way to recover a deleted file, you should get a file recovery program. We'll look at two types here—ones that recover files after the deletion has occured, and ones that give you before-the-fact protection.

AFTER-THE-FACT FILE RECOVERY

You're probably aware that recovering deleted files is possible. When you erase a file in MS-DOS, the contents of the file are not actually erased; its entry in the directory is marked to indicate that it's been deleted (the first character is deleted). However, if other files are written to disk afterwards, the deleted file might get overwritten, and then the data *is* lost.

You might assume that if you used a file recovery program immediately after deletion, you would simply have to provide a new initial character to restore the directory entry, and everything would be fine. But it's not quite that simple—sometimes it's very easy to recover a file, and sometimes it's very difficult. This is a result of the way files are stored on a disk: the data portion of a disk is divided into units called clusters, and every file is stored in a whole number of clusters, with no fractions of clusters. In the directory portion, each file's entry contains what you see when you enter DIR—the file's name, size, and time/date stamp—plus the location of the beginning cluster for the file. A file recovery program has to find the rest of the file's clusters, and this is what can be difficult, depending on how *fragmented* the file is. If the file was stored in consecutive clusters (in one spot on the disk), recovery is simple: all of the clusters are in one place. This is sometimes called quick undeletion.

Problems arise if the file was fragmented—i.e., stored in clusters scattered across the disk; this will be the case for the majority of your working files, because they've been edited and resaved, and old files have been deleted. Recovering a scattered file is significantly more difficult. You know where the first cluster is, and you know how many more clusters you need to find, but you don't know where they are: they're mixed in with the free clusters from old files deleted long ago. The only thing to do is to check the contents of each free cluster, one at a time, until you've found all the bits and pieces that make up your file. This is sometimes called manual undeletion.

It can get even more difficult if anything was written to disk after your file was deleted. Of course, it's always recommended that you use your undelete program immediately after deletion, but sometimes it just doesn't work out that way. Writing to the disk may cause two additional problems: first, the data in your file may get overwritten, so at best you can only recover part of it with manual undeletion. Second, and even worse, the directory entry for your deleted file could be overwritten, in which case you haven't got a clue as to the file's size or location. (To see how easily this might occur, here's a scenario. Imagine you're working in Wordstar 4.0, and you delete a file. Then you open another file, realize you deleted the wrong one, and then quit from the file. Quick undeletion should work, right? Unfortunately, when you opened up a file, Wordstar 4.0 created two temporary files on the disk, with extensions .A

ILLUSTRATION BY DAVID DIAZ

and .B, overwriting your directory entry. Running any program that creates and deletes temporary files will often leave you faced with doing a manual undeletion.)

So, we now know what any undeletion program must be able to do. Obviously, it must let us enter a new initial character for the filename. It must also be able to display the contents of an individual cluster for us to see if they are what we want, include a cluster in the file we are building or skip over it, and find other free clusters. We'll look at three such programs—Norton Utilities, Mace, and PC Tools—in a moment.

OTHER FORMS OF PROTECTION

As we've just seen, undeletion is what you do after the erasure has already occurred. However, there are preventive measures you can take—there are programs you install beforehand that will keep you safe if you do delete a file accidentally. There are different varieties, which all require you to do some housekeeping, but the recovery they offer is generally perfect and trivial to perform; no messy manual deletion required. We'll look at just one program of this type, SafetyNet, in detail, though it should be noted that Mace Utilities and PC Tools Deluxe also offer a weaker form of before-the-fact protection.

Although they won't be discussed here, other types of recovery programs should be mentioned. Related to undeletion are such rescue operations as unremoval of subdirectories, which is virtually identical to undeletion of a file, and unformatting of hard disks. This last is possible because DOS's FORMAT on hard disks only cleans out the directory, leaving your files anonymous but intact; unformatting programs are usually of the before-the-fact type, so that you have to install them sometime before the accident occurs. (When used on floppies, however, FORMAT actually does erase the data on your disks, making recovery impossible.) Also worthy of mention are programs that remove files from bad areas on disk and programs that unfragment files, which improves general performance and makes undeletion easier.

Now for a word about what recovery programs won't do. They won't save you when a hard disk suffers a head crash, or when you spill coffee on a floppy, or do anything else that physically affects the media on a disk. This means that you will still need to make backups of all your valuable files.

So now let's look at four popular recovery packages. The first three packages offer a whole range of general disk utilities, but we'll be focusing on only their recovery capabilities. You should be able to use any of these programs to recover from any deletion; what distinguishes them is the ease with which a manual undeletion can be performed.

NORTON UTILITIES, VERSION 4.0

Here is the one that started it all, the most famous of the file recovery packages. For undeletion, it offers both a stand-alone quick undeletion program, QU, and the main utility program, NU, for powerful disk exploration functions and manual undeletion.

QU accepts a specific filename as an argument, or else it will present you with a listing of all the deleted files in the current directory, and it will go through the list one at a time. If QU doesn't think it can recover a file, it tells you so. Otherwise, it will ask you if you want to undelete it, and you can easily process multiple files this way. Sometimes, when QU tells you quick undeletion is possible, the file it has recovered is missing data or contains wrong data. This is to be expected: QU cannot always tell if the data has been overwritten or fragmented. Then you have to delete the file again and try manual recovery.

For manual undeletion, NU lets you create a new directory entry if the old one has been overwritten.

NU presents you with a series of menus, and you choose options by moving a highlight bar and hitting Return, or hitting "hot keys." For manual undeletion, NU is the only program reviewed that offers the option of creating a new directory entry if the old one has been overwritten. Then it chooses the most likely cluster, which you can view in ASCII form, or both ASCII and hexadecimal if it isn't pure text. A list of the clusters you've chosen so far is displayed; to find more clusters, you can keep letting NU find what it considers the most likely ones, you can specify a particular cluster or sector number, or you can even search the disk for the first cluster containing a given string, an excellent feature. You can review the clusters you've selected to check for continuity, or put them in a different sequence, which makes rebuilding a fragmented file much easier. Once you're satisfied, NU will restore the directory entry appropriately.

Among the other utilities included are programs to sort a directory any way you like; change file attributes; change screen attributes; test a disk for bad sectors and move clusters from bad areas; make batch files interactive; search for a text string on disk; change the current directory without specifying the entire path name; and list system information.

PC TOOLS, VERSION 3.4

PC Tools is the only program reviewed here that can be installed as a memory-resident program. The main program, PCTOOLS, presents you with a directory of the disk and some menu lines at the bottom. If you choose Undelete, the program asks if you want to recover a file or a subdirectory. Then it displays all the deleted files in the current directory, marking those that it be-

lieves can be recovered with quick undeletion. You select the ones you want to recover and choose whether you want quick or manual undeletion. Like Norton's QU, this program is optimistic about its quick undeletion capabilities, occasionally giving you a file of bad data, which you will have to erase and try to recover manually.

The manual undeletion capabilities are sufficient, if not overly powerful. PCTOOLS shows you just the beginning of each cluster in hex and ASCII, though seeing the end would give you a better idea of what comes next in your file. The program chooses the next cluster to show you, and you can't search for a text string or move to previous clusters. You are shown the number of clusters found and needed; once you've added enough clusters to equal the size of the deleted file, the program won't permit you to continue. In most instances PCTOOLS will suffice. However, for a seriously fragmented file whose end precedes its beginning on the disk, PCTOOLS won't let you move backward, so the recovered file will have its end-of-file marker in the middle, requiring byte level disk editing to make the entire file usable. Also, to recover a file whose directory entry has been overwritten, you'll need the entry of another deleted file that was the same size or larger than the file you want, or else you won't be able to get all the data.

Some of the other functions available from within PCTOOLS are to view, edit, delete, rename, copy, or compare files; format or verify a disk; search for a text string on disk; change file attributes; move entire subdirectories around on disk; or give system info, all within the single RAM resident program. There are also a pair of separate programs to provide unformat protection for a hard disk. Finally, there are programs to rapidly backup a hard disk, and to unfragment disk files.

PC Tools Deluxe has a delete tracking feature that stores the location of deleted files, allowing automatic recovery of badly fragmented files as long as they haven't been overwritten. The unformat program now attempts recovery even if not installed before deletion. Other new features include a nondestructive format progam for floppies and a text editor in the RAM-resident program.

MACE UTILITIES, VERSION 4.10

Mace Utilities provides you with both before-the-fact protection in the program RXBAK and after-the-fact undeletion in the program UNDELETE. Running RXBAK on a disk produces the file BACKUP.M__U, which stores information for recovery purposes; when it comes time to undelete a file, UNDELETE will use BACKUP.M__U if it exists, or it will proceed on its own.

UNDELETE can be run as an option from the menu in the MACE program, or by itself. It presents you with a listing of all the deleted files on disk, in all directories. When you move the selection bar to a file, its recovery status is displayed: quick undeletion possible, probably fragmented, or probably deleted. UNDELETE's estimation of a file's status was the best among the programs reviewed here; it wasn't perfect, but in a couple of instances it correctly judged that a file was fragmented or deleted when both Norton's QU and PC Tools said

that quick undeletion was possible. If you've run RXBAK on a disk, UNDELETE will consider quick undeletion possible on all files listed in BACKUP.M__U, and it will restore any of them—no matter how fragmented—to the state defined in the backup file; you should run RXBAK daily to keep this file up to date. However, if any one of the files was overwritten after it was deleted, UNDELETE will use BACKUP.M__U and restore the wrong data.

If you choose manual undeletion instead, you are initially prompted to specify another drive for the recovered file to be saved to, so that in the event something goes wrong, you won't have scrambled your only copy of the deleted file—a reasonable precaution. The program shows you the entire contents of a cluster in ASCII, and you can move through the disk forward or backward at will. UNDELETE will tell you when you've added the expected number of clusters, but it lets you continue if you like; this allows you to use another deleted file's directory entry for recovering a file whose own entry is gone. One inconvenience is that the program automatically exits after a single undeletion (quick or manual), instead of letting you perform more.

Other recovery utilities included in this package can diagnose your disk for bad sectors and remove files from dangerous areas. There is an unformat program that will restore your disk using BACKUP.M__U if it exists, and will make an attempt even if it doesn't—a feat no other program attempts. A nondestructive floppy format program is included to allow recovery of those, too. A separate group of utilities is for speeding up performance: they can unfragment disk files, sort a directory, provide a RAM cache for faster disk access, and improve screen speed. Finally, a separate program allows you to recover deleted dBASE files with ease.

SAFETYNET, VERSION 1.4

SafetyNet, as mentioned earlier, is a different type of program from the other three utility packages reviewed here. It is purely a before-the-fact data protection program that you install in RAM, and it works in a very different manner from Mace Utilities' RXBAK. It not only stores the directory, it actually protects the data of your deleted files from being overwritten. When you delete a file with SafetyNet installed, the free space on your disk doesn't increase. Further write operations to the disk won't be able to access the space used by the deleted data, so your files will always be intact.

You install SafetyNet into RAM with the program SNBOOT; it's recommended that you invoke it in your AUTOEXEC.BAT file. In the arguments to SNBOOT, you can specify which drives you want to protect, whether you want unformat protection for your hard disk, and any file extension that you don't want protected (i.e., you don't care if they're overwritten after they're deleted). This useful feature lets you exclude extensions like .BAK, .$$$, or .TMP, which indicate temporary files created and then erased by programs while you're working. These would quickly fill up even a hard disk if they were never deleted.

After SafetyNet is in place, deletion operations proceed much more slowly. Deleted files are invisible to DOS, but you can see by typing DIR that the deleted files haven't been converted to free space. Then, if you have to recover a file you deleted, just run the program SN. It presents you with a listing of all the deleted files, which you can recover with perfect reliability. You can also purge them, which totally overwrites them so that no recovery is possible. You'll have to purge files regularly to keep your disk from filling up, once you're certain you want them deleted. And if you've just formatted your hard disk, you can unformat it perfectly.

TO SUM UP

As usual, the best product for you will depend on your needs. If you absolutely don't want to deal with manual undeletion, SafetyNet gives perfect recoveries and requires the least housekeeping—merely purging whenever necessary. Mace Utilities needs a little more preventive housekeeping to avoid manual recoveries, but it also offers manual undeletion if you need it, as well as a wide range of recovery and speedup utilities. PC Tools provides a fine assortment of general DOS functions alongside its undeletion in a handy RAM-resident program, and it includes a hard disk backup program besides. Finally, Norton Utilities offers the most powerful manual undeletion capabilities, which allow recovery from even the worst situations. ■

T.F Chiang is a regular contributor to PROFILES.

QUICK REFERENCE SUMMARY

Product: Norton Utilities, v. 4.0
Manufacturer: Peter Norton Computing
2210 Wilshire Blvd #186
Santa Monica, CA 90403
Phone: 213-453-2361
Sugg. List Price: $100.00

Product: PC Tools Deluxe, v. 4.2
Manufacturer: Central Point Software
9700 SW Capitol Highway, Suite 100
Portland, OR 97219
Phone: 503-244-5782
Sugg. List Price: $79.00

Product: Mace Utilities, v. 4.10
Manufacturer: Paul Mace Software
400 Williamson Way
Ashland, OR 97520
Phone: 503-488-0224
Sugg. List Price: $99.00

Product: SafetyNet, v. 1.4
Manufacturer: Westlake Data Corp
Box 1711
Austin, Texas 78767
Phone: 512-328-1041
Sugg. List Price: $59.95

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USING THE NEW MAILMERGE

Differences between WordStar 3.3 and 4.0.

BY JIM SPICKARD

For years WordStar was the world's best selling word processor. When 8-bit computers were king of the hill, WordStar ruled the office. Touch-typists loved it because it was fast and their fingers never had to leave the keys. Designers loved it because it gave them complete control of the printed page.

But those in the know loved it because of MailMerge.

As MS-DOS replaced CP/M, WordStar didn't change. Other word processors added footnotes and thesauruses. Options proliferated. Gradually office workers and authors drifted away. But hard-core WordStar users stayed loyal—not out of bull-headedness, but because none of those other programs could hold a candle to MailMerge's flexibility.

They still can't. WordStar 4 has caught up to those other word processors, and MailMerge still gives it an advantage. It's now called MergePrint. It doesn't cost extra anymore, and it's better than ever.

But we MailMerge jockeys have to watch out. WordStar 4's MergePrint and WordStar 3.3's MailMerge are not completely compatible! I had to revise all my programs when I got my upgrade. Most everything worked, though, and the output is even better than before.

WHAT'S MAILMERGE?

MailMerge is WordStar's built-in programming language. At its simplest, it lets you combine a list of addresses with form letters for mass mailings. At its most complex, it can generate reports for dBASE III.

I've used MailMerge to enter address lists on disk, automatically proofreading as I go. I've used it to assemble boilerplate and to compile bibliographies. I've even used it to transfer data to and from my spreadsheet. And I've used it to generate more form letters than I can remember. All I needed was a bit of knowledge, some persistence, and a willingness to work with MailMerge's limitations.

Anybody can do the same.

If you're already familiar with the easy stuff—if you can create a simple form letter and merge a data file—this article's for you. If not, take a look at William Murdick and Tyra Braden's "Beginner's Luck" column in the November 1986 issue, or read your manual. Then pick up this article again.

Hang onto your hat! First I'll show you some of the fancier things MailMerge can do. Then I'll walk you through the differences between MailMerge and MergePrint.

"IF"-LOGIC

Let's suppose you're the complaint manager for a software firm. You've found bugs in several of your products, and you want to send each product's users a free upgrade. To give your letters a personal touch, you've written a form letter that not only addresses the customer by name, but cites the particular product that you are replacing (see Figure 1). What else will MailMerge let you do?

First off, let's add a description of the bug you're fixing. The

```
.DF mailing.lst
.RV user,address1,address2,city,state,zip,product

              Bottom Drawer Software
                 Nowhere, CA 00000

26 January, 1988

&USER&
&ADDRESS1/O&
&ADDRESS2/O&
&CITY&, &STATE& &ZIP&

Dear &USER&:

   By now I am sure you have spent many happy hours
with our &PRODUCT& program.  &PRODUCT& is one of a
family of Bottom Drawer products designed to
increase your computing pleasure.
   As part of our outreach to customers in &CITY&,
Bottom Drawer Software is happy to be able to offer
you a free &PRODUCT& upgrade. ...

.pa
```

Figure 1: A sample form letter.

description will be different for each product. MailMerge has to check which product you're replacing and include a paragraph describing the right one. Can it do it? No sweat! You don't even have to change your data file. "Conditional statements" make the job easy.

Conditional statements let you include text if variables take certain values and omit that text if they take others. To print a different paragraph for each of three products, for example, start with an .IF statement, then write the text you want included. End each .IF with .EI (*E*nd *I*f) before beginning the next:

```
.IF &PRODUCT& = ByteBlaster
We are offering this upgrade because several users have
reported problems with the "Disk Eject" routine. It seems
that...
.EI
.IF &PRODUCT& = NumberCruncher
We are offering this upgrade because we have discovered a
faster and more accurate way to emulate the math co-
processor on 8086 machines.
.EI
.IF &PRODUCT& = DriveTester
We are offering this upgrade because of certain difficulties
encountered by users of non-standard disk drives. ...
.EI
```

As MailMerge encounters each .IF statement, it tests the variable to see whether it meets the specified conditions. If it does, it prints whatever lies between .IF and .EI. If not, it skips to the .EI statement, then continues.

Were there only two products, you could use the .EL (*E*L*s*e) option:

```
.IF &PRODUCT& = ByteBlaster
...[print first text]
.EL
...[print second text]
.EI
```

Either the first or the second text will be printed, not both.

WARNING: the command syntax I have described here works in WordStar 4, but not WordStar 3.3. As we shall see below, 3.3's conditional syntax is a bit more powerful. But by cleverly combining .IF, .EI, and .EL, you can do almost anything you want.

INTERACTIVE MENUS

Let's take another example.

When I got out of school, I went looking for a job. I've got a lot of skills, so I wasn't looking in just one field. Rather than type a different letter to each employer, I put MailMerge to work. I wrote 20-plus paragraphs, then had MailMerge ask me which ones to use. Different combinations of paragraphs made each letter unique.

The .AV dot command is the key. It tells WordStar to "Ask for a Variable". After .AV Name, for example, WordStar stops the printer and types "Name?" on your screen. You enter the name, then hit Enter. Then every time WordStar encounters &NAME& in your file, it prints whatever you have entered.

You can give yourself a bit more information, if you want. To get a longer prompt, type:

```
.AV "Is this a sociology job? (Y/N) => ",Soc
```

You can then use &SOC& in an .IF command to print certain paragraphs and not others. Unfortunately, the prompt plus your response can't be longer than 80 characters. For long messages use .DM (*D*isplay *M*essage) followed by .AV Soc on the next line. Then there'll be plenty of room:

```
.DM Enter the job title on the next line
.AV Job
```

Figure 2 contains part of an interactive session our software complaint manager could use to "personalize" form letters even more. Note the use of .SV (*S*et *V*ariable) to make &PHRASE& different for each product.

As usual, there's another way to do things. Instead of typing each optional paragraph into my letter, I could give every paragraph its own file. The .FI (*F*ile *I*nsert) command tells WordStar to insert a file into the document while printing.

```
.IF &PRODUCT& = Byteblaster
.FI B:BYTEBLAS.DOC
.EL
```

```
.AV Date
.AV "Customer Name ",user
.AV Product
.AV "Has customer complained? (Y/N) ",gripe
.IF &PRODUCT& = BiteBlaster
.SV phrase="the Disk Eject routine."
.EL
.SV phrase="the accuracy of decimal regressions."
.EI

                                        &DATE&

Dear &USER&:

   A few months ago, you purchased our &PRODUCT&
program.  &PRODUCT& is one of a family of Bottom
Drawer products designed to increase your computing
pleasure.
.IF &GRIPE& = Y
   You recently called one of our customer
representatives about a problem with &PHRASE&  We
have located the problem and are sending you an
updated disk.  We very much appreciate your bringing
this to our attention.
.EL
   Several of our customers have reported problems
with &PHRASE&.  Though you may not have encountered
this difficulty, we are sending you an updated disk.
.EI
...

.pa
```

Figure 2: An interactive form letter.

```
.FI B:NUMBERC.DOC
.EI
```

You can pass variables like &PHRASE& to BYTEBLAS.DOC and NUMBERC.DOC. Just .SV the value in your main file.

.FI is useful even if you're not writing form letters. When I wrote my dissertation, I gave each chapter its own file. I had 12 files spread over four disks. Then I merge-printed the following DISS.ALL file:

```
.FI b:chapter1
.FI b:chapter2
.FI b:chapter3 change
...
```

MailMerge numbered the pages consecutively, as if it were printing one long file. The "change" after "chapter3" tells WordStar to "change disks"—a handy way to overcome limited disk space. (NOTE: With WordStar 4, "c" can be used in place of "change.")

```
.CS
.DM
.DM      WHICH PARAGRAPH COMES NEXT?
.DM
.DM      1) ByteBlaster Introduction
.DM      2) NumberCruncher Introduction
.DM      3) General Introduction
.DM      4) Thanks for Complaining
.DM      5) Thanks for NOT Complaining
.DM      6) ByteBlaster Upgrade
.DM      7) NumberCrunch Upgrade
.DM      8) Offer to Upgrade other Programs
.DM      9) General Closing
.DM     10) Alternate Closing
.DM
.DM      0) End Letter
.DM
.AV "Pick one => ",Next
.IF &NEXT& <> 0
.FI &NEXT&.DOC
.GO top
.EI
```

Figure 3: A menu generator using ".FI".

Figure 3 combines the .FI command with .DM and .AV to build an onscreen menu that lets you choose which paragraphs to include. .GO top takes you to the beginning after each file; .CS Clears the Screen while the .DM lines refresh the menu. Take a minute to look it over. With MailMerge, a little creativity goes a long way.

I should say a word about the .GO command in Figure 3. MergePrint in WordStar 4 has two .GO options: **.GO top** goes to the beginning of the file; **.GO bottom** goes to the end of it. MailMerge in WordStar 3.3 has a GOTO command that can skip forward in a file but not backward. Neither version supports the other's statements.

OUTPUT REDIRECTION

One final trick before moving on.

Most often, you'll use MailMerge to print form letters—a data file plus a form letter and you're on your way. But where does that data file come from? MailMerge only reads data in "comma-delimited format," where each piece of information is separated by commas from the others. Anyone who's tried to type comma-delimited data knows how many mistakes one makes. Fortunately there's an easier way.

MailMerge can write data to disk just as easily as it can to your printer. It's quite simple. Set your letter's margins to zero and the page length to 1. Turn print-time reformatting off (.PF off) so MailMerge won't word-wrap lines. Ask for the data you want with the .AV command. Your file should start like this:

```
.CS
.AV "Customer name: ",name
.AV Address
.AV City-State-Zip
.PF off
.PL 1
.PO 0
.MT 0
.MB 0
"&NAME&","&ADDRESS&","&CITY-STATE-ZIP&"
```

When all the data has been collected, MailMerge writes the variables in order, separated by commas. It even surrounds them with quote marks, so you can type names like "J.Q. Public, Jr." and not have them treated as two variables.

To print a disk file, first type **M** at WordStar's opening menu. Then send the file to disk rather than to your printer. With WordStar 4 that means using the ASCII or XTRACT printer drivers. With WordStar 3.3 you answer the question "Disk file output?" with a **Y** and give a file name.

If you want to enter data for more than one customer, however, you have to get the file to repeat itself. Version 4 and version 3.3 do this differently. In version 4, just combine an .AV and an .IF with the .GO top command:

```
.AV "More data? (Y/N) ",yesno
.IF &YESNO& = Y
.GO top
.EI
```

Version 3.3 can't .GO to the beginning of the file, but it can GOTO named locations farther down. Assuming your file is named ENTER.MAS, you can .FI the file again:

```
.AV "More data? (Y/N) ",YESNO,1
.IF &YESNO& = "N" .OR. &YESNO& = "n" GOTO END
.FI ENTER.MAS
.EF END
```

Whether something is in upper or lower case matters in WordStar 3.3; it doesn't in WordStar 4. The ,1 after YESNO in the 3.3 example makes sure you enter just a single character. Version 4 doesn't support this option.

Not all the differences between MailMerge and MergePrint are in the manual; some are obscure.

You can create similar MailMerge programs to proofread data you've already entered, to eliminate records containing particular values, to add another variable to your data files, etc. There isn't room to give examples here, but at the end of the article I'll suggest a book full of them.

COMPARING THE VERSIONS

The last few paragraphs highlight one of the main differences between WordStar 4's MergePrint and WordStar 3.3's MailMerge—a different "if"-logic. I've found several other differences as I've updated my MailMerge routines. I've summarized them in Figure 4. Not all of these differences can be found in the manual. Some of them are pretty obscure. But I think I've tagged the major ones. First I'll finish the differences in "if"-logic, then move to other matters.

WordStar 4 uses only three conditional commands: .IF, .EL,

	Version 4 (MergePrint)	Version 3.3 (MailMerge)
"if"-logic	.IF &VAR& = ...	.IF &VAR& = "..." GOTO label
	may surround values with quotes	must surround values with quotes
	<, =, > for numbers or strings	<, =, > for strings only
	case insensitive	case sensitive
	.EL	(no equivalent)
	.EI	.EF label
	(no equivalent)	.AND. and .OR.
	.GO top	GOTO label
	.GO bottom	can only go down
formatting	formats text with imbedded ruler lines	formats by matching existing margins or defaults
	eliminates blank lines	eliminates blank lines
	formats output: field size, center, left, right, various numerical formats ($,* etc)	(no equivalent)
math	complex math functions	(no equivalent)
data files	commas or <CR> separate variables	commas separate variables, <CR> separates records
	all commas used	final comma skipped if field is blank
misc	.RP must have number	.RP with or without number
	(no equivalent)	.AV VAR,# number limits length of input (e.g.: 2 characters)

Figure 4: Differences between MergePrint and MailMerge.

and .EI. As I've demonstrated above, you can use these commands to decide whether or not to print a particular passage:

```
.IF &ZIP& < 10000
...
.EI
```

prints the lines between .IF and .EI only if the zip code is less than 10000.

Unlike version 4, version 3.3's .IF commands don't stand alone. The full syntax is .IF ... GOTO label, where label is an .EF label statement farther on in your document. The label part is optional: you can treat .EF just like .EI if you want. But using labels gives you the option of skipping the next .EF statement and going to a different one.

To print only the New England zip codes, for example, you would use the following:

```
.IF &ZIP& >= "10000" GOTO NOTNEWENG
...
.EF NOTNEWENG
```

Note that version 4 tests with "less than" while version 3.3 tests with "greater than or equal to." That's because in the former .IF prints lines, while in the latter it skips them. Version 3.3 also requires quote marks around the test value.

In 3.3 you can reverse the test with the .EX (EXcept) command, with an identical result:

```
.EX &ZIP& < "10000" GOTO NOTNEWENG
...
.EF NOTNEWENG
```

Version 4 doesn't have .EX. .IF does the job.

Version 3.3 lacks version 4's .EL (ELse) option, but adds .AND. and .OR.. These powerful commands let you test for more than one condition at a time. For example:

```
.EX &ZIP& < "10000" .OR. &ZIP& > "90000" GOTO xx
...
.EF xx
```

skips all zip codes except New England and the West Coast. To skip everyone named Dodd living in Akron, use:

```
.IF &NAME& = "Dodd" .AND. &CITY& = "Akron" GOTO xx
...
.EF xx
```

Though I can't test two variables at once in version 4, I can get the same result by nesting .IF statements. It takes more lines, but the resulting document is easier for non-programmers to follow. Translating between the versions is really pretty simple. I can only think of one or two circumstances in which it wouldn't work.

FORMATTING AND MATH

In two areas, version 4 really shines.

MailMerge has always been able to reformat text while printing. If names and addresses are extra long or extra short, it adjusts the other text. The finished document looks as if it has been typed personally for the customer to whom it is addressed.

Version 3.3 had a few glitches, though. Specifically, it had no way of knowing what margins it was supposed to use for wrapping words. By default, it set the right margin by the first soft carriage return it found in the file. But if you tried to put a variable in the first line of the first paragraph of your document, you got the standard 65-character line—no matter what you wanted. Longer lines got wrapped prematurely.

MergePrint allows you to format variables—center data or right- or left-justify it in a field.

Version 4 solves that problem. WordStar adjusts your margins after every ruler line or margin command embedded in the text. If you use elite type in your letters as I do, just set the margin with .RM 78. Then variables can go anywhere. Your text comes out perfectly.

Changing the margins with ^OR won't do the trick, though. The margin command has to be embedded in the file. And if you use ^OG to indent block quotes, you now have to reset the left margin as well (.LM).

In both versions, however, there are times you won't want WordStar to reformat your text. Reading a long city name into the following, for example, will activate word-wrap:

```
&NAME&          &ADDRESS&          &CITY&
```

The result could be:

```
John Jones              123 4th Street
Albuquerque, NM
```

To keep the city in the proper column, use the .PF (Printtime Formatting) command. Put .PF off before this line so Albuquerque, NM will continue into the right margin. Either .PF on or .PF dis will turn reformatting back on again. (.PF dis means "Discretionary": it only reformats paragraphs containing variables. .PF on reformats everything.)

Besides improved reformatting, version 4 allows you to format variables. You can center data or right-justify or left-justify it in a given field. You can specify how numbers are to be printed: how many decimal points, whether to include a dollar sign, etc. Version 3.3 lacks all these features.

First, assign a display format to any digit or letter (except "o") using the .SV command. Then include the digit or letter between the "&" signs with the variable, separated by a slash. For example:

```
.SV 1=LLLLLLLLLLLLLLLLLLL
.SV 2=CCCCCCCCCCCCCCCCCCC
.SV 4=$$,$$$.99
.SV 5=ZZZZZ
.SV 6=(ZZZ,ZZZ.99)
&ITEM/1& &NUMBER/5& @ &COST/4& ea.
&SOURCE/2&
Net profit (loss): &PROFITLOSS/6&
```

This might print as follows:

```
Widgets                 12345 @              $25.00 ea.
ACME Corp.
Net profit (loss): (5,432.75)
```

Version 4 will also do math. The .MA command allows you to enter equations into your documents. To add three numbers, for example, use:

```
.MA total=&ITEM1&+&ITEM2&+&ITEM3&
```

Equations can be much more complex. The following equation, for example, figures the monthly payments on a loan. &LOAN& is the loan amount, &INT& is the yearly interest, &YEARS& is the loan period in years. (NOTE: You should type this in on one line, not two. The line is broken here to accommodate the magazine's margins.)

```
.MA pay=&LOAN&*(&INT&/1200)*((&INT&/1200+)^
(&YEARS&*12))/(((&INT&/1200+1)^(&YEARS&*12))-1)
```

Version 3.3 does no math, and the CP/M version of WordStar 4 can't go beyond the four basic operations (+, -, * /). Pages 297-299 of the MS-DOS version's manual contain a truly awesome example of MergePrint mathematics. No other word processor on the market can touch WordStar here.

ODDITIES

A few other quirks separate versions 3.3 and 4.

In 3.3, you have to use quote marks in conditional statements. They are optional in 4. For example, .IF &STATE& = "California" works in both versions (assuming you add a GOTO to in 3.3). .IF &STATE& = California only works in version 4.

Version 3.3 was also case sensitive, where version 4 is not. To test whether the operator has answered Y to an .AV statement, for example, 3.3 had to use

```
.IF &ANS& = "Y" .OR. &ANS& = "y" GOTO
```

Version 4 just uses .IF &ANS& = Y.

Version 4 uses different operators to compare values in .IF statements. 3.3 just compared strings; 4 compares numbers, too. Thus .IF &NUM& < 245 is false in both versions when &NUM& is 55, because the < operator compares text in ASCII order. Version 4's #< operator compares numbers and shows &NUM& #< 245 to be true.

The .RP (*RePeat*) command is different. In both versions it repeats a file, but in version 4 you have to specify how many times the file is to be repeated. In 3.3 you didn't. You could repeat until all your data was gone.

Versions 4 and 3.3 handle data files a bit differently. Both use comma-delimited data files, but version 4 also lets you separate data by carriage returns.

```
Jones
123 4th          is the same as          Jones,123 4th,Anytown
Anytown
```

In version 4 you can use any combination of the two. Not so version 3.3.

If your last data field is blank in 3.3, MailMerge ignores it. It reads the next variable from the line below. Version 4 reverses this: a stray comma at the end of a data line becomes a blank value. Either way you have to be careful—your data can be displaced.

Under MS-DOS, version 4 lets you insert the date and time in your documents. Both MS-DOS and CP/M give you a variable for the current line and page. I'm sure I've missed a few differences, but I suspect they're not important. If they are, they'll rap my knuckles one of these days.

FOR MORE INFORMATION

The best place to start exploring MailMerge is your manual. That sounds obvious, but it's not. The MailMerge manual scarcely scratches the program's surface. I've already given you more tips than it contains.

The references to MergePrint in the WordStar 4 manual are more complete, but scattered. You have to look in several places to get a handle on all the features. .PF, for example, is listed under "MergePrint" but not under "MergePrint Dot Commands" in the reference section. Don't miss the sample documents in Appendix B of the MS-DOS manual. They're really first rate.

To learn how to use MailMerge to its fullest, though, you ought to read M.David Stone's classic *Getting the Most from WordStar and MailMerge: Things MicroPro Never Told You* (Prentice-Hall, Inc., 1984). Here's where I learned how to generate DBASE reports and to interface with spreadsheets. Stone provides lots of proofreading and disk writing routines. Though his sample programs are written for 3.3 (and earlier) versions, most can be easily translated to version 4. In a busy office, the book is worth its weight in silver. MailMerge itself is worth its weight in gold. ■

Jim Spickard is a sociologist of religion who finds himself writing more and more about computers. He is a remote editor of PROFILES.

SURVIVAL TIPS FOR THE ONLINE NEOPHYTE


RICHARD STARKMAN

BY BROCK N. MEEKS

If you've become an old hand at telecommunications, you've probably managed to suppress your memories of those first few agonizing days (weeks?) when you struggled to understand your modem, communications software, and something called a "BBS."

I know my stomach gets a bit queasy when I think back to the time when I first ventured into the land of baud rates, parity, stop bits, and a hideous device known only as "RS-232." Somehow I endured. Somehow, you did, too.

But it all comes back when you watch a friend grappling with the same obstacles. As Yogi Berra once said, "It's like deja vu all over again."

And, as you well know, the technical difficulties are not the only ones to be overcome. Going online takes more than technical proficiency. For one thing, the online world is in many ways a culture of its own, with its own manners and mores, and you can save yourself a lot of grief if you know what to do—and what not to do—before you begin.

There are other sorts of pitfalls, too, that can make you put your modem up for sale overnight unless you're prepared for them and can avoid them.

So, if you're new at navigating through the ethernet—or if you're showing a newcomer the ropes—here are some pointers that may make the difference between a *bon voyage* and a bummer.

DO YOUR HOMEWORK

Learn the jargon. This lets you converse with the "natives." Once you're familiar with the language, you'll feel more confident. The world beyond the green screen is intimidating enough without stumbling over the language barrier.

Doing your homework also means knowing the workings of your communications software. I know, there are precious few readable manuals, but time spent learning your communications program's functions should be thought of as an investment—one that will pay handsomely later on.

FIND A STYLE THAT'S RIGHT FOR YOU

Part of the attraction of the online medium is that you can play any part you like—flaming liberal, staunch conservative, or just a "fun guy" out for a midnight lark. More often than not, however, your online persona is an extension of the "real" you. Research bears this out; people are tremendously more candid online.

When developing a style, it's best to just be "natural." Remember, people are getting to know you solely by reading your online comments. If you're tempted to play devil's advocate, for instance, your comments may draw withering fire from other users. If you can handle the heat, good for you. Most can't. (But it's just this sort of variety that makes the online community a most interesting place to "hang out.")

KEEP YOUR COOL

Get a handle on your emotional state of being before you switch on your modem. If you go online feeling like an emotional basket case, you're likely to log on the next day and wonder what ever could have possessed you to enter yesterday's off-the-wall comments.

I find that my moronic online comments are easily traced back to some dour mood. And take it from one who knows: humble pie leaves an aftertaste. The online world is difficult enough to navigate without making the entire ethernet your personal battleground.

Of course, there will be those times when you just can't help but take emotional baggage online, and you may very well say things you don't mean. In that case, at least have the hindsight to recognize what you've done and make amends. Apologize, grovel, whatever—but get the situation resolved. Developing this attitude may be the single most important factor in your online longevity.

KNOW YOUR WEAKNESSES

There almost certainly are some things you don't do well. Accept your shortcomings and apply those insights to your online sessions.

Join in the types of discussions you feel most comfortable with —share your expertise.

Maybe you don't handle confrontations well. Online it's easy to confront someone because you don't have to involve yourself in a face-to-face discussion. But if you're not adept at such conversations off line, don't suddenly decide you can handle them online.

It's easy to fire those first salvos, but people fire back. I've seen too many people become disenchanted with tele-

communications because they couldn't handle a fierce online discussion.

Join in the types of discussions you feel most comfortable with. These may be technical discussions or roundtable discussions where you can share your expertise. Get involved in the types of discussions you enjoy or you're doomed. And who needs another statistic?

SHARE YOUR STRENGTHS

This is the flip side of the above. Know what you're good at, what you enjoy the most, and what it is that you have to offer others. Get a handle on your strengths and you'll flourish online.

When I first went online some seven years ago, I was hammered on by other online participants because I was always looking at each side of a discussion. I was labeled "wishy-washy." One wag suggested I use the handle "Charlie Brown." I copped to this apparent "failing," claiming my journalistic background: "Journalists aren't paid for their opinions," I fired back. Secretly I harbored my own worries. "Are they right?," I agonized.

Now, several years later, I've come to see that this aspect of my online style is a strength. It makes me a better participant. I often use this strength to revive an important discussion that I fear is slipping into the abyss of apathy.

KNOW WHEN TO SHUT UP

Learn to "keep your mouth shut," figuratively speaking. Nothing will torpedo a new modem owner faster than not knowing when to keep quiet and "listen." If you are prone to entering comments rivaling the word count of *War and Peace*, you'll find them summarily passed over and rarely replied to.

And if you become known as someone who can't be trusted with privileged information, you're through before you get in the game. The issue of online privacy is delicate enough as it is. Violate that privacy—in any way—and you'll be a long time regaining any respect.

KEEP YOUR SENSE OF HUMOR

Don't take yourself or what's being said online so seriously that you cannot find a spot for humor. We're not talking Superpower Summit Conference-level discussions here, after all.

Through all the frustrations and setbacks you'll ultimately experience online, smile. Sound like tripe? Maybe. But I've found that those capable of injecting humor into their messages are the most lively and "well-rounded" online personalities.

Checkbook shock comes with overzealous exploration of the "global village."

You don't have to be Bill Cosby or Stephen Wright to keep humor in your online traveling bag. Just take things at face value and learn to see the humor in each and every thing that happens. For better or worse, the ability to laugh at yourself and the circumstances surrounding your telecommunications will ensure your success.

DON'T FORGET—TIME IS MONEY

Checkbook shock is an insidious malady of the Information Age. It comes with overzealous exploration of what seems like a bright new world, a "global village." It isn't free, folks.

Sure, you can dial into your local labyrinth of bulletin boards until smoke starts to rise from your Hayes-compatible modem; but sooner or later, you discover that the real advantage of online communications lies "out there" in the land of "pay for play." In other words, to reach out and telecommunicate, it's going to cost you some coin.

There is nothing quite as horrendous as that first three-digit bill for accessing CompuServe or The Source. Nothing can kill your desire to go online faster than a charred hole in your rent money.

One solution, among others, is writing responses off line. This immediately does two things for you. First, it saves you connect time. Second, it gives you a chance to reflect and say what you really want, instead of something you may end up regretting.

FIND A MENTOR

Online mentors are out there. Find yours.

An online mentor is a person you can go to when you have a question or a problem. Maybe it will be the person who answers all your "dumb questions." Perhaps it's the person who quietly takes you aside in Email and explains some of the finer points of this medium.

Send that person Christmas presents and birthday cards. Don't let him get away—he (or she) will undoubtedly show you the way to improving your online skills.

STAY IN TOUCH WITH REALITY

Using the modem as an excuse for procrastination eventually catches up with you. If you find yourself logging on when you really should be studying, getting that report done for your boss, or doing your taxes, it's time to reconsider.

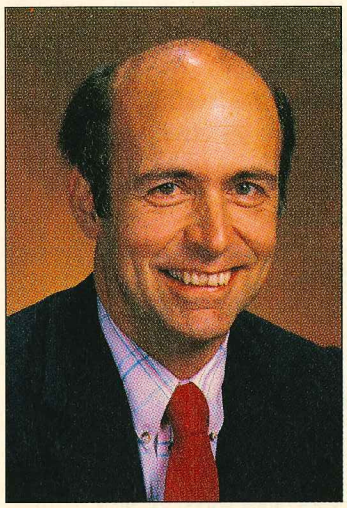
Ah, you're nodding your head. You know what I'm talking about: The online addict. We all joke about it. "It'll never happen to me," we say, but it can and will if you're not careful.

Stories abound of people staying up till the wee hours, charging through one system after another, only to find themselves dragging into work the next morning with an "online hangover." More dangerous are those who find they cannot function without their "online fix" each day.

Newcomers reading this will not believe me. Ask around. The veterans will tell you. It's scary. Some people live their lives online, and the "real world" becomes an ancillary reality.

THE BOTTOM LINE

What it all comes down to is staying in control—of your time, of your money, even of your temper. The online world is a fascinating place, but like so many other things, you have to approach it the right way to really enjoy it. If you don't, you'll give up in disappointment. If you do, you'll find literally a whole world of friends and good fellowship. ■



GAIL GOODENOW

WORKING WITH A GENIUS

BY TED SILVEIRA

Electronic page layout is wonderful, no doubt. But laying out pages on a normal monitor, even with a program as good as Ventura Publisher, can be frustrating, like trying to work with blinders on. If you work with your type at normal size, you see the type and the graphics just fine, but you only see part of the page. On the other hand, if you work at reduced size so that you can see the whole page at once, your type looks like gray squiggles, and your art like mush.

The answer, of course, is to get a bigger monitor, not one that merely shows the same picture at a larger size but one that shows you more of the page you're working on. These large-screen monitors (sometimes called full-page monitors) were once found only on expensive engineering workstations like Sun and Apollo. With the boom in desktop publishing, though, many companies are now offering high-performance large-screen monitors that you can attach to an ordinary MS-DOS computer. They're not cheap—prices generally run $1,800 and up—but what a view!

Recently, I had the chance to work with one of these monitors for several weeks, and it was a treat. The system I used is the Genius, from Micro Display Systems, which lists for $1,495 and is available (as an option) with Kaypro's Extra! Extra! desktop publishing bundle. The Genius uses a 15-inch white phosphor screen mounted in portrait mode (that is, with the long axis running vertically instead of horizontally as in a typical monitor). It weighs in at about 30 pounds (not bad for a monitor this size) and comes with its own special video card, a massive double-decker affair.

INSTALLATION

The installation is not difficult, though the manual is only barely adequate. To start, you copy the Genius' special software, including the video driver, VHR_ANSI.SYS, to your root directory and add the line DEVICE=VHR_ANSI.SYS to your CONFIG.SYS file. Next, you reconfigure your system (through hardware jumpers or software setup, depending on your machine) to expect a monochrome display. Then you remove your current video card (no dual monitors here) and plug in the Genius video card. Because of the shape and size of the card, it has to go in one of your 8-bit slots—it won't fit in a 16-bit AT-style slot. You may also need to rejumper the parallel port on the Genius card if it conflicts with your current parallel port. Finally, you cross your fingers, plug in the power, and boot up your system.

THREE VIDEO MODES

The Genius offers three video modes. The most impressive is its own native mode, which gives you 80 columns by 66 lines (that's right, 66) of black letters on a white background (light gray, really). However, this mode is only usable with programs that have installations for the Genius, though you can also use it from the DOS prompt. The DIR command, for example, will give you a listing 66 lines long—very impressive.

For other, uneducated programs, the Genius offers two options. It has an IBM mode, which offers either CGA or monochrome text emulation and displays 25 lines in double-height letters, again black-on-white. This mode would be excellent for people who need larger characters, but the characters themselves are not very attractive. The Genius also has a so-called "dual" mode that can emulate a 25-line monochrome text display (white letters on black) at normal size in the upper half of the screen and a 25-line CGA display in the bottom half. (To be honest, I didn't try to make this feature work.) Most unenlightened programs treat the Genius as if it were an IBM monochrome text display and use only the upper half of the screen (though you can force them into the double-size mode, if you want).

GENIUS IN THE REAL WORLD

I tried the monitor with Ventura Publisher, which has a video driver for the Genius. At first glance, I was disappointed, because although I could see both the top and bottom of the page, I couldn't see both the left and right sides at the same time. The screen seemed to be too narrow! Then I remembered to turn off the side-bar on the left (^W), and there was the page with all four sides showing: top, bottom, left, and right. If you've never seen Ventura in action on one of these full-page monitors, with sharp black letters and graphics against a light background, I can tell you the effect is stunning. You see the whole 8½ by 11-inch page at once, in fine detail.

Well, almost the whole page. You can actually see a section about 8 by 10½ inches, which will show all your text if you have at least ¼-inch margins. The

image is slightly smaller than actual size (about 95 percent), but the image is sharp and clear enough that you don't mind.

Then I tried the monitor with WordStar 4.0, which also has a video driver for the Genius. Again, the results were wonderful—a full 66 lines of text on the screen at once. Originally, I had been a little concerned that the screen rewriting would be sluggish when paging through text (because of the large area to be covered). But in fact, the performance seemed excellent to me. Using WordStar on my Kaypro 286i, I ran a rough stopwatch test and found the Genius could write a full 66-line by 65-column screen of text in six- to seven-tenths of a second. Not instantaneous, but fast enough.

Because the Genius has been around for a while, it is one of the best supported of the full-page monitors. Generally speaking, every program that supports any full-page monitor has a Genius video driver. That includes not only Ventura Publisher and WordStar, but also Microsoft Windows (so you can run PageMaker or any other Windows-based program), AutoCAD, WordStar 2000, Lotus 1-2-3, Samna Word, WordPerfect, FormMaker, and others.

Because the Genius has been around awhile, it's one of the best-supported full-page monitors.

THE THORNS ON THE ROSE

So, is everything rosy with the Genius? No, it is not. I encountered a number of problems during the time I had the monitor. To begin, I had a problem with the video card. This card is big, a full slot long and a full slot wide. And, as I mentioned earlier, it has to go in an 8-bit PC-style slot instead of a 16-bit AT-style slot because the board fits right down to the main circuit board, with just a cut-out for the connector. But my problem was that the board didn't fit very securely into the connector slot—it felt as if the board and the support bracket bottomed out before the connector got more than part way into the slot. Now, while I had my computer in the normal horizontal position, everything worked fine, but I like to stand it on edge, next to my desk. With the computer in this position, I periodically experienced video problems that were cured only by opening up the case again and pushing down on the Genius video board to reseat it. I'd guess that the weight of the double-decker board combined with the less-than-perfect fit of the connector caused the board to work far enough out of its slot to create a flaky connection.

The view on the screen, though impressive many ways, left something to be desired in others. I don't know if it's the particular picture tube that MDS uses or the fact that it's mounted in portrait position, but I found the curve of the glass to be very noticeable and even a little disturbing. All picture tubes are curved (except the new Zenith flat tension mask monitors), but there's a difference of $\frac{5}{8}$ inch between the center and the edge of the screen, enough to keep me conscious of the slope much of the time.

The display is dark gray-on-light gray, rather than real black-on-white. It gives sufficient contrast for easy viewing most of the time, but not as much as some other monitors in the same range. Perhaps because of this, I couldn't distinguish shades of gray as clearly on this monitor as on an ordinary green-on-black monitors. (When you run a color graphics program on a monochrome monitor, these shades of gray—or green—are used to emulate different colors.) And though the characters are fully-formed, using 8 x 12 pixels in a 9 x 15 pixel cell, they look slightly smaller than those on a typical 12-inch monitor and appear to be slightly compressed vertically. Still, I had no trouble reading them at any time.

During fast scrolling in the full 66-line mode, I consistently found stray letters appearing in blank areas of the screen. Often, I also found that random characters in my text had been changed to other characters (or sometimes, uppercase letters to lowercase). These changes appeared only on the screen—the file itself was never corrupted in any way. And in WordStar, for example, I could correct the display by marking the whole screen as a block (which causes WordStar to rewrite the screen). However, the stray bits seem to indicate that the Genius was running near (or actually slightly over) its speed limit. I don't know if this problem would appear on a machine slower than the 10 mHz Kaypro 286i I used.

Finally, a very few programs (all minor shareware) took a dislike to the Genius. One garbaged up part of the screen, while another was slow as molasses. In both cases, I assume the problem was a conflict with the Genius' special video driver, VHR_ANSI.SYS, and it may well have been the fault of the programs, rather than of the Genius.

WHO SHOULD BUY?

Should you buy a large-screen monitor, then? For desktop publishers, paste-up artists, electronic drafters and designers, and other specialists who work with objects larger than normal screen size, a large screen is a tremendous asset, something that will help them do better work and do it faster. The Genius has much to recommend it to this group—especially its not-too-high price and wide software support, but it's probably best suited to desktop publishing and similar jobs because of its portrait-mode orientation. Drafters and technical artists are more likely to be happy with the somewhat larger 19-inch monitors in the normal landscape orientation.

Other users, even those who can afford the cost of such a monitor, are still probably better off with a high-performance EGA or VGA video card and high-resolution multi-scan color monitor, both for their irresistible color and for their nearly universal software support.

QUICK REFERENCE SUMMARY

Product: The Genius
Manufacturer: Micro Display Systems, Inc.
1310 Vermillion St.
Hastings, MN 55033
Phone: (612) 437-2233 or (800) 328-9524
Sugg. List Price: $1,495

MICROSOFT EXCEL

BY JACK NIMERSHEIM

Remember when "Mac-bashing" was all the rage, shortly after Apple first introduced the Macintosh? Everyone who was anyone in the PC community took a few swipes at Steven Jobs, and then quickly dismissed his brainchild as a preordained failure. It was called an electronic "Etch-a-Sketch" for which no serious business software would be developed.

Things didn't work out quite that way. One reason was Microsoft Corporation's release of Excel for the Mac. Here was a powerful spreadsheet program dedicated PC users could only admire from afar. We grudgingly bemoaned the fact that a comparable product did not exist in the world of MS-DOS.

With the arrival of Microsoft Excel for the PC (or PC Excel, or Windows Excel—no one seems to know what to call it to differentiate it from its Scottish cousin), that oversight has been rectified. Was the wait worth it? My answer to this question is an unqualified "Yes." After more than a month of experimenting with Excel, it's difficult for me to imagine ever returning to my old spreadsheet software.

FEATURES AND PERFORMANCE

Excel is the PC spreadsheet against which all other PC spreadsheets must now be measured. Whereas recent changes to the venerable Lotus standard have been, at best, evolutionary in nature, Excel introduces some truly revolutionary advances to the spreadsheet market.

Excel runs under Windows 2.0 or Windows 386. The program also includes a stand-alone, run-time version of Windows, for those users who do not have one of these releases of Microsoft's Windows.

The first thing you notice about Excel is how much the PC version resembles its Macintosh predecessor. Running under Windows, Excel uses the same type of graphics interface Macintosh owners have boasted about for years, with just enough differences to circumvent any legal hassles with Apple. One big difference is the extensive support of color that Windows provides, as opposed to the monochrome standard still prevalent in the Macintosh environment.

This graphics-based structure permits incredible flexibility when specifying the screen appearance, or designing a printout. For example, you can configure Excel to display all numbers below a specified value in red on a white background. This is invaluable for spotting potential problems in a budget projection. You can also adjust the height of individual rows within your spreadsheet and select from a variety of type styles for ranges, individual cells, or even single letters or numbers, both for display and at print time. Headers and footers, including page numbers, can be included in an Excel document. Combine these formatting capabilities with a high-quality laser printer, and you can use Excel to generate report pages of near-typeset quality.

It's difficult to explain how intuitive the Windows/Excel interface is. With a mouse and Excel's menu structure, nearly every feature a serious user might ever need sits, quite literally, at your fingertips. Without even opening a manual, you can begin building an Excel spreadsheet, immediately incorporating some of the program's more advanced features.

Enter unfamiliar territory and context-sensitive Help screens are available at the click of a mouse button. Should you get completely lost, the program includes a comprehensive, on-screen tutorial that can be accessed at any time during an Excel session. In a pragmatic tip-of-the-hat to what has gone before, Excel even provides a special Help function that allows you to enter a 1-2-3 or Multiplan command and then display the Excel command structure required to perform an identical operation.

Excel fully supports the dynamic linking of multiple spreadsheets into a true three-dimensional structure. This eliminates the "cut-and-paste" approach previously required to consolidate data from multiple spreadsheets into a single file. Instead, Excel elevates cut-and-paste operations to a fine art, to enhance your spreadsheets rather than complicate them. For example, to dynamically link portions of one spreadsheet to another one, you simply use the mouse to point to the appropriate rows and columns of the first spreadsheet and then "click" those values into the desired range, or even single cell, of the second spreadsheet. Adjust values in the original work area and those changes are reflected in the second spreadsheet.

Excel's voracious use of RAM is offset by creative programming and efficient use of expanded memory.

This same point-and-click approach makes generating an Excel chart child's play. Highlight the desired labels and data, specify the Chart option, then select one of Excel's 44 available chart types from the program's Gallery option, and your graph appears in a new window. You can even include data from disparate areas of your worksheet in a single chart. Excel automatically differentiates between text and numeric values in the specified range and places each in its appropriate place on the requested chart.

Were Microsoft less conscientious, Excel might easily strain even the AT and 386 systems on which it is designed to operate. To alleviate this problem, Microsoft incorporated two important programming techniques into Excel's design: minimal recalculation and background processing. With minimal recalculation, the program recalculates only those cells directly affected by new input. Background processing means you're no longer "locked out" of your keyboard while this recalculation occurs. Combined, these two features allow

Excel to perform admirably, even when running on the 8-Mhz AT with which I tested the program. I have a feeling it would fly if installed on a higher-speed AT or 386 machine—which Microsoft recommends.

Admittedly, Excel is voracious when it comes to memory. Install Excel on a system with 640K of conventional memory and you're left with approximately 180K of work space. Here again, however, the program overcomes this limitation through creative programming and efficient use of expanded memory.

Excel includes a disk-caching program that runs automatically in either extended or expanded memory. This greatly reduces the time required for swapping program code from disk to RAM, a procedure that happens quite regularly during an Excel session. Ironically, Microsoft designed Excel to use LIM Expanded Memory more efficiently than Lotus, one of the companies responsible for establishing the LIM standard. Whereas 1-2-3 uses EMS for data storage only, thus forcing conventional RAM to quickly fill up with formulas and cell definitions, Excel places both its cell tables and data in expanded memory. You can create a much larger work area before depleting conventional RAM and receiving an out-of-memory error.

Once a spreadsheet grows beyond a certain size, the ability to audit that spreadsheet becomes more of a requirement than a luxury. Excel provides a variety of tools for auditing your work. You can attach notes to any cell, explaining the assumptions behind a specific value or formula. You can also tell Excel to highlight all cells that depend on a specified reference or, conversely, all cells on which a reference depends. You can even open a window containing a listing of these cells.

When it's time for a comprehensive audit, you'll want to use Excel's Preview feature. This lets you scan six screens of information on a single, compressed display. Admittedly, the type used for this display is so small you can't read individual cells. Still, Preview does allow you to visually analyze a large section of your spreadsheet for hidden problems.

Excel's Precision as Displayed option eliminates the potential headache of rounding errors. Selecting this option allows you to specify that all values be stored in, say, two-decimal precision, thus eliminating the types of errors often associated with floating-point calculation.

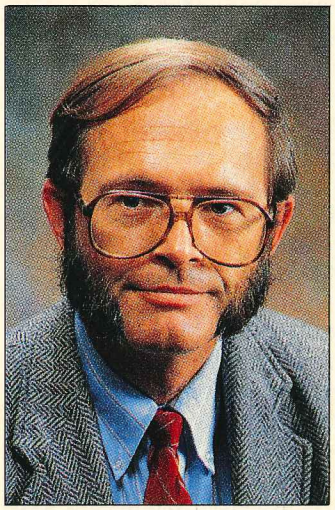
DOCUMENTATION AND SUPPORT

Given its extensive Help features and on-screen tutorials, Excel does not require the documentation support other programs might. Microsoft recognized this and limited its manuals (which could have grown to unmanageable proportions) to two binders comprising an alphabetically arranged Reference Guide and a Functions and Macros book, crammed with a variety of ideas and tips on how best to tap the hidden power of Excel. To be honest, I've yet to open either of these manuals (except for the purposes of this review, of course) and don't anticipate needing them until a truly mind-boggling spreadsheet application rears its ugly head.

A quick-reference brochure introduces operational concepts—dialog boxes, window placement and sizing, icons, etc.—for anyone unfamiliar with the Widows environment. The package also includes function-key templates for both the standard and enhanced AT keyboard.

Excel is not copy-protected, and requires no special uninstall procedure to back up or replace files on your hard disk. The absence of copy protection lets you make archive copies of the program's five

CONTINUED ON PAGE 64



RICHARD STARKMAN

TURBO PASCAL 4.0: A MILESTONE

BY TOM ENRIGHT

Turbo Pascal 4.0 from Borland International is the long-awaited upgrade that elevates Turbo Pascal to the same performance and interface level as Borland's other language products. Version 4.0 is more than just another periodic upgrade such as you expect from any language. It marks the emergence of Pascal as a full-fledged, professional development tool.

As a professional programming tool, Turbo Pascal now has all the features required for major programming tasks. It has a fully integrated environment, separate compilation of libraries (although Borland chooses to call them UNITS), a complete project MAKE facility, support for all video standards currently found in the IBM PC environment, blazingly fast compilation, and highly optimized program performance. All these features are wrapped up in a package that hobbyists and casual programmers can still use.

The bottom line is that Borland has pulled off another hat trick. Turbo Pascal 4.0 is an excellent product.

FEATURES

The most striking feature of Turbo Pascal 4.0 is the user interface. You now get a windowed environment with a sliding bar menu at the top of your screen. Each selection on the sliding bar activates a pull-down menu with further options. This is the same type of menu structure found on Borland's other products, as well as Microsoft's newer language compilers. If you happen not to like the integrated environment, a traditional command-line version of the compiler is also on the distribution disks.

Other major features of version 4.0 are separate compilation of program units, excellent video and graphics support, full project MAKE facility, and production of EXE rather than COM files.

The ability to separately compile sections of program code or groups of procedures and functions has been long overdue. This capability has been one of the major advantages of languages such as C. This allows you to exclude the machine code for these functions from programs that don't need them. It also lets you write and debug special-purpose code once and then include that section of special code in programs that use it without having to recompile it each time.

Turbo Pascal comes with several units (video, graphics, and DOS service calls) already compiled as separate units. To use any command from these units, you must declare the unit at the top of your program. The keyword USES followed by the name of the unit or units instructs the compiler to include these units in your program. Unless explicitly included, the code for any unit is not made a part of your program.

Graphics support under 4.0 has been significantly expanded. First of all, when initializing graphics mode you have the opportunity to specify which one of five graphics drivers is to be used. Drivers included with Turbo Pascal 4.0 are CGA for standard color graphics cards, EGAVGA for systems equipped with an EGA or VGA graphics card, HERC for Hercules monochrome graphics, ATT for the AT&T 6300 line, and PC3270 for IBM 3270 terminal emulation. While many users will want only one of these drivers, programmers writing software for others now have much more flexibility.

Also included with the compiler are font files for five alternate text styles, so while in graphics mode, you can display text in a variety of styles and sizes. This merges well with the new commands to draw both two- and three-dimensional bar graphs with a variety of fill patterns and line styles. Along with this come other commands to draw and fill polygons with straight colors or colored patterns. Several fill and line patterns are already defined, or you can define your own.

The project MAKE facility allows you to compile and link all parts of complex multi-file programs with a single command. The facility also merges OBJ files at link time and recompiles only those files that have been changed since the last compilation. A MAKE facility is one of the hallmarks of professional development systems normally built around C compilers. Hobby programmers will have little use for the MAKE facility, but professionals will love it.

Turbo Pascal now compiles EXE instead of COM files. This puts an end to the 64K barrier as far as Turbo Pascal is concerned. COM files cannot be larger than 64K because of their method of addressing memory. EXE files, however, are limited only by the amount of memory in your system.

PERFORMANCE

Along with the increase in Turbo Pascal's capabilities comes an improvement in

performance. One of my first steps in looking at this compiler was writing a small program to test video output speed in text mode. Two things were immediately apparent when running this program under Turbo Pascal 4.0: speed and program size.

The speed of program execution was phenomenally faster under Turbo Pascal 4.0. The test program printed 24 65-character lines on the screen, erased the screen, and repeated this process 10 times. No special provisions to speed up screen writes were used; all output used the standard WRITELN procedure. On a 6 MHz 286i the program executed in approximately one second. Under Turbo Pascal 3.01 running on the same computer, the program required 29 seconds to execute.

As should be obvious from this example, Turbo Pascal 4.0 writes directly to video RAM in text mode, and the process has been highly optimized. Many programmers used to write their own output routines to access video RAM directly—now the compiler does the job for you.

I also mentioned that program size caught my attention when the two programs had been compiled. The 3.01 version of the video test program compiled to a 11,600-byte COM file, while the 4.0 version yielded a 4,224-byte EXE file. This was precisely the opposite of what I had expected. Normally EXE files are larger than the equivalent COM file because of the increased overhead due to memory addressing and other factors. Turbo Pascal 4.0 is highly optimized for both execution speed and program size.

The use of precompiled units explains some of the decrease in program size, but not all. Many compilers use this approach but cannot produce programs that small. Turbo Pascal 4.0 takes steps to optimize the portions of each library included with your code and to make sure that any one library is only included once in a program.

For instance, say you write a program that uses two precompiled units (CRT and DOS). You insert the required statement at the top of your program to include these units. But, unknown to you, the CRT unit also calls the DOS unit—it has an internal instruction to include the DOS unit. Many compilers would include the precompiled DOS unit twice in the machine code of your program. Turbo Pascal 4.0 is smarter than that—it will include the DOS unit only once. The net result is very small programs.

Borland has an agreement with McGraw Hill to produce a line of books for new and experienced users.

You won't get as much speed improvement in other areas of the language as I got with video I/O. There's an across-the-board increase in speed, but the major improvement is in text mode video output. Considering that video output speed on PC compatibles has been a sore point from their inception, it's about time that someone did something to correct the problem.

The only disadvantage to version 4.0 is that it is not totally compatible with prior versions. Some commands available under prior versions work differently or do not exist in 4.0. To overcome this difficulty, Borland provides two alternatives. First, an UPGRADE program will alter source code for earlier versions to work under 4.0. It does a good job on syntax changes, but cannot catch all incompatibilities. Second, two precompiled units (TURBO3 and GRAPH3) are provided to support syntax and characteristics from prior versions of the language.

Many other languages include built-in debugging facilities. Borland does not include one. However, Turbo Pascal is compatible with professional debuggers like Periscope. Casual programmers will have to debug the old-fashioned way. Professionals will use a professional debugger.

DOCUMENTATION AND SUPPORT

The manual that comes with Turbo Pascal 4.0 is 680 pages—not small by anyone's count—and like previous manuals, it contains little introductory material on programming in Pascal. It's not intended to be a programming tutorial; it's a reference work, and as such it is extensive and complete.

Borland does offer tutorial products—its Turbo Pascal Tutor has been updated for version 4.0. It also has an agreement with McGraw Hill to produce a line of third-party books keyed to both new users and experienced programmers. This approach has merit. Tutorial material can be presented much better in a program or book devoted to that purpose than as part of a manual.

Borland's product support is second to none. Primary access to support is through the Borland SIG on CompuServe. This is a direct line to support technicians at Borland International. There is also a message board and both public domain and shareware data libraries for all Borland products. Support is also available on BIX (Byte Information eXchange), by writing directly to Borland, and by calling Borland's product support voice line. This is an unprecedented level of support in the computer industry.

CONCLUSIONS

To say that I like and recommend Turbo Pascal 4.0 is a marked understatement. I found it very difficult to write this review without sounding like a teenager who just discovered sex. The product is that good!

A few adaptations in your programming style are needed to move from earlier versions to 4.0, but this is a small price to pay for the power and ease of program development available under Turbo Pascal 4.0.

I have used Borland's Turbo Pascal since the first release under CP/M, and I have not been this impressed since I first discovered Pascal. ■

QUICK REFERENCE SUMMARY

Product: Turbo Pascal 4.0
Manufacturer: Borland International
4585 Scotts Valley Drive
Scotts Valley, CA 95066
Phone: (800) 255-8008, in CA (800) 543-7543
Sugg. List Price: $99 (limited-time upgrade for registered owners of prior versions: $39.95)

CP/M SURVIVAL IN AN MS-DOS WORLD

BY TED SILVEIRA

The world is becoming a hostile place for CP/M users. It's not just being outnumbered 20 to 1 by CP/M's upscale cousins, the MS-DOS users. It's not even having to put up with occasional dinosaur jokes. The real trouble is that most of the computer world has simply forgotten that CP/M exists (those who knew in the first place).

So what? Suppose you don't need color graphics or desktop publishing or Lotus 1-2-3 compatibility. You don't yearn for a CD-ROM or a laser printer or a personal fax machine. Your faithful Kaypro does everything you need, and it still works as well as the day you first turned it on. Why should you worry about what the rest of the computer world does? Here's why...

NOTHING LASTS FOREVER

Your Kaypro may seem to be immortal, but it's not—eventually, it's going to decay. Barring power surges and other disasters, the integrated circuit chips in your Kaypro—the things that make your computer compute—may well outlive you, but a computer has other parts that do wear out. A hard disk drive, constantly spinning at 3600 rpm, day after day, has a limited life span. A floppy disk drive doesn't spin as fast and doesn't run constantly, but it, too, has moving parts that wear out. The video screen on your Kaypro, just like a TV, will begin to misbehave as it ages (or simply grow dim and fade away). And after hours of constant pounding, even the keys on your keyboard will eventually collapse from overwork.

Of course, like any responsible owner, you'll take your Kaypro to be repaired when it becomes ill. But where? It's no exaggeration to say that most retail computer stores and computer repair shops are staffed by people to whom CP/M computers are mysterious relics of computer pre-history, beyond the reach of written records. And as more people move from CP/M to MS-DOS, the CP/M market shrinks further and the remaining repair shops that work on CP/M computers close down or switch to MS-DOS.

And as the CP/M market shrinks, companies that make CP/M-specific hardware and software also switch to MS-DOS or simply disappear into the void. It takes money to produce major products, money for advertising, for people who answer phones, for shipping boxes. Even people whose hearts are devoted to CP/M can't ignore the bottom line.

THE CP/M CONTINGENT SHRIVELS

That leaves the KUGs and other CP/M user groups, which are now the court of last resort for many people. But even the user groups, which have always been one of CP/M's great strengths, are beginning to disappear. Almost all CP/M-oriented user groups are suffering from declining attendance as their members move to MS-DOS (many because they now use MS-DOS at work). Some groups try to stay afloat by opening an MS-DOS section, which looks like a good idea in the short run but always turns out to be a disaster. The sheer size of MS-DOS and its ceaseless flood of new hardware and software simply swamps the CP/M contingent. It's hard to raise your hand with a question about using the [Z] option of PIP when everyone else is talking about multi-tasking operating systems and displays with 16 million colors.

What's worse, the CP/M user groups are steadily losing their experts. To be successful, every user group needs some experts—experienced, knowledgeable users, not necessarily computer professionals—to answer questions and provide advice. Over the past two years, most of these CP/M experts have moved on to other computers and other operating systems, sometimes out of commercial necessity but often simply because they're the kind of people who like to explore new things (that's how they got to be experts in the first place). And, unfortunately, very few of the remaining CP/M users are moving up to take their places as the new experts.

YOU'RE ON YOUR OWN—ALMOST

In other words, you and your CP/M Kaypro are going to be increasingly on your own. Not entirely on your own—

As time goes on, it will be up to you to know where to get parts, repairs, and answers.

Kaypro still has parts for its CP/M computers, *PROFILES* will still come out every month with CP/M articles and ads, MicroPro will continue to sell the CP/M edition of WordStar 4.0, and somewhere some unreconstructed hacker will be sitting at the kitchen table, writing CP/M code. But more and more, as time goes on, it's going to be up to you to know where to get parts, where to get repairs, where to get answers. A quick trip through the Yellow Pages isn't going to be the solution any more.

And that's what these next few columns are going to be about—the tricks, traps, and secret sources you need to keep your Kaypro alive. Call it the CP/M user's guide to survival in an MS-DOS world. But before you begin stocking your cupboards with disk drives and spare keyboards, take a minute to think about this question: How far do you plan to go with your CP/M Kaypro? Or, to put it another way, when does it make sense to switch to MS-DOS instead?

THREE CHOICES

As far as I can see, CP/M users have three choices. First, you can settle the whole issue simply by switching to an MS-DOS computer as soon as finances permit. This choice makes a lot of sense if you're running into CP/M-MS-DOS compatibility problems. If people at work are grumbling because you can't produce Lotus 1-2-3 files or Microsoft Word files, or worse yet, if you can't run a program you want because it's only available in MS-DOS, then the time has come. This choice also makes sense if you've got the itch for

something new (a perfectly valid reason, as far as I'm concerned). In either case, give your CP/M Kaypro to someone who can use it and start shopping.

Second, if you don't feel any immediate pressure to switch to MS-DOS, you can simply run your Kaypro until it dies or needs expensive repairs, which could be a long time. Most writers, for example, still submit their work in the form of printed manuscripts. It doesn't matter what word processor or operating system a writer used—all that matters is having the right words on the paper. In this and similar cases, you can use your Kaypro as long as it works well and then, when it starts to cost you money, retire it and move on to MS-DOS (or whatever is king at the time). All you need to worry about is transferring your data from your old system to your new one (something I'll talk about in the coming months).

Third, you can decide you're going to keep your Kaypro running on into the 21st century, if you're willing to back up the decision with some money and time. This choice is really almost a matter of personality. Maybe you still have painful memories of learning CP/M and WordStar, and you can't face the idea of learning yet another set of software. Maybe you positively like CP/M—you feel comfortable with its familiar commands and admire its frugal elegance. Or maybe you're the sort who'd rather refinish a walnut table or rebuild the engine of a classic Chevy than buy something new. In any case, if you decide you really do want to keep your Kaypro alive for the next 15 years, you probably can, if you're prepared.

If you decide, for whatever reason, that you want to keep your Kaypro running for a while yet, then stick around. Here are some of the things I'll be covering in the next few months: wear and tear on your computer and what you can do about it, how to avoid being locked out of the MS-DOS world while using a CP/M computer, where to find replacement parts and supplies, where to get CP/M software when you need it, and how to stay in touch with other CP/M users to share what you know and contribute to CP/M's great oral tradition. ■

NETWORKS: A REAL LIFE SOLUTION

BY MARSHALL L. MOSELEY

Networking—what a concept. A local area network (LAN) is a series of computers connected to each other via special cables and expansion boards. Once connected, computers in a network can exchange data, access the same files, and run each other's programs. In the business environment networks boost productivity by providing a central source for data and programs while still allowing desktop computers to do most of the information processing.

In 1986, Kaypro Corporation decided to create a special department to market and support networking products. Since that time the networking department has proven itself by providing high-quality networking products to Kaypro's customers.

THE HARDWARE

There are four components to each networking system sold by Kaypro: the network operating system, the computers themselves, the network interface card, and the communication media (cables connecting the computers).

The network operating system sold by Kaypro is Advanced Netware, by Novell Incorporated of Orem, Utah. Kaypro distributes the entire Netware line, including a special version of the operating system designed specifically for 80286-based computers. Novell is the acknowledged market leader in networking and the recipient of numerous awards for its products.

Kaypro's desktop PCs—the 386, 286, 286i, PC, and PC-30—adhere very closely to the IBM PC standard. As a result they work quite well with Novell's operating system. The Kaypro 386, 286, and 286i are very fast and are usually configured as network fileservers. (A file server is the central computer that contains all the network files and controls access to those files.) The Kaypro PC and PC-30 are often used as individual workstations. In fact, because some workstation users need only the files available on the file server, Kaypro sells a special network version PC without any disk drives.

The two types of communication media available are co-axial cables and twisted-pair (telephone) wiring. Co-axial cables are made of a rubber-coated metal sheath enclosing an insulated wire core. They provide minimal signal loss and fast data transfers. Twisted-pair wiring is less expensive than co-axial cables, but when a lot of it is used the signals being transmitted degrade markedly.

KAYPRO NETWORKING

Rick Bartlett is the product manager for Kaypro's networking department. He is responsible for selecting the products used in networking systems and for seeing that all network customers are satisfied with their purchases. He also coordinates and teaches network training classes for Kaypro dealers.

Bartlett is very enthusiastic about Kaypro's networking department. He sees it as different from other network services because Kaypro's customers receive personal, on-the-spot service, while still getting all the advantages of buying from a large corporation.

"We provide individual training to all our network dealers, and those classes are *tough*. No dealer is certified to sell network equipment unless he or she completely understands both the hardware and software. They are taught how to analyze a customer's needs so they can recommend the best networking solutions. Each dealer is also trained in how to diagnose and solve all kinds of problems. So when they go back to their dealerships, they can provide the kind of personal service that Kaypro customers want.

"But when problems do arise that are outside the scope of a local dealer, Kaypro is there. Replacement parts are available quickly, for example—often overnight. Also, if a customer finds that their dealer is overburdened Kaypro can arrange for another dealer in the area to supply service.

"In 1987 we did over a million dollars in network business with only 400 certified dealers. Now, with that number approaching 600, we expect 1988 to be a very good year."

In the past three years LANs have grown from unreliable patchwork systems to corporate workhorses. Along the way Kaypro has been there. ■

CONTINUED FROM PAGE 59

high-density distribution diskettes, thus eliminating the risk to your investment in case of disk failure. Microsoft even provides a return form in the Excel package that lets you take advantage of the company's 30-day money-back guarantee policy if you're not completely satisfied with the program.

Microsoft seems to have strengthened its telephone support policies recently. I remember having problems with a DOS function a couple of years ago and running into a brick wall upon trying to contact the company for technical support. When I made calls concerning Excel, without revealing my role as a product reviewer, I got immediate responses from three separate technicians. Telephone support is available Monday thru Friday, 6 a.m. to 6 p.m., Pacific time. You pay for the call, but the response time and availability of knowledgeable staff compensates somewhat for Microsoft's lack of a toll-free support line.

SUMMARY

Excel represents a new state of the art in PC spreadsheets. If you already have or can afford the hardware Excel demands, and you need every ounce of power a spreadsheet can provide, this is the program to buy. I only hope more programs are forthcoming that offer similar breakthroughs in other areas—word processing, database management, telecommunications, and the like—for I have glimpsed the future, and the view looks *Excel*lent. ■

SCORECARD

FEATURES: Excellent
PERFORMANCE: Excellent
DOCUMENTATION: Very Good
EASE OF USE: Excellent
SUPPORT: Very Good

QUICK REFERENCE SUMMARY

Product: Microsoft Excel 2.0
Manufacturer: Microsoft Corporation
16011 NE 36th Way
Box 97017
Redmond, WA 98073-9717
Phone: (206) 882-8088
Sugg. List Price: $495

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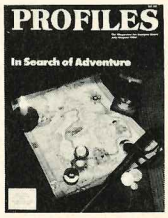

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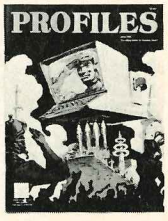

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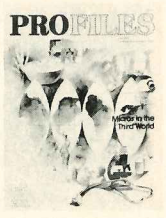

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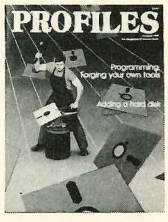

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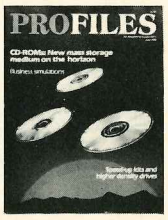

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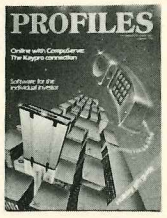

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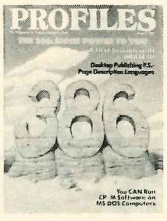

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- *You can* run CP/M software on MS-DOS computers
- Kaypro's newest computer – The 386

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KAYPRO PRODUCT SPOTLIGHT

CLIP AND SAVE

Here, we begin a monthly "spotlight" feature of Kaypro products. Each month, we will provide specifications (memory, video, software bundle, disk drives, keyboard, etc.) and price of a different Kaypro product. These "spotlights" will give you all the information you need to know about current and future Kaypro products, and can be clipped for future reference. Our first installment features part I of a price listing of computers and accessories available at press time (March 1988). **For more information on any Kaypro product, see your local Kaypro dealer or call 1-800-4-KAYPRO.**

COMPUTERS

Model	Sugg. Retail Price
PC	1,595
PC/30 (30 MB)	1,695
PC-286	2,995
286i MODEL A	1,895
286i MODEL C	2,795
386 MODEL A	3,995
386 MODEL E-40 (40 MB)	5,795
386 MODEL E-130 (130 MB)	8,095
386 MODEL N-150 (150 MB, Novell file server)	8,795
2000+	2,795

SYSTEMS

Model	Sugg. Retail Price
EXTRA! EXTRA! Desktop Publishing*	
DTP-A (286)	$4,603
DTP-B (286)	5,885
DTP-A (PC/30)	3,395
DTP-B (PC/30)	4,795
Upgrade Kit	1,549

Network Products

Netware SFT-I	$2,895
Netware 286	2,195
Netware 86Q	920
Arcnet Card	259
Active Hub (8 port)	695
Passive Hub (4 port)	65
Network Starter Kit (Netware 86Q/2 Arcnet cards)	1,395
PC-Diskless Workstation	999
Arcnet Boot ROM	50

*DTP-A includes: Computer, software, ½ card EGA multi-video, mouse, and monochrome monitor.
DTP-B includes: Computer, software, full page monitor, and mouse.
Software: Ventura Publisher 1.1, Gem Desktop, Gem Draw Plus, Gem Paint, WordStar Professional 4.0, Word Finder (Thesaurus), MS-DOS, GW-BASIC, and MasMenu.

MONITORS

Model	Sugg. Retail Price
Monochrome monitor	$ 145
XTRON Dual Mode (Amber)	99
XTRON Dual Mode (Green)	99
EGA Color Monitor (14" diagonal, non-glare screen with tilt and swivel base.)	575
RGB Color Monitor (12" diagonal, non-glare screen with tilt and swivel base.)	425
Full Page Monitor with Adaptor	1,795

DISKETTE DRIVES

Model	Sugg. Retail Price
1.2 MB (5.25") Diskette drive (286/386) A half-height floppy drive for use in all 286 and 386 systems.	$ 195
360K (5.25") Diskette Drive (PC)	145
720K (3.5") Disk Drive Kit This drive is useful when there is a need to exchange data with portable computers such as the Kaypro 2000+.	169

FIXED DISK DRIVES

Model	Sugg. Retail Price
40 MB Hard Disk Drive Kit (286)	$ 939
30 MB Hard Disk Drive Kit with RLL Controller (PC)	539
133 MB Hard Disk Drive Kit (386)	3,395
40 MB Hard Disk Drive Kit (386)	1,039
80 MB Hard Disk Drive Kit (386)	1,535

TAPE DRIVES

Model	Sugg. Retail Price
60 MB Internal Tape Drive Kit (286/386) A ¼-inch streaming tape drive that comes complete with controller, cable, software, and manual. Has transfer rate of 90KB/second and is compatible with Novell Netware.	$ 925
60 MB External Tape Drive Kit (286/386) Same specifications as internal tape drive, but comes in a case that allows the drive to be kept external from computer.	925

CABLES

Model	Sugg. Retail Price
Parallel printer cable (8 bit)	$49.95
Serial modem cable (16 bit)	49.95
Parallel printer cable (16 bit)	49.95
Serial RS-232 (286/PC)	49.95
External anchor modem cable	19.95

CLIP AND SAVE

EDITED BY K.A. CARRIGAN

The following new product listings are not reviews and should not be considered endorsements. To be considered for publication in this column, press releases should be sent to K.A. Carrigan, "New Products" Editor, c/o *PROFILES* Magazine, 533 Stevens Ave., Solana Beach, CA 92075. Releases must state prices and the operating systems the products support. Include photos if available.

DESKTOP PUBLISHING DESIGN COURSE
Introduction to Design for Desktop Publishing *is a step-by-step course on desktop publishing design principles. No specific computer system is assumed and it does not require previous graphic arts experience.*

This audio-directed course consists of eight lessons of one to two hours. It covers the basics—from planning a publication grid to effective use of laser fonts. Illustrations and printing considerations are also discussed.

Individual lessons teach you how to design newsletters, manuals, reports, catalogs, ads, brochures, magazines, newspapers, and more.

$295. FlipTrack Learning Systems, 999 Main St., Glen Ellyn, IL 60137; 800-222-FLIP.

Buyer's Hotline #550-49

DOS TUTORIAL PROGRAM
HELPME with DOS is a shareware DOS tutorial program that serves as a reference guide for users at all levels.

The program offers immediate access to definitions, applications, and variations, plus examples of over 40 DOS commands and error messages.

It is available on selected electronic bulletin boards or directly from P & B Computer Services.

$10. Kaypro MS-DOS and IBM compatible computers. P & B Computer Services, Inc., P.O. Box 70531, Bellevue, WA 98007; (206) 641-7390.

Buyer's Hotline #553-49

FIND FRACTURED FILES FOR FREE
dCHECK is a file-checking tool that can spot corrupted data in dBASE III and compatible data files before you back it up.

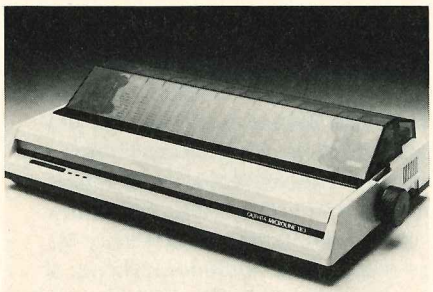
The program automatically checks DBF files for virtually any type of damage, including bad or missing headers, offset data, embedded end-of-file markers, and cross-linking.

dCHECK is designed to be run at the DOS prompt or included in a batch file. It can be used with all popular backup programs and procedures.

Free. Kaypro MS-DOS and IBM compatible computers. Irwin Ink, 5095 Murphy Canyon Rd., Ste. 200, San Diego, CA 92123; (619) 277-1973.

Buyer's Hotline #555-49

WIDE-CARRIAGE PERSONAL PRINTER
The Microline 183 is a high-speed, near letter-quality, wide-carriage printer that accommodates spreadsheets and oversized documents.



The printer uses a standard pull tractor and a friction-feed platen. It offers speeds of 120 charcters per second (cps) in utility mode, 60 cps in emphasized and enhanced modes, and 30 cps in near letter-quality mode.

A variety of print style options are available. It also can produce double-density, bit-image graphics, enabling users to develop custom characters, illustrations, and graphs with up to 144 x 144 dots-per-inch resolution.

The Microline 183 weighs 13.2 pounds, is five inches high, and occupies a 20.5 x 10.6-inch footprint.

$399. All Kaypro computers and IBM compatibles. Okidata, 532 Fellowship Rd., Mount Laurel, NJ 08054; (609) 235-2600.

Buyer's Hotline #557-49

DATA COMMUNICATIONS CATALOG
The Winter edition of the 1988 Black Box Catalog offers hard-to-find data communications and computer devices.

Included in the 154-page catalog are 36 new products, a wide selection of cables and switches, half-card Fiber Optic PC boards, and a pocket-sized Tote-A-Modem.

Free. Black Box Catalog, P.O. Box 12800, Pittsburgh, PA, 15241; (412) 746-5500.

Buyer's Hotline #552-49

UNIVERSAL PRINTER RIBBON

The Super Hy-Type Universal Ribbon is a multi-strike, black-film ribbon that delivers up to 400,000 impressions per cartridge and is compatible with 766 daisy- wheel printers, including Xerox, Diablo, Juki, Wang, DEC, Dataproducts, and C. Itoh.

The ribbon has fewer working parts than earlier Xerox ribbons and also features a new wrap drive that reduces torque by 60 percent.

Special ink coating eliminates impression voids and yields a sharper contrast between paper and print. An end-of-ribbon sensor signals when a ribbon change is needed.

$7.16. C. Dunlop, Xerox Corporation, Xerox Square, Rochester, NY 14644; (800) 822-2200.

Buyer's Hotline #559-49

ROTATE SPREADSHEETS

VERTIGO is a product that rotates spreadsheets, flow charts, financial documents, and reports 90 degrees and prints them sideways from virtually any graphics printer.

The user can specify the number of characters per inch (from 1 to 27) and lines per inch and select from 12 image-enhancing fonts.

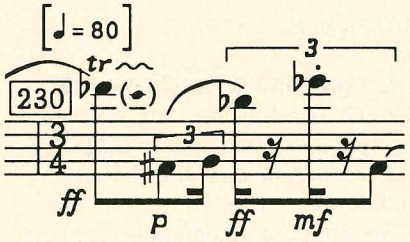
VERTIGO is compatible with most spreadsheet applications, including LOTUS 1-2-3, Symphony, and Multiplan. The product will drive most dot matrix, laser, or inkjet printers and will print the entire IBM character set.

$49.95. Kaypro MS-DOS and IBM compatible computers. Jewell Technologies, 4740 44th Ave. S.W. #203, Seattle, WA 98116; (800) 628-2828.

Buyer's Hotline #556-49

DESKTOP MUSIC PUBLISHING

SCORE is a computerized music printing system that creates and stores camera-ready sheet music.



The program provides complete control over placement, size, shape, spacing, and output resolution of printed music notation. It contains a complete inventory of dynamic, accent, articulation, pedal, octave, and other markings. Its drawing program lets the user design new symbol and font libraries.

Editing can be done with a mouse or keyboard. An entire page of music can be viewed at once, or the user can zoom down to individual objects for precise editing.

$795. Kaypro MS-DOS and IBM compatible computers. Passport Designs, Inc., 625 Miramontes St., Half Moon Bay, CA 94019; (415) 726-0280.

Buyer's Hotline #558-49

COMPUTER MAINTENANCE

PC Care Manual: Diagnosing and Maintaining Your MS-DOS, CP/M or Macintosh System *is a book that provides the tools computer users need to diagnose malfunctions, make repairs, and perform tests on their machines.*

No special skills are necessary to use this book. It includes a listing of programs that help diagnose the problem and also confirm that the system is working properly after repairs.

The diagnostic program modules enable readers to troubleshoot the keyboard, monitor, printer, disk drive, and modem.

$16.60 paperback, $24.95 hardback. Tab Books, P.O. Box 40, Blue Ridge Summit, PA 17214; (717) 794-2191.

Buyer's Hotline #560-49

CUSTOMER MANAGEMENT

Client Master is a pre-programmed application designed to increase a business person's organization, efficiency and output.

The program includes an autodialer, a standard database for extensive client information, search criteria that can be customized, and a mini word processor to write letters that can then be merged for a selective mass mailing.

The product also prints 3 x 5-inch index cards, mailing labels, and business envelopes on a full range of printers. Client Master exports data to either ASCII-delimited or DBF file formats.

$149. Kaypro MS-DOS and IBM compatible computers. Computer Masters Software, 6505 Sepulveda Blvd., Los Angeles, CA 90045; (213) 645-6530.

Buyers Hotline #551-49

RAM RESIDENT PRINTER CONTROL

PrintIT plus is a RAM resident program that sends control codes directly to your printer, no matter what program you happen to be using.

Once PrintIT has been run pressing Alt-Left shift brings up the PrintIT control menu. From there you can send your printer the codes for bold-facing, underlining, italics, form-feed, line-feed and more. PrintIT comes with drivers for most popular printers.

$39.95. Kaypro MS-DOS and IBM compatible computers. Computer Aided Business Solutions, 17000 South Golden Rd., Golden, CO 80401; (303) 279-1868.

Buyer's Hotline #563-49

DRAW ORGANIZATION CHARTS

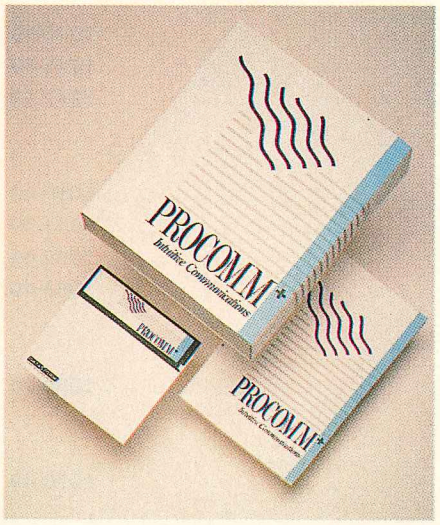
TERRIFIC! Organization ChartMaker, version 2.5 is a program for drawing business organization charts.

The product features on-screen chart construction allowing the user to see how the chart will look on paper before printing. LaserJet and dot matrix printers produce the best charts, but any printer will work.

Users draw charts free-form on the screen. The program handles text centering, box drawing and features an automated Make Pretty function that cleans up the chart.

$59.95. Kaypro MS-DOS and IBM compatible computers. KD Systems, Inc., P.O. Box 97024, Raleigh, NC 27624; (919) 847-8838.

Buyer's Hotline #562-49



COMMUNICATIONS SOFTWARE PACKAGE
PROCOMM PLUS is a full-featured stand-alone communications software program.

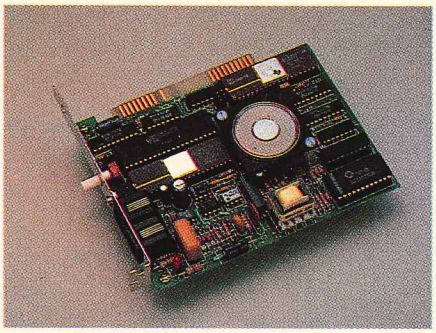
Features include 12 error correcting file transfer protocols with two designed to accommodate high-speed error correcting modems; 16 popular asynchronous terminal emulations; a fully automated dialing directory; and ASPECT, a powerful script command language.

The new program also includes context sensitive help, keyboard re-mapping, Record (Learn) Mode, and Host Mode for remote access.

$75. Kaypro MS-DOS and IBM compatible computers. Datastorm Technologies, Inc., 1621 Towne Dr., Ste. G, Columbia, MO, 65202; (314) 474-8461.

Buyer's Hotline #564-49

MODEM PLUS PROCOMM
The Zoom/Modem HC 2400 is a 2400/1200/300 bps full-duplex, Hayes-compatible half-card modem.



It features four COM ports, adaptive equalization, an audio output jack for connection of an optional external speaker, and a high-speed UART bus interface.

Additional features of the modem include dial tone detection, auto-dial/auto-answer, an onboard speaker with volume control, a second jack for a local phone, and onboard power-up and analog loopback diagnostics.

The communications program ProComm is included with purchase.

$169. Kaypro MS-DOS and IBM compatible computers. Zoom Telephonics, Inc., 207 South St., Boston, MA 02111; (800) 631-3116.

Buyer's Hotline #554-49

PRODUCT UPDATES

Checks & Balances version 4.1, a program that balances checkbooks and tracks income, cost of goods, and expenses by user-defined categories, now contains a new, expanded manual. It also includes 128 account categories (96 for CP/M) and a tax flag to indicate tax-related and non-tax-related entries. Data files can be transferred between CP/M and MS-DOS computers. CDE Software, Los Angeles, CA. ☐ **Ellie 1.1**, an English-to-dBASE translator, is now being shipped with advanced memory management utilities, MARK and RELEASE. The memory-resident program can be loaded or removed from RAM with a few keystrokes. A memory-resident technique allows peaceful coexistence with other popular resident utilities. ELF Software, New York, NY. ☐ **Back-It**, a hard-disk backup program, is now available in version 3.0. The new release can fill a 360K floppy disk in 17-18 seconds and locks out bad sectors of the diskette before writing to it. Gazelle Systems, Provo, UT. ☐ **Sideways** Version 3.2, a Lotus 1-2-3 add-in utility that prints reports sideways, now can be accessed without exiting from 1-2-3. Funk Software, Inc., Cambridge, MA. ☐ The Electronic Bulletin Board System program **WILDCAT!**, version 1.1, now offers support for additional file transfer protocols. It also includes a Live Program option that allows the product to run applications from outside the program code via menu selections. Mustang Software, Bakersfield, CA. ☐ **Integrated Accounting**, version 3.2, now includes the revised Federal Withholding formulas for FIT, FICA, and FUTA, and updated SIT, SUTA, and SDI formulas. Integrated Accounting is a program that integrates general ledger, payables, receivables, payroll, inventory, and job cost on one disk. Bedford Software Corp., Redmond, WA. ☐ **Word for Word**, version 3.0, a document conversion utility, has expanded capabilities for five new formats. Supported formats include: WordStar 4.0, Microsoft Word 4.0, PFS: First Choice 2.0, XyWrite III, and MultiMate Advantage II. The new version also includes global directory support and expanded bi-directional document conversions for 26 formats. MASTERSOFT, Phoenix, AZ.

ADVERTISER'S INDEX

How to Use the Buyer's Hotline

Here's how it works: Each product manufacturer or distributor will have a Hotline number. This month the numbers are listed next to the page number in the Advertiser's Index. In future months, the number will also be listed within the ad itself or the Quick Reference Summary at the end of each article. Make a note of which products (and the corresponding Hotline number) you would like more information about. Then simply call our toll-free Buyer's Hotline number (1-800-4KAYPRO). Give the operator the information she requests, and that's it!

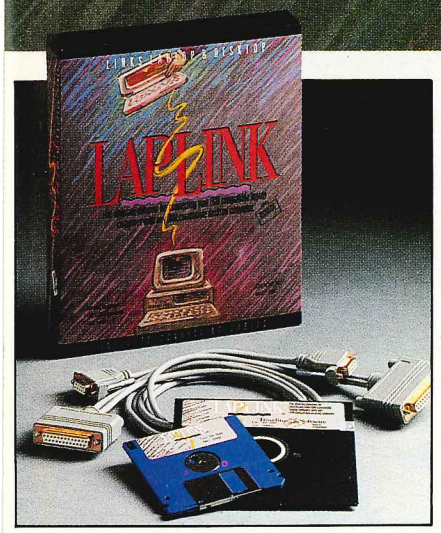
Weekly reports of our readers' product information requests will be forwarded to the manufacturers and distributors, so that you can get the information quickly... and be able to make an informed buying decision within your own time frame. We sincerely hope that this service will be of great value to all of our readers.

Listed below are the companies and Hotline numbers for those products mentioned in our editorial features this month.

Product	Hotline #
Spreadsheets: The Next Generation	
Windows Excel	1010-49
Quattro	1011-49
Lucid 3-D	1012-49
Overcoming the Language Barrier	
DaynaFile	1020-49
DeskTop Express	1021-49
The Graphics Link	1022-49
Hercules Graphics Card Plus	1023-49
Hijaak	1024-49
Lotus Express	1025-49
MatchMaker	1026-49
PC MacBridge, PC MacTxt, TangentShare	1027-49
MacChuck	1028-49
MacLink Plus	1029-49
QuickShare	1030-49
TOPS Macintosh, TOPS DOS 2.0, TOPS FlashCard	1031-49
xFer 2.0 (for CP/M)	1032-49
Print Spoolers	
DUET	1040-49
PrintQ	1041-49
Backgrounder ii (for CP/M)	1042-49
File Recovery Utilities	
Norton Utilities, v.4.0	1050-49
PC Tools Deluxe, v.4.2	1051-49
Mace Utilities, v.4.10	1052-49
SafetyNet, v.1.4	1053-49
Desktop Publisher	
The Genius	1060-49
Editor's Choice	
Turbo Pascal 4.0	1070-49
At a Glance	
Microsoft Excel 2.0	1080-49

LAPLINK

BEST OF '87 — SELECTED AS BEST OF '87 PC MAGAZINE JANUARY 1988



The Ultimate Laptop and PS/2 Connection

They are still talking about LAP-LINK release #1. It has achieved virtually an unanimous editor's choice as THE solution for connecting Laptop PC's and the new IBM PS/2 series with any $5^1/_4$ inch disk PC. LAP-LINK eliminates the need to purchase expensive external disk drives. Even if you own an external disk drive, LAP-LINK's incredible transfer speeds are much faster than a normal disk copy— transfer megabytes of information in just minutes! And since LAP-LINK weighs only ten ounces (cable and disk), you can easily carry it with you for instant connectivity at any location.

Unlike other transfer programs, there is absolutely NO installation required to use LAP-LINK. No messy changes to your CONFIG.SYS file or rebooting. Just type "LL" and LAP-LINK automatically connects itself. And LAP-LINK works between any version 2.xx or 3.xx of the MS-DOS/PC-DOS operating system.

LAP-LINK users couldn't agree more with Jerry Pournelle, "I don't know if the manual is any good or not: I've never had any reason to open it. LAP-LINK is so thoroughly intuitive, fast and simple to use that the manual is blooming near superfluous. This is one of those products that sets standards: it does what it's supposed to do, does it well, and does it without fuss or bother...."

Release 2 is now available at your local computer store. Get a jump on your friends, and check it out before everyone starts talking about it. **Call for FREE Laptop accessory catalog 1-800-343-8080 or 206-483-8088.**

RELEASE 2 FEATURES

- Transfer speeds over 115,200 baud
- Turbo option increases speed up to 50%
- Unique split window file selection
- Includes file tagging, XTREE disk management and directory sorting
- Can be used for hard disk backup to $3^1/_2$" floppies
- Supports all IBM PS/2 computers
- Includes both $3^1/_2$" and $5^1/_4$" disks with unique universal "4 headed" cable.
- **Still Only $129.95 including cable**

Rave Reviews

PC MAGAZINE EDITORS' CHOICE

"Traveling Software's LAP-LINK is the most convenient transfer product...it does not require changes to the CONFIG.SYS or AUTOEXEC.BAT files on either machine as the Brooklyn Bridge does...LAP-LINK transfers data even faster than the Brooklyn Bridge. It seemingly sets a record for the fastest transfer on a PC."

Howard Marks
PC Magazine — July 21,1987

"LAP-LINK IS NOTHING SHORT OF INCREDIBLE..."

Jerry Pournelle
Byte Magazine — July 1987

Traveling Software

TRAVELING SOFTWARE®

Circle 2 on Reader Service card.

ACCOUNTING FOR MICROS

$395 Set of Four
$325 Set of Three
$465 Set of Five

ACCOUNTING FOR MICROS is a set of integrated accounting programs which meet professional standards. They're fast and easy to use, with complete instructions. Our manual (shown above) also includes helpful information on bookkeeping and computers.

GENERAL LEDGER $125
Allows up to 1,000 accounts & 1,000 transactions/month. Retains mo/end balances for Last year, This Year and Forecast. Includes Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summaries and Journal Reports.

ACCOUNTS RECEIVABLE $125
Allows up to 2,500 customers and 1,000 invoices per month. Invoicing can access Inventory Module. Keeps customer names and addresses. Invoice prints on plain paper or any pre-printed form. Statements can be printed at any time.

INVENTORY $125
Allows up to 4,000 parts. Keeps 3 month history of unit sales as well as year to date. With AR, can be used as point of sale system (prints invoices, handles cash). Reports include Inventory Value and Stock Report, Internal and Customer Price List.

ACCOUNTS PAYABLE $125
Allows up to 500 vendors and 600 invoices/mo. Records invoices and handwritten checks. Prints computer checks on any pre-printed form. Keeps vendor names and addresses.

PAYROLL $125
Will handle up to 100 employees with eight deductions per employee. Deductions may be determined as fixed dollar amounts or percentages, or referred to a table for automatic look-up. Tax tables are easily entered, or purchased separately. Prints checks and W2's.

SET OF FIVE $465
SET OF FOUR $395
SET OF THREE $325

RUN ON MOST CPM AND MSDOS

Apple CPM	*IBM PC,XT,PC jr,AT*	*Sanyo (all)*
Columbia	*Kaypro (all)*	*Tandy (all)*
Compaq	*Morrow (all)*	*TeleVideo*
Corona	*Osborne (all)*	*Zenith 100 & 150*
Eagle (all)	*Panasonic*	*8" CPM*
Epson QX-10	*Radio Shack CPM*	*Other compatibles*

DEMO DISK $18.00

Try all 5 programs above (GL, AR, AP, IN, PR). Order our DEMO DISK for $18.00 (includes shipping). Condensed versions of the programs give you the "feel" of data entry and access. Includes sample reports and instructions. Specify machine.

TMAN $125
The "Catch-All" program. Files any type of information for quick access. Name or subject oriented with 15 lines of notes per name. Use TMAN as a mailing list, filing system, notebook, etc. Can be used alone or with data from our other programs.
Try ***TMAN DEMO $16***

HOW TO ORDER: Please specify machine and disk format. You can pay by check, by VISA or MasterCard (we need your expiration date and card number), or by UPS COD (add $2.50 COD charge). Our price includes shipping. Minnesota residents, add 6% sales tax). We ship most orders the same day.

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