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THE ORIGINAL MAGAZINE FOR
TRS-80™ OWNERS

H&E COMPUTRONICS INC.



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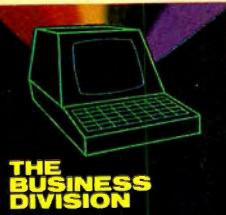
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BITS AND PIECES

Howard Y. Gosman

ON THE COVER

When the OSBORNE 1 portable computer was first introduced, some skeptics said that no one would ever take a small portable computer seriously. The skeptics were wrong! It turns out that a small, truly portable computer is exactly what many people want. It was instantly obvious that there was a huge market for powerful portable computers — and many other manufacturers are rushing to get into the act. These computers are definitely *not* toys. Their manufacturers have taken great pains to make sure that their machines are powerful, fully equipped with the latest features, and able to compete directly with desktop microcomputers. Among the portable computers available, one of the best is a very successful OSBORNE "look alike" called the KAYPRO II, and there is even a "repackaged" portable version of the IBM PC, made by a third party

manufacturer and using the IBM's keyboard.

In the programming department at H & E Computronics, we have been quite concerned with making our own software available on many different computers, and we now are transferring all of our own software packages to our own OSBORNE. Everyone who has seen it or used it is very enthusiastic about this computer. There are many good features that make this machine a highly competitive computer: the full size keyboard is excellent for high speed touch typing; the screen, although small, is very clear and legible; and the fact that this computer runs CP/M has made program transfers very easy for us. We feel that there is a fantastic future for "briefcase computers".

Unfortunately, our favorite manufacturer has not introduced a portable computer. Although Radio Shack has

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The purpose of the *H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is to provide and exchange information related to the care, use, and application of the TRS-80™ computer systems. H & E COMPUTRONICS, Inc. does not take any financial responsibility for errors in published materials. Users are advised to check and edit vital programs carefully.

The *H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* encourages comments, questions, and suggestions. H & E COMPUTRONICS will pay contributors for articles and programs published in the magazine.

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THE CRYSTAL BALL

News and Rumors of Interest to TRS-80 OWNERS

MICROSOFT DUMPS THE TRS-80

We had a big surprise recently when we tried to replenish our inventory by placing an order for TRS-80 software from Microsoft. We could hardly believe it, but we were informed that once their present low supplies run out, there will be no more TRS-80 Model I/III software available from Microsoft.

This is something of a shock. The TRS-80 made Microsoft what it is today (or is it the other way around?), and it's hard to conceive of why they would dump the very computer that made them famous. When the TRS-80 was first introduced, there were no notable microcomputer software companies. Along with the original TRSDOS came the first good microcomputer BASIC, written by Microsoft. The rest is history. They must have been making money, with all those TRS-80's out there. Microsoft wrote improved versions of BASIC, developed a great deal of good utility and applications software, and rapidly became a household word among TRS-80 enthusiasts. Microsoft even started the Adventure craze with the first and only adaptation of the original mainframe Adventure (written for a DEC PDP-11). As the Apple gained popularity, they started providing some software for it as well.

With the introduction of the IBM PC, Microsoft saw its chance to get a cut of IBM's action. Microsoft's MS-DOS operating system for the IBM PC is considered by many to be the best operating system available for the IBM, very similar to IBMDOS, but more powerful and versatile than either IBMDOS or CP/M-86 (also for the IBM). Perhaps here lies a clue to Microsoft's current course-change. With a really good applications package, you may be able to nearly control the market for that particular type of software, but the package will still only sell to those computer owners who need that particular application. Those owners may be a rather small percentage of all computer owners. But when you sell a very successful version of a higher-level

language like BASIC, or if you sell an operating system that is acknowledged by most of the industry to be the best available system for a certain machine, you will successfully sell to nearly all owners of that particular machine. It's possible that Microsoft plans to concentrate on systems software, developing operating systems and higher languages, perhaps in cooperation with computer manufacturers who can make Microsoft products standard equipment with their machines.

Microsoft has shown even more interest recently in making money off of the IBM PC. There is one rumor afoot that they want to buy PC Magazine.

But it's still hard to understand how Microsoft could turn its back on the TRS-80. It seems like they're biting the hand that feeds them. Well, here's some more speculation: Radio Shack, as mentioned last month, has just liberalized its relationship with third-party software developers. Radio Shack now wants to help outside developers in several ways. Radio Shack has finally seen the light, and like IBM, has realized that extensive outside support is needed to keep the TRS-80 a viable competitor in the present micro market. Previously unavailable information, like the source code for TRSDOS, is now to be made available to program authors. Licenses are now available for outside developers so that TRSDOS may be duplicated and provided on diskette along with applications packages. Software authors are invited to submit their programs for Radio Shack's evaluation and approval. All approved software may be included in a software guide to be published by Radio Shack. And, finally, if Radio Shack is really impressed with a particular company, they may contract to become the exclusive distributor of that company's programs for the TRS-80 line.

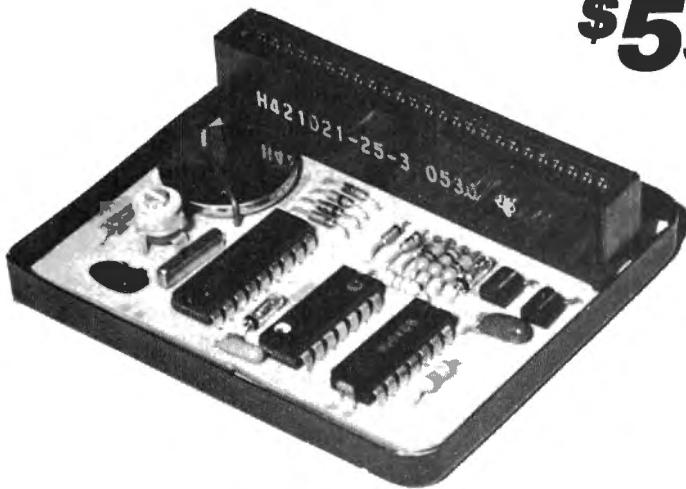
Is this perhaps what has happened with Microsoft? Can we expect to see Microsoft's software appearing on the

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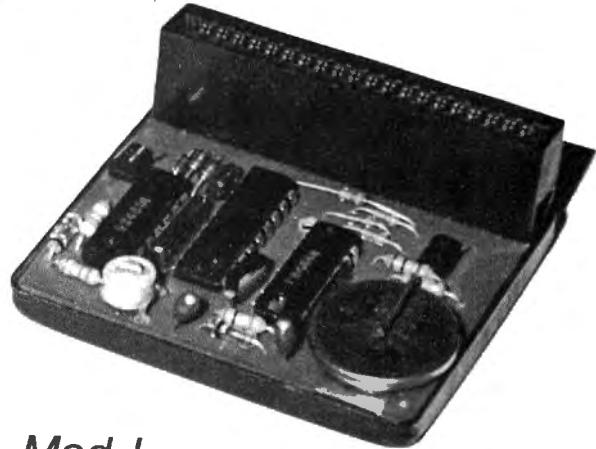
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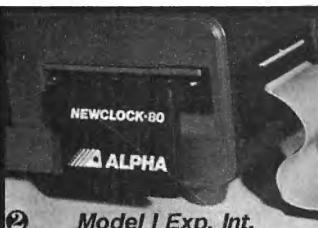
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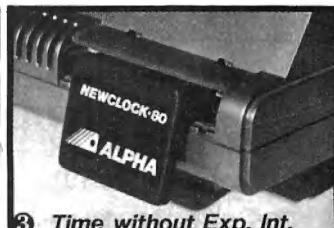
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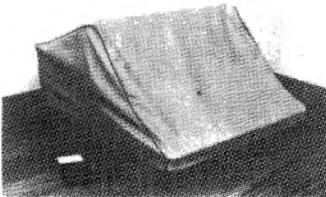
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THE CRYSTAL BALL

continued from page 4

shelves of Radio Shack Computer Centers, packaged in Radio Shack binders? We don't know for sure. But here's one project that might be sponsored by Radio Shack: Microsoft is reportedly working on a Unix-type operating system for the Model 16 that will support three users. We'll be keeping our eyes open.

NEW RADIO SHACK COMPUTERS AND OTHER INDUSTRY NEWS

It seems that Radio Shack is planning to release a TRS-80 Model 12 and a TRS-80 Model IV.

The Model 12 will be an upgrade of the Model II, with the addition of a couple of new card slots and a nice white case like the Model 16. Dvorak says that "Tandy was having trouble selling the silver-painted TRS-80's to offices where there was a modicum of concern for aesthetics."

The Model IV will be an upgrade of the Model III. Look for a full 80-column display, and 128K RAM among other things on the new model.

Another big rumor is circulating regarding a possible merger that would have very far reaching consequences. AT&T may purchase or merge with Digital Equipment Corporation. If AT&T can add Digital's expertise in marketing and supporting high-powered micro and minicomputers to its own vast experience in large systems and networking, they'll quickly become the new giant in the industry. IBM, watch out!

IBM COMPATIBILITY

Very soon, most new microcomputers will have to meet a new criteria. They'll have to be at least somewhat compatible with the IBM PC. Several PC imitators have appeared recently, as well as specially-redesigned versions using real IBM components. These special PC's include at least two portable models.

The IBM PC's instant rise to nearly the top of the market was predictable. And naturally a lot of people are ready to ride to success on the wave of enthusiasm for the PC. Makers of PC add-on equipment, especially

memory boards, are making a fortune. The most successful company, Tecmar, now has nearly 50 hardware products to enhance the PC. Everything comes cheaper than IBM's own add-on equipment, and there's a lot that's not available from IBM at any price.

Osborne will be jumping on the bandwagon, too. In January Osborne will introduce an upgraded OSBORNE 1 computer, which will be equipped with double-density disk drives. Can you guess whose disk format these drives will be compatible with? IBM's, of course.

Will Radio Shack participate? Can we expect a TRS-80 that is disk-compatible with the PC? It's quite likely. Even if Radio Shack ignores it, you can bet that someone will be on the job trying to do it with software.

STILL MORE COMPUTER MAKERS

Makers of TV's, stereos, watches and calculators are all getting into computers now. They are mainly jumping into the low end of the field, to provide competition for the VIC-20, the TRS-80 Color Computer, and other under-\$400 computers.

Sony, Timex, and Seiko (Epson), have all introduced small computers. The Timex/Sinclair ZX80/81 is the all-time cheapest computer, and their combined manufacturing and marketing expertise will soon be supporting the Spectrum 1000, a very powerful under-\$300 color computer, that will have fantastically low-priced peripherals, like an under-\$100 disk drive.

Seiko/Epson has a very impressive notebook-sized computer. This computer has been advertised on television and in mass-market magazines, and is presented as a replacement for a student's notebook. With a full-size keyboard, you really could take notes in class by touch typing. With an LCD display, micro-size printer, and cassette storage all built in, the Seiko computer makes an attractive package.

Sony put very distinctive touches into its SMC-70 personal computer, and their distribution network for their AV products will undoubtedly come in handy.

Make room for more: Casio, maker of watches and calculators, will introduce a personal computer for

only \$63, and Panasonic will introduce their personal computer in the under-\$300 range. ■

BITS AND PIECES

continued from page 2

created a very good portable computer terminal, it's not yet practical to pick up your TRS-80 in one hand and carry it to work with you on the bus.

But the marketing and design people at Radio Shack are pretty sharp, so we're sure that they are watching the competition very carefully, and taking lots of notes. With the mass movement toward powerful portable micros, we expect to see Radio Shack's portable TRS-80 become a reality sometime during 1983. And when it does appear, you can bet that it will be every bit as impressive as the other portables. And best of all, it will most likely be compatible in many ways with the other TRS-80's.

MODEL 16 OPERATING SYSTEM

A new frontier for TRS-80 people: 16 bits on the Model 16. Although not many people own Model 16's yet, we're all anxiously awaiting further news about the new "big brother" of the TRS-80 family. Owners of the new powerhouse have been somewhat disappointed to find that their machine's greatest capabilities all seem to lie in the future.

Well, the outside manufacturers have already started to move in on the Model 16. Ryan-McFarland Corp., creators of RM/COBOL, have released a 16-bit multitasking operating system that will run on the Model 16. RM/COS (Commercial Operating System) will take advantage of the more sophisticated features of the Model 16, allowing the connection and use of two of Radio Shack's DT-1 data terminals, so that three users can run programs on the system simultaneously. Of course, the operating system supports RM/COBOL on the Model 16. The complete Model 16 package, including the RM/COS operating system, RM/COBOL, runtime and sort-merge software will cost \$1500. If you're a Model 16 owner and you're interested in RM/COS and COBOL, contact Ryan McFarland

continued on page 8

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BITS AND PIECES

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The plans for this conversion cost \$15 and they include a complete bill of materials, tool and manufacturing lists, step-by-step instructions, illustrations, wiring diagrams and sheet-metal templates. A complete kit may be made available in the near future. For more information, contact L & E Electro Sales Co., 7017 Hazeltine Ave., Suite 10, Van Nuys, CA 91405; (213) 994-3110.

NEW EDUCATIONAL SOFTWARE

A new educational software series, MATH ON COMPUTERS, has been introduced by Quality Education Designs. The series includes ARITHMAGIC, FACTORING WHOLE NUMBERS, FRACTIONS, and DECIMALS.

These are completely interactive, self-paced tutoring programs that coax children to learn by making the learning fun. The programs use the computer as a tutor, reinforcer, and vehicle for expansion of learning through games and explorations. ARITHMAGIC consists of a set of programs designed for use at different stages of the math curriculum, and the other three packages are intended to be used together, in sequence. For more information, contact Quality Education Designs, P.O. Box 12486, Portland, Oregon 97212.

UCSD P-SYSTEM FOR TRS-80'S

The USCD p-System UOS, or Universal Operating System, has

been introduced for the TRS-80 Models II, III and 16. This operating system has gained fame because of the "portability" of programs written under it.

With the UOS, users can write programs on any TRS-80, and the same program will run on either of the other two TRS-80's with no changes to the software and no special hardware. In addition, the very same program will also run on the APPLE II, OSBORNE, XEROX, COMMODORE, DEC, HEWLETT-PACKARD, or the IBM PC (when equipped with the UOS).

The UOS is priced at \$650, and separate software is available for support of the CORVUS hard disk and for networking systems. Utilities are also available (at \$100 each) to convert TRSDOS or CP/M files to the UOS.

For further information, contact PCD Systems, Inc., 163 Main Street, P.O. Box 143, Penn Yan, New York 14527.

PASCAL FOR MODELS I AND III

The November 22 edition of *InfoWorld* featured an extremely favorable review of a complete Pascal system for Model I or III. The package, from Alcor Systems, consists of an editor, the Pascal compiler, and a run-time support package. In addition, a patch program is included to help you upgrade your software if any new versions of the system should be released in the future. For more advanced work, an optional Advanced Development System is available, which includes a P-Code optimizer and a Z80 native code generator.

The editor is a general-purpose full screen text editor, which was itself written in Pascal. It allows all of the expected editor functions such as insertions and deletions, search/replace, setting and clearing tabs, etc. The CLEAR key is used as a control key for entering certain commands, such as those used for storing or reading a text file. Also, there is an on-line help feature that allows you to load explanatory instructions from disk, to coach you in the use of the various editor and compiler commands.

The compiler has two versions. The first is complete and very fast, but is limited as to the size of the program

that can be compiled. This version requires virtually all of user memory. The second version needs far less memory, and thus can compile much larger programs, but it is slower and it has to load "overlay" files from the disk during the compiling operation. The fast compiler is said to be able to handle source programs up to some 1000 lines long, while the slower version will work on programs as large as 4000 lines.

Most impressive is *InfoWorld's* evaluation of this package. *InfoWorld* reviewers rate programs in four separate areas, either as poor, fair, good or excellent. Here's how the Alcor Pascal package rates: Performance, excellent; Documentation, excellent; Ease of Use, excellent; Error Handling, excellent. This kind of rating is rare in *InfoWorld*. Here's a quote: "No compiler I've ever worked with has been simple to use, but this package is the easiest I've used".

If you want to get into Pascal, contact Alcor Systems, 800 West Garland Avenue, Suite 100, Garland TX 75040. The Alcor Pascal package is priced at \$199. ■

LETTERS TO THE EDITOR

TRS-80 vs. Apple

It was with great pleasure that I read your comparison between the Apple II and the TRS-80 in "Bits and Pieces" for November.

I have long suspected the TRS-80 to be superior in many ways to the Apple, but never having laid hands on one, I have kept me suspicions to myself. On prowling through the advertising and articles in various computer magazines one gets the impression that nearly everything is being offered for, or written for the Apple. The poor old TRS-80 seems to be left out in the cold, nobody caring whether there is hardware or software for it.

Now I think you've uncovered the truth — your article showed that the TRS-80 doesn't need all that stuff. My TRS-80 Model I, with 48K, an old Teletype Model 33 and a couple of disk drives running under NEWDOS/80 version 2 is, I think, more than the equal of any small computer system

around. I've been computing about four years, using my TRS-80 for business applications. Apart from SCRIPSIT and VISICALC, all my programs are home-brewed. They are good ones and they do their jobs well. I know I have barely scratched the surface of this wonderful machine's capabilities.

Recently I installed Omikron's MAPPER and CP/M with MBASIC and WORDSTAR. This makes the TRS-80 more like an Apple, and, frankly, I think the whole thing is a large step backward.

Here are a few of the things that happen when you switch over to CP/M and MBASIC. The clock is gone. The computer no longer knows — or cares — what time or what day it is. The computer doesn't know what disk anything is on unless you tell it. MBASIC imposes many limitations on the programmer. There is, of course, no PRINT @, because this couldn't be transported to another make of computer. There is no CLS command — you have to resort to clumsy commands in order to clear the screen, and equally clumsy ones to print at a given spot on the screen. An article could be written on comparisons between MBASIC and NEWDOS/80's Disk BASIC.

We can't discuss graphics, because there is simply no mention of graphics in the CP/M or MBASIC literature.

WORDSTAR is doubtless a very fine text editing system — at least many writers claim it to be. I have much to learn about it. I do know I can keep SCRIPSIT on my system disk and jump in and out of it with a single keystroke. WORDSTAR, on the other hand, with its two companion programs 'WSMSGS.OVR' and 'WSOVLY1.OVR' (which must be present in order to run WORDSTAR), won't fit together on a 40-track single density disk, let alone merely occupy a little space on the system disk. SCRIPSIT has its commands in the form of little stickers on the fronts of the controlling keys, while WORDSTAR keeps menus ever in front of you on the screen, occupying the first nine lines of the screen while the text being edited occupies the remaining

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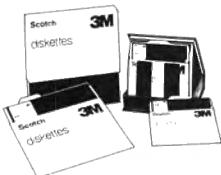
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LETTERS TO THE EDITOR

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seven. In order to see what you've just written it's necessary to do rather a lot of scrolling.

I don't want to be too hasty to condemn CP/M and its companion programs. I shall persist in my efforts to learn and understand them. But I can say without any equivocation whatever that at the conclusion of my learning sessions, when I switch back to NEWDOS/80, start the clock and re-enter the realm of friendly programs, I have the feeling of being home again."

Jay Cox
15 Lake Drive East
Wayne, NJ 07470 ■

FREE DISK SPACE — GRATIS

Norman Cookson

you've saved 4 granules (4 * 1280 bytes) of disk space. Not a bad start, but only a start, as you will see.

(OUT WITH IT, COOKSON! There must be something negative about this. Radio Shack would have done this themselves, if there weren't a catch involved.)

True, true, A note on BASICR in the DOS manual warns that RS applications programs must be used with BASIC, not BASICR. Well, this user has gotten identical results with DISKDUMP, GETTAPE, and GETDISK using either BASIC or BASICR. Nevertheless a skeptical user might keep backups of the master diskette that retain both BASIC and BASICR. For every diskette not loaded down with excess baggage, however, the saving would be 5120 bytes.

FORMAT/CMD consumes 3 three granules (3840 bytes). If you're a single-disk user, you've never used this file at all. Multiple-disk owners use this function once for each data disk and then the program lies untouched until the next application. And for this, valuable file space is unavailable on every master backup. By killing FORMAT on all but the master and one or two backups, you're leaving more room on every disk for the good stuff. Proceed as follows:

DOS READY
KILL FORMAT/CMD.F3GUM

FORMAT/CMD IP	3 granules
BASIC/CMD IP	4 granules
TEST1A/CMD	2 granules
GETDISK/BAS	2 granules
TEST2/BAS	12 granules
GETTAPE/BAS	2 granules
DISKDUMP/BAS	1 granule

Yes, BASIC is included in the above. Here's why:

The DOS manual refers to BASICR as an enhanced version of BASIC. The only difference between the two, it claims, is that the former has a re-number command (NAME). Both programs occupy precious disk space, but only one BASIC is truly needed. Try this:

DOS READY
KILL BASIC/CMD.F3GUM
RENAME BASICR/CMD.F3GUM TO BASIC/CMD

You now have a BASIC that incorporates the renumber command, and it loads every time you type "BASIC" at "DOS READY". Not only that,

TEST1A/CMD is the last "CMD" program considered for deletion. This program tests the ROM and RAM in your machine. An essential test, no doubt, but do you need to clutter all your system disks with copies of it? Your one or two master backups can save this program, and on all other disks you can tally up 2 more granules of free space (2560 bytes).

If, so far, you've had reservations about removing that which RS hath joined together, consider that the remaining files to be examined are BASIC programs which can be copied back from the master diskette at any time.

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PROGRAM PREVIEWS

A. A. Wicks

ZORLOF — the Magnificent

When we begin to count up the number of available word processing programs for the TRS-80, we find that a half dozen might be stretching it. This count does not include CP/M types, or the small "letter-writer." There are several good reasons for this dearth. Probably the most important is that a really good word processing program is not a programmer's minor task by any means, especially if it operates partially or completely in machine language. A great deal of thought and recognition of the user's needs must precede the programming, and I am awed by the knowledge that programmers must possess to write a satisfactory program. Another reason is that the market will only support just so many sales, and the company with the first successful program quite often continues to lead. Cost is still another factor, and it seems that the "usefulness/popularity" curve relates directly to cost.

This brings us to "ZORLOF — the Magnificent Word Processing System," produced by ANITEK Software Products. I recognize that it is not truly a reviewer's prerogative to be critical of the names given to programs; however, I do believe that ANITEK do themselves a disservice with this name. I don't know what the obsession is that causes so many companies recently producing programs to relate their products to magic and sorcery, but ANITEK has joined that group. I feel this program has sufficient merit and professionalism to warrant some business-oriented title, because it may otherwise be overlooked easily by serious seekers of word processing software.

The program has a great many positive attributes for the user. First, it is a good program overall, notwithstanding some possible operating problems that will be mentioned later. Second, it is modest in cost; and, third, I can foresee that it could become one of the leading word processing programs. ZORLOF has many operational capabilities (too many to cover in one review), so

without further digression, follow along and I will discuss the most important.

ZORLOF operates in machine language, which means that all functions are essentially immediate. This also means that you may type as rapidly as possible and it will always be waiting for you. Also, in typing, as with any good word processing program, you never need worry about the "end of the line," for the material typed will "wrap-around" as the typing reaches the right-hand side of the screen, always printing a full word at the end of the line. If it looks like the word will not fit, ZORLOF instantly moves it to the next line. Furthermore, the line just typed does not remain "ragged right," as it is known, but the whole line will be spaced so that it is justified (lined up evenly), on the right.

In connection with this justification process, this program is unique in one respect — it has "reverse word-wrap." Any time that a space is typed on a line, a check is made by the program to see if the words from the beginning of the line up to the space can fit on the previous line. If so, it is "reverse-wrapped" and placed at the end of the previous line. There is no eye-catching jump when this occurs — it just occurs too rapidly for that. If an <Enter> has been made on a line, this function will not occur, however.

Continuing on the subject of justification, ZORLOF permits four types: left, right, both right and left, and center (each line is centered). These layouts will occur on the video screen, and in printing. Also, these modes may be mixed, i.e., one line might be justified left, the next one, right — and so on, for a particular effect.

Getting ZORLOF into operation is problem-free. ZORLOF goes on a "TRS-DOS-compatible" system disk, Model I or III, and can be operated with a minimum of one disk drive and as little as 32K of memory. There are many disk operating systems that fit this category. Typing "ZORLOF" while

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in DOS Ready mode, then <Enter>, will result in several Status lines (to be described), appearing at the top of the screen, and a blinking cursor. You may then start typing and using all of the functions of this full capability word processing program.

I was momentarily alarmed (and later annoyed), when I first started typing, by the key-click sound effect that occurred with every typing stroke, until I recalled reading about it in the manual. This sound simulates rather well, the clicking of typewriter keys. Personally, I dislike it, and was pleased to note that it could be turned off. This sound is created by opening and closing the relay in the computer (expansion interface in Model I). Under continuous and heavy usage, in my opinion, this will contribute to an early failure of this relay. It would therefore be better if the default was "click-off" for convenience, or better yet, no simulation.

The Status lines that appear provide certain information to the user, and also allow the entering of information for subsequent operations. The Status lines are present at all times, and cannot be removed from the screen. In order to have the cursor move into this area to add or change information, the Control Key (CLEAR) and the Equals Key must be pressed together. Even at that, the cursor will not enter certain reserved areas of the Status display, as a protection to the user from loss of format data. You are permitted entry to, and typing in the Name field (file name), and the Width field. The other three fields are entered by the program, and are information for the user. They are Word Count, Free Memory, and Line Count. Two other areas are open for use — the Search field and Replace field, wherein the string (words, numbers), that you are searching for and their replacement, may be entered. The second line of the Status display will show error messages should they occur.

There are certain advantages to the word processing user in this type of interactive display — the operating information is always in the same location, you always go to the same location to change it, and the variable factors are constantly updated. The principal disadvantage is the need to

move the cursor to the status area to make entries. However, the control key action just mentioned speeds this operation.

The Width field is a flexible one, and any width from 5 to 128 characters may be entered here. Because the video display has a 64-character width, if a figure higher than this is entered the extended characters will be displayed too, if a "Preview" is requested, as a second line (although it will not be printed as such). This is unusual and convenient. Most word processing programs, with one known exception, will show the extended character width only by moving a "window" into the non-visible area. By changing the character width and previewing, various final formats may be observed. Further mention will be made later regarding other aspects of the Width function.

Certain Editing activities must occur in the Status area. For instance, when a string of characters (a word, for instance), is searched out and located, the desired action may be to replace it with another word. The Replace field is used for this, by typing the word exactly as it is to appear, in this field. The cursor is then returned to the text area (anywhere), and the control and "S" for Search and Control-R (for replace). The cursor will locate the searched-for word and it will be replaced with the word chosen for replacement. The automatic Search and Replace function when used will search and replace all occurrences of a word. Incidentally, one feature under Search that I consider worthwhile is the limitation that may be placed on a word being searched. As an example, if you are searching for the word "at." By placing a space, and <Enter> at the end of the defined string, the cursor will not stop on such words as "attempt" or "atomic." There is also the option of using the "Blank" character (made by typing Clear-Space), as a so-called "wild card," whereby some characters in a string must be specified but the others do not matter.

EDITING

ZORLOF has so many editing commands it would be quite impos-

sible to describe all of them here. In fact, there are 52 Control+Key editing functions, in addition to the normal cursor-movement controls. Depending upon the user's requirements, some may never be utilized; however, they are there if needed. A few of these many editing features will be mentioned, particularly those that may be unique to ZORLOF.

Line by line text scrolling up and down is possible, as is page-scroll, also up and down. Deletion possibilities include character deletion right and left, as well as word, line, and block deletion, the latter being a portion of text (block), which must be previously identified by block marker characters. A block also may be copied to disk. In the latter situation, a line space is opened up using the appropriate command, and the name of the block inserted prior to copying it to disk. As soon as this is done, both the name on the screen and the block markers disappear from the screen and the text reverts to its previous display.

A Directory display may be called at any time. The directory display is complete, showing file names, length of each in bytes and granules, and the "Print Queue." Pressing another control returns the screen to the text display. The Print Queue mentioned registers up to 13 files for printing sequence. The queue is established by calling the directory, placing the cursor over the file names in turn and typing control-Q. The names will be displayed on the screen in marked order (first-in, first-out), for printing.

Similarly (and conveniently), by displaying the directory, placing the cursor over a file name and pressing control-K, a file may be eliminated (killed). You may then return to your intact text — very useful if you have received a "disk full" message, and can eliminate some previous file to make room. I do not wish to continue a discussion of Directory indefinitely, but there are so many useful calls to be made while in this function, that they should all be given some mention. For instance, there are two ways to obtain a file from disk and place it in memory. One, which is quite common to many word processing programs, is to type in the file name. ZORLOF is somewhat unusual in its approach to this common

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rogram I have seen that does a definitive job of showing on the screen where expanded characters or printing will appear, by a special indication. It also provides a few extra characters for display (and printing, if the printer has them). These require a shift-key action as well as a typed character, which is not the one produced, incidentally. For example, Shift< produces a left brace, and Shift> makes the right brace character. (The manual mistakenly refers to these as "brackets.") In the same way, superscript and subscript characters are entered, but of course will not appear on the screen as such. As an example, control-1 produces an up-arrow at the cursor position, which will translate into a superscripted character at printing time. What character is superscripted? That must be defined, and the defining process is a little complex, perhaps more than a little. No need to try and describe it here; it may be done quite satisfactorily, but I would like to have seen an easier way (or an amplified explanation in the manual).

A rather interesting command for a

word processing program to have is Renumber. But it should be mentioned that ZORLOF allows the editing of BASIC and EDTASM (Editor-Assembler) files. The renumbering is limited to starting at 10 and counting by tens. All leading numeric values are stripped from each line, and the appropriate number value is inserted. EDTASM files will always have five-digit line numbers, whereas BASIC line numbers will be only as long as is necessary. It should also be observed that GOTO and GOSUB line number statements will not be changed. Therefore, if you have an operating system renumbering function that will do the entire job, it would be to your advantage to use it, rather than ZORLOF.

One other useful character for printing purposes is an underline with nothing above it, such as might be found on a form where information is to be entered by the user. As readers will no doubt be aware, this is not a normal keyboard character on the TRS-80. Entering a control-4 produces this character.

PRINTER COMMANDS

We have discussed some of the extensive editing features of ZORLOF. The printing command library of ZORLOF is almost as large as the editing commands in extent, and, once again, it would not be possible to review all of them. Nevertheless, the flexibility of ZORLOF in this area cannot be described without a review of some of the more useful and important ones.

It is probably unnecessary to state that ZORLOF will not do what the printer won't do, but I will say it to avoid any misunderstanding. Printer commands tell the program within ZORLOF how to format the text as it prints. All of the usual word processing program controls are available — such as left margin size, text indenting, page length, line spacing, and so on. In addition, any special considerations such as Expanded Characters, Subscripts, Pausing (for paper insertion), etc., are part of the Print Text function. Most of the commands have default values, which will result if no change is provided.

ZORLOF supports a number of printers, and these have been identified in the manual by a code.

References are then made within the description of each command, if any information is pertinent to a particular printer. For example, K4 is the code for the Epson MX-80 and MX-100. A statement under "Expanded Width Characters" says, in part, "...If your printer is type...K4..., you can also print Condensed-Expanded characters..." This certainly serves to clarify what functions or commands for your printer font you can use in the Print Text mode. Printers supported by ZORLOF include, to mention but a few, Microline, Centronics 737 and 739, RS IV, Epson, NEC; and several daisy-wheel printers such as Diablo, Qume, RS DW II, etc. Also, for serial printers, the baud rate may be set at any of the standard rates between 110 and 9600 baud.

In addition to the many standard printer settings for margins, justification, etc., the line spacing may be set at any spacing between 1 and 10 lines. Text indenting, with a portion of text of shorter than normal lines indented both right and left, can be set using IL ("in left"), and IR statements followed by a number representing characters. These limits will remain in effect until cancelled by IL0, etc. This is an easy method for controlling indentation and permits right and left justification of the indented material.

You do have control of your Character Density (not to be confused with printing density), using ZORLOF. The characters-per-inch may be set to anything between 60 and 20.0 in proportional spacing mode. The advantage in having this under control is in determining the actual length of a line in inches, as you know how many characters there are. A good control to have, if you have some width restriction to cope with.

The producers of ZORLOF have coined a new verb to describe emphasized, or Boldface printing — "bolding," with even a past tense for this word — "bolded." Perhaps this is because the printer is commanded to do a really heavy job on the printout. The command, inserted prior to the line with the affected words, overprints each character no less than seven times (trust your paper thickness!). For those printers already having an emphasized mode, this will

be done with but one pass over the affected line.

Italics, too, are supported by ZORLOF, but normally only for those printers that have this capability. Italics may be produced by other printers that have dot-addressable graphics capability, but this may be somewhat complex if only one word, for instance, is to be italicized. Which makes this as good a time as ever to talk about the "Special Function Character" print command that does this and other operations not normally found in most word processing programs.

The Special Function Character (SFC) command allows the sending of a string of ASCII characters and printer control codes. For those who may not have studied their printer manual to any extent (or may not care to), printer control codes vary with each printer, and they tell the printer to do certain functions that you do not have to put your hands into the printer to accomplish. As an example, there is a control code that causes the printer to change type style, and we have talked about this in the ZORLOF program. There are many others, of course. They are usually issued in hexadecimal form, but they may also be sent in decimal as CHRS\$nn statements. Try some with your printer — it provides a better knowledge to you as to what is happening.

Continuing, ZORLOF requires that SFCs commence with the SFC for English Pound, followed by a numerical value (optional), defining the width value of the character to be defined. (A short table of widths for the various printers is given in the manual.) The numerical value may be anything from 0 to 254. The expression "n" for a Centronics 739 printer would be equal to 1/1500-inch. The command continues with ASCII characters as required.

From this point on, depending upon your printer, accessibility to many special characters is possible. If your printer has dot-addressable graphics, then all sorts of graphics may be printed. There is no doubt whatsoever that the understanding of how this may be performed, together with a thorough understanding of your printer, is essential. It is complex, but the

manual provides several examples that clarify the process considerably. Incidentally, this should not be considered a "graphics dump" — where the graphics content of a screen is "dumped" to the printer. (I'm still awaiting that program for my 739, and if any readers have one I am sure the Editor would publish it!)

One valuable command in text formatting is "Go to Line Number." This command triggers a series of line feeds from the cursor to any selected line number (remember, the Status tells you the line you are on, constantly). Consequently, this command leaves "n" lines of blank space in your text. An ideal application of this would be in a final printing where you would like to insert a "paste-up" of a drawing, or a half-toned screened photograph. If any page numbers or headings are passed by the linefeeds as they slip by, the former will be printed, leaving you with copy ready for further processing.

ZORLOF has some further formatting capabilities that cannot be overlooked in this review. The Header line format allows two header lines — one for even-, and one for odd-numbered pages. Enhancing this is the possibility of having different header titles for odd and even pages (or they may be the same). In addition, one of these may be expanded characters (or both may be), for appearance or emphasis. Footer lines are identically processed, but with a different command. Page numbers may alternate from one page to another in their placement with a title, so that the page number is always on the outside edge of the sheet.

EDITING BASIC AND EDTASM FILES

Earlier, I mentioned that ZORLOF could be used for editing BASIC and EDTASM files. Nearly all of the operations for which ZORLOF is capable may be used for this purpose. Any restrictions are due more to the nature of these files than to ZORLOF itself. This ability is not likely to interest anyone who has no programming needs; however, to those who do, it can be useful.

ZORLOF begins by recognizing

that you have a BASIC file or EDTASM file to work on, by the entry you make in the Width field in the Status area. "BAS" there defines a BASIC file, "EDA" is recognized as an Apparat EDTASM file, and "EDR" represents Radio Shack EDTASM. Anything else in the Width field causes ZORLOF to treat the contents of the file as a normal text file.

The Open Line command causes ZORLOF to go into the Insert Program Line mode. All text below the cursor moves down one line, a new line number is inserted at the beginning of the blank line, which will be one increment greater than the previous line, and the cursor moves to the second place after the line number. As long as you remain in this mode, each time <Enter> is typed, a new blank-but-numbered line is inserted. But, what happens when you reach the previously numbered line that had been opened up? No problem; the function terminates automatically when the line number of the current line is one less than the line number mentioned. Also, the function can be terminated manually by moving the cursor to the beginning of the line and typing Control-L. I found this one feature of inestimable value while preparing a program that required a number of re-entries of lines and some back-tracking, when some problems being worked on occurred. The renumbering restriction has already been mentioned earlier in this review.

In editing EDTASM files, tabbing operates in a similar way to text files, except that spaces are used instead of tab characters. You may not tab BASIC files. In editing BASIC and EDTASM files, text width is limited to 64 characters. Printer commands (other than "Print"), are not allowed when editing these files. ZORLOF causes these files to go to defaults of 66 lines per page, six line spaces at the top, four at the bottom, and eight characters of left space.

OPERATING MANUAL

The manual that accompanies ZORLOF is adequate, with good grammatical construction and lucid writing. There are a few minor spelling errors and a few typographical

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ones. The general writing style is receptive to the reader, but tends to assume a modicum of word processing and technical knowledge on the part of the user. On the other hand, this type of knowledge should probably be obtained from texts on the subject. It is not a manual to give to the new word processing operator with only a "do it!" to go on. But there is a good preliminary discussion that includes "Getting Started," and several pages of explanation regarding the general overall functions of ZORLOF. This is followed by each of the Commands in the form in which they will be used, their functional title, and as many paragraphs as is necessary to quite thoroughly explain the "how" and "why." This is followed by an example of the use of the Command, with further explanations in many cases. These descriptions, except where they are extremely brief, are limited to one to a page, which helps readability and reference.

Even with the Editing Commands listed alphabetically by command letter (which are, for the most part, mnemonic), the manual needs an

Index, especially as the Table of Contents is limited to only six lines. For instance, in searching for Page Formatting and Margin Settings, part of this information was found on Page 11 as a paragraph within Section 3., but the only Contents reference to Section 3 is as "Status Lines." And in Section 5 there is other information relating to text indenting — all part of the same thing but with no easy reference.

A useful adjunct to the manual for neophytes would be a sample page, showing headers, footers, page numbering and other useful information.

The manual comprises 80 numbered pages, printed both sides, and includes a double-sided Reference Card that shows Editing Functions on one side, and Printer Commands on the other. Printing of the contents of the manual and the card has been done using an NEC PC-8023A dot-matrix printer. The complete manual has been bound in a three-hole snap-together report cover. This manual will not lie flat when opened, which is clearly a nuisance. A manual this size could probably have been bound

using a plastic spiral spine and cover stock, for the cost of the report binders used. This manual rates a 7 on our usual 1 to 10 scale.

ZORLOF is an ambitious undertaking, and, as mentioned previously, has excellent potential as a prominent word processing program. It does lack some features that more elaborate word processing programs have, but not many. But it also lacks the higher price of these programs. The potential buyer must therefore evaluate the balance between the two. The scope of the commands of ZORLOF is excellent, and places a great deal of word processing power at the fingertips of the user. In fact, the great number of commands could be a detraction in a sense, because of the restrictions placed upon it by the limitations of the computer. By this, I mean that the TRS-80 is a general utility computer, and when an extensive number of word processing controls are needed, there just are not sufficient keys available. This then, requires that many control and pseudo key functions must be redefined, and this is always a difficult but necessary task. This too, slows up a fast touch-typist, in having to use two- (and three-) key simultaneous actions, especially when the keys defined are not the normal ones for the typist.

I had problems with ZORLOF at several points. One difficulty was the "multi-key" situation, just described, but that was not a technical problem; and my distress with the "key-click" function has also been mentioned. Added to this, however, was that on the numerous occasions that I used ZORLOF during this review, I sometimes could cancel the key-click, and sometimes not. Unfortunately, when I could not, the command to cancel (Clear-Break), sent the computer right back to DOS Ready. After several attempts at this, I usually gave up and accepted the click — worrying all the while about the relay.

Another problem was the case of the disappearing cursor. If typing was not begun after getting a screen display, the cursor just disappeared, to reappear several seconds later, then disappeared — ad infinitum. When typing, the cursor stayed alive.

continued on page 18



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PROGRAM PREVIEWS

continued from page 16

I cannot believe that this is the normal intent of the program — if it is, it is unpleasant. Also, the video appears to be scanned continuously, similar to a closed loop video display. This causes occasional minor flashes and streaks across the screen.

Due to an imminent deadline, I was unable to discuss these problems with ANITEK — but it is reasonable to accept that a review should be based upon what is received for examination — just as the user would get it. However, I am impressed by the integrity of the company, which was gained in some previous correspondence, and I am sure that they will resolve any problems that users may have. Their warranty, good for 30 days, offers full return privileges if the product is unsatisfactory. Also, I hope that the producers will have the opportunity to comment upon these criticisms in this, or a future issue of *Computronics*.

ZORLOF the Magnificent — ANITEK Software Products, P. O. Box 1136, Melbourne, FL 32935 — TRS-80 Model I/III, 32K Memory, one disk drive — \$69.95 plus \$2.00 shipping.

A. A. Wicks
30646 Rigger Road
Agoura, CA 91301 ■

ANITEK RESPONDS TO REVIEW

I would like to thank Mr. Wicks for the excellent review he gave ZORLOF, our word processing system. It is worth mentioning that the two problems noted at the end of his review have both been corrected since the time of its writing, these being the disappearing cursor and the occasional returning the DOS when cancelling the Key-Click. The first was simply a matter of slowing the blink rate of the cursor to $\frac{1}{2}$, thus keeping its rate and the sync rate of the video monitor at different frequencies. The second was cured by moving the Key-Click-Cancel function from CLEAR-BREAK, which with TRSDOS Model I sometimes takes you back to "DOS READY" — to CLEAR-9, which does not.

JUST ONE OF THE WAYS IN WHICH THE LITTLE GUY (AND GAL) BENEFITS FROM THE COMPUTER AGE

Mike Shadick

Once upon a time—not so very long ago, really, but quite a while by computing standards—the little guy often got left out in the cold when it came to, for example, investment opportunities. If he didn't happen to have \$100,000 or more to invest, he was limited to relatively low-paying bank accounts, stocks and bonds. The really big money-makers—such as money-market funds—were available only to those who did have the big bucks required as a minimum opening deposit.

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There are many other ways, of course, in which "the little guy" and his female counterpart both benefit from the computer age. I've focused on the above, as but one example of how computery has enriched our lives. In this case, quite substantially!

Mike Shadick
Cedar Square West, Apt. E-414
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Those customers who have reported either of these two problems, or any other difficulty with the operation of ZORLOF, have received personal attention from me and/or one of our staff until that problem was solved. Many times a brand new disk with a custom version of ZORLOF was sent to that customer free of charge. We pride ourselves on being a company that stands behind our products and our customers. This is evident in our full refund if not 100 percent satisfied guarantee. Even after the 30 day term of the guarantee, we continue to give full support and individual attention to every customer who calls or writes.

Since the review was written, we have added some new features to ZORLOF which your readers would be interested in hearing about. ZORLOF can now handle Form Letters, giving unlimited records/run,

unlimited fields/record, and fields as large as 1000 characters are possible. We have added a "ZAP-PROCESSOR", a first for a-word processing program. This is a scrollable, full-file, zap-styled editor that can be used to patch or modify any type of file, text or program. We have also added printer drivers for 9 more printers, bringing the total to over 50. The new ones include, among others, the C.Itoh Starwriter F-10 and the Smith-Corona TP-1. These features are available with ZORLOF now, and the price is still only \$69.95.

Thanks again, Mr. Wicks and Dr. Howe, for the great review of ZORLOF.

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ARRAY OF HOPE FOR BASIC PROGRAMMERS (PART 6)

Arne Rohde

6.1 Sorting Arrays

There are a large number of different methods available for sorting a complete array into a particular sequence. There are also a large number of variations and improvements on the basic methods. Unfortunately, there also seems to be some confusion as to the names of the more common sorting methods, and the names used in this survey are taken from some of the more authoritative text books. Some articles may be found which use other names for the same or very similar methods.

This survey is not intended to be exhaustive, but merely to present some of the methods which can be used to sort an array, and some of the factors which can influence the choice of method. The choice will often depend on a number of factors such as array size, memory available, and number of times the sort is to be executed. For those who want to study sorting methods in more detail a number of references are given to books and articles.

6.2.1 Sorting by Extraction

It is often necessary to reference the elements in an array in a particular sequence but without changing the sequence of the original elements. Typically the sequence will only be used once, whereas the original sequence will be used for other purposes. An example of this would be an array consisting of all customers, stored in customer number sequence. For a particular report, the array must be accessed in sequence by value of purchases in a particular period, or in name or zip code sequence. Another example would be a hash code array, where any change in the sequence of the elements would destroy the possibility of a direct reference by hash code. There are a number of methods available for extracting the array elements in the desired sequence, without disturbing the original array sequence.

One method which can be used is to establish a pointer array, where the elements in this array merely point to the original array elements. These pointers can then be sorted without affecting the original array. An example of an array with corresponding pointer array would be the following:

Item #	Key value	Pointer array before sorting	Pointer array after sorting
0	32	0	2
1	59	1	4
2	10	2	0
3	66	3	6
4	23	4	1
5	71	5	3
6	48	6	5

The pointer array is then accessed serially, and the item pointed to is then used as the next item in sequence. The disadvantage of this method is that extra storage is required for the pointer array, two bytes for each element in the original array.

The pointer array could also have been implemented as

a link array, making the original array into a linked list. The disadvantage is, of course, the same as for the pointer array, that extra memory is required. Also the linked list may be slower to sort than the pointer array, depending on the sorting methods used.

Another possibility, which we shall examine in more detail here, is to extract the keys from the original array in the correct sequence. This requires a search through the entire array for each key value to be used, except for the special case of duplicate keys. The extraction starts by finding the lowest key value in the array and using this item. The next search finds the next-lowest key value, and so on until all elements in the array have been used. Special consideration is taken for duplicate key items, which may not be uncommon in the applications where this method is useful.

To implement the extraction we shall use several data items. The previous key value used will be stored in PKV, the position of this item in the array will be stored in PIP. The expected next key value will be stored in NKV, and the position of this item in NIP. As usual the index I will be used in the search. The array is defined as A(AM), and since it can be a hash code array a key value less than zero will indicate an unused element. If the array has no indication for unused elements then the number of elements used (AE in previous examples) will have to be known instead.

The search will be relatively slow because of the need to access each array element, and because the search loop requires several comparisons to determine the next key item. The code could be as follows:

```
100 PKV = 0: PIP = -1
110 NKV = -1: I = 0
120 IF I > AM THEN 160
    ELSE IF A(I) < PKV THEN I = I + 1: GOTO 120
130 IF A(I) = PKV:
    IF I > PIP THEN NKV = PKV: NIP = I: GOTO 160
    ELSE I = I + 1: GOTO 120
140 IF A(I) < NKV OR NKV < 0 THEN NKV = A(I): NIP = I
150 I = I + 1: GOTO 120
160 IF NKV < 0 THEN 200: REM No new value
170 PIP = NIP: PKV = NKV: REM store new as previous
180 GOSUB xxx : REM Use the element A(NIP)
190 GOTO 110
200 :REM Extraction completed
```

The main loop consists of the lines 120 to 140. Line 120 checks if all elements have been accessed on this pass, and if so passes control to line 160. It also checks whether the present element should be considered, or whether it has a lower key value than the previously used item. Note that PKV is initialized to zero so that this test will also exclude the unused elements on the first pass. Line 130 checks for duplicates, and is the reason why the position of the previous item used must be stored. Any duplicate key items will be accessed in the sequence in which they

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appear in the array. If the duplicate key has a lower or equal key position it will be bypassed. Only those elements with a higher key than the previous one will be passed through to line 140, and this checks for keys with a lower value than the current next expected key value. If NKV is negative then there is no current next expected value, and the first item encountered is stored.

If control passes to line 160 with no positive value in NKV then the extraction is complete, otherwise the new item value and position is stored, and the item is processed. The search then continues at line 110 to find the next item.

As mentioned earlier the extraction technique can be very slow for large arrays. The time required for extracting all elements in sequence from random arrays of different sizes was measured. Since the time is independent of the key sequence no test was made with an array almost in sequence. The times, in seconds, were as follows:

Array size	Extraction time	Time per element
20	14.3	.715
50	74.9	1.498
100	283.0	2.830
250	1717.0	6.868

The time for each element is approximately doubled for each doubling of the array size, and this is what could be expected from the algorithm. In other words the time taken to extract each element is directly proportional to the size of the array, and the total time thus becomes very slow for even moderately sized arrays. The method can only be recommended for small arrays, and where storage for other methods is not available.

6.2.2 Bubble Sort

The bubble sort is probably the best known sorting method, which is unfortunate since it can be very inefficient. Because of the speed it should probably only be used for very small arrays, and if the array is almost in sequence before the sort. The sort is called a bubble sort because the higher keys appear to bubble up to the end of the array. On each pass through the array at least one element will be positioned in the correct place, and in the worst case a pass will have to be made for each element in the array.

On each pass through the array each element is compared with the following element. If the first element has a lower key value then the two are exchanged, otherwise they are left in the original positions. The comparison then continues to the next pair of elements. When the highest key value is encountered in a pass it will then have to be exchanged with each of the following elements, finally ending at the end of the array. Thus the highest remaining key value will be positioned correctly after each pass.

The sequence for the sort will be illustrated in an example. When two elements are compared, an asterisk will appear under these keys if no exchange takes place, otherwise the new sequence of the keys will be shown. The sequence and key values will be those from the tree shown

in the section on searching. The initial key sequence is 3, 5, 1, 6, 2, 7, 4, and the desired sequence is, of course, 1, 2, 3, 4, 5, 6, 7. The first pass of a bubble sort can be shown as follows:

Initial sequence	3	5	1	6	2	7	4
First pass	*	*					
	1	5	*	*			
		2	6	*	*		
			4	7			
After first pass	3	1	5	2	6	4	7

The element with key value 7 has been "bubbled" to the end of the array, and on subsequent passes the final element does not have to be compared with the preceding item. This is one of the methods which can be used to speed up the sort. A check should also be made whether any exchanges have been made at all, since the sort is finished when no exchanges have been made in a particular pass. The second and following passes through the data would be as follows:

Before pass 2	3	1	5	2	6	4	7
Pass 2	1	3	*	*			
	2	5	*	*			
		4	6				
After pass 2	1	3	2	5	4	6	7
Pass 3	*	*	2	3	*	*	
		4	5				
After pass 3	1	2	3	4	5	6	7
Pass 4	*	*	*	*	*	*	
	*	*					

The final pass, pass 4, was required to determine that the elements were in sequence, and since pass 4 did not give any exchanges the sort was terminated.

There are a few other less obvious methods which can be used to speed up the bubble sort. If exchanges do take place in a particular pass, then the following pass does not have to continue to the next to last element compared on the previous pass, but the next to last element exchanged on the previous pass. This cannot be seen from the example above, but should be obvious, since all following elements must be in sequence since no exchange has taken place. Thus a pointer to the last exchange should be kept.

The next technique which can be used is very similar, since it is also possible to ascertain the lowest index where a comparison has to be made. On a new pass, the first comparison needed is with the element just before the first element exchanged on the previous pass. Again the size of the array used in the example does not make this apparent.

The array to be sorted will again be dimensioned as A(AM) and will contain AE elements, starting from element zero and proceeding without unused positions to element

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AE - 1. PFE will be used to store the previous first exchange position, and PLE will store the previous last "exchange. AW will be used as a work item to temporarily store an element being exchanged, PE is used to store the last item to compare, and EXC will count the number of exchanges on each pass. The algorithm will also be made to cater for empty arrays, or for arrays containing only a single element (which is obviously always in sequence). A number of published sort algorithms do not cater for these two cases. The bubble sort with the two optimization techniques described above can be coded as follows:

```

100 PFE = 0: PLE = AE - 2
110 IF PLE < PFE THEN 170: REM sort complete
120 EXC = 0: IF PFE < 0 THEN PFE = 0
130 PE = PLE: PLE = -1: FOR I = PFE TO PE
140 IF A(I) > A(I + 1) THEN AW = A(I):
    A(I) = A(I + 1): A(I + 1) = AW:
    EXC = EXC + 1: PLE = I - 1:
    IF EXC = 1 THEN PFE = I - 1
150 NEXT I
160 GOTO 110: REM repeat until no exchange
170 :REM Sort terminated

```

The main processing loop is implemented as a FOR ... NEXT to speed up the processing. The loop compares all elements within the range established in the previous pass. A test was run with the program as shown, both with random key values, and with keys almost in sequence. The optimisation code was then removed, and the same tests rerun. In the first removal all elements except those after the last one compared on the previous pass were compared. This was done by removing PFE, and by decrementing PLE by one on each pass, and without resetting it on each exchange. Thus EXC was used instead to determine when the last pass was completed. An attempt was also made where each pass compared every element in the array, with the loop defined as FOR I = 0 TO AE - 2 and EXC set to indicate an exchange in a particular pass. The times were as follows:

Array size	Random keys		Keys almost in sequence		
	Optimized	Semi-optimized	No optim.	Optimized	Semi-optimized
20	6.6	6.0	6.7	1.1	1.3
50	37.6	31.4	46.0	2.3	4.2
100	149.1	127.8	174.4	6.0	11.2
250	887.9	777.3	1176.9	19.5	25.1
500				54.5	72.1

It is interesting to note that the optimized version is slower for random key values. This is due to the extra processing required to test for the first exchange and to store the values for the first and last exchanges. With random keys very few comparisons can be avoided, and the extra code requires more time than that saved. When the keys are almost in sequence, the case is reversed. Here the limits of the compare sequence can be reduced considerably, and the number of exchanges will also be reduced. The best case for the optimized version occurs when only a single key is out of sequence. In this case only

a single comparison will be made on all except the first pass. The worst case condition for the bubble sort occurs when the keys are initially in the opposite sequence to that required. In this case there will be as many passes as there are elements in the array.

The difference in times for random keys and keys almost in sequence is very marked, and shows the cases where the bubble sort can be useful. It should, however, be noted that for random keys the bubble sort is slower than the insertion in sequence. The only condition where the bubble sort is reasonably efficient is for small arrays, or arrays with only a few keys out of sequence.

6.2.3 Sifting Sort

The sifting sort and its basic variations are known by a variety of different names. It is also known as a shuttlesort or a delayed replacement sort. In itself it can be said to be a variant of the bubble sort, but with only a single pass through the array. The sort compares adjacent elements until two elements are found to be out of sequence. Instead of just exchanging these two, the lowest value is moved to the correct position in the array. Thus there is only a single forward pass, but there can be a large number of backward passes to find the correct position for an element.

The sort can be illustrated with the same array as used for the bubble sort. Comparisons are marked with asterisks, and exchanges resulting from a comparison are shown with the key values in their positions after the exchange.

Initial sequence	3	5	1	6	2	7	4
Compare until exch	*	*					
Exchange			1	5			
Backwards until no exch	1	3					
Continue from forw seq			*	*			
New exchange required				2	6		
Backwards until no exch			2	5			
	2	3					
	*	*					
Continue forward seq					*	*	
New exchange						4	7
Continue backwards					4	6	
					4	5	
					*	*	
Forward sequence complete							
Final sequence	1	2	3	4	5	6	7

Some of the variations on the theme can also be illustrated. The number of exchanges on the backward portion of each pass can be reduced by storing the exchanged element temporarily and treating it like the sequential insertion sort mentioned earlier. Thus the preceding elements are moved up in the array until the correct insertion point has been found. For this reason the method is also known as the delayed insertion sifting sort. This version can also be illustrated:

(See top of next page.)

Note that the current key value in a particular array position can be found by finding the last value shown in the particular column. For this reason the sequence after each pass is not always shown.

Initial sequence	3	5	1	6	2	7	4
Forward until exchange	*	*					
Move out-of-seq element			*	5			
Find position for key 1	*	3					
End of array - pos found	1						
Continue forward			*	*			
				*	6		
Find pos for key 2			*	5			
			*	3			
Position found	*	2					
Continue forward			*	*			
				*	7		
Find position for key 4				*	6		
				*	5		
Position found			*	4			
Forward complete - end	1	2	3	4	5	6	7

Another variation bears a closer resemblance to the bubble sort, but instead of always proceeding in one direction, every alternate pass will proceed in the opposite direction. For this reason the name "cocktail shaker" sort has been proposed for this method. As with the bubble sort one element less participates in the comparisons after each pass, since each pass will have placed at least one element in its final position. But unlike the bubble sort, the positioning will occur at both ends of the array. For certain distributions of data, this sort can be faster than the ordinary bubble sort. The same optimization methods mentioned for the bubble sort can also be used in this case. The sort is illustrated as follows:

Initial sequence	3	5	1	6	2	7	4
First pass forward	*	*					
		1	5				
			*	*			
				2	6		
					*	*	
						4	7
Sequence after pass 1	3	1	5	2	6	4	7
Second pass backward					4	6	
				*	*		
				2	5		
			*	*			
					1	3	
Sequence after pass 2	1	3	2	5	4	6	7
Pass 3 forward			2	3			
			*	*			
				4	5		
					*	*	
Pass 4 backward				*	*		
				*	*		
			*	*			
No exch - final sequence	1	2	3	4	5	6	7

Only the code for the delayed insertion sifting sort will be shown, since for most arrays it is probably faster than either of the two other methods illustrated. Since it consists of two distinct pass types, the code will also reflect these two types. The first part is similar to a pass in the bubble sort, and the second part is similar to the insertion of an element into a sequential array. The code can be as follows:

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```

100 FI = 0
110 FI = FI + 1: IF FI >= AE THEN 170: REM Forw pass end
120 IF A(FI) >= A(FI - 1) THEN 110
130 AW = A(FI): A(FI) = A(FI - 1): BI = FI
140 BI = BI - 1
150 IF BI > 0:
    IF A(BI - 1) > AW THEN A(BI) = A(BI - 1): GOTO 140
160 A(BI) = AW: GOTO 110
170 : REM Sort end

```

The data item FI is used as the index for the forward pass, and BI is used as the index on the backward passes. The forward pass consists of the lines 110 and 120 until two adjacent elements are found to be out of sequence. The lowest key value is then stored in AW, and the highest key moved up one position in the array. The loop in lines 140 and 150 then move the elements one position forward in the array until the correct position for AW has been found.

The timings for the routine were again performed with random key values and with items almost in sequence. The recorded times were considerably better than for the bubble sort, and since the sort algorithm is only slightly more complex it should probably be preferred for the cases where the bubble sort is considered. Again, however, for random keys it is still slower than the insertion of new elements in sequence. The times recorded were as follows:

Array size	Random sequence	Almost in sequence
20	4.0	1.3
50	18.5	2.7
100	76.0	4.4
250	438.3	12.8
500		24.3

No times were recorded for the other variations on the sifting sort, since these will require more exchanges of elements without simplifying the logic. They should thus be slower in all cases than the version shown here.

6.2.4 Shell Sort

The Shell sort is named after D. L. Shell who first described the sorting method in 1959. Since then a few improvements have been suggested, and the algorithm has been extensively analysed. The sort is also known as the Shell-Metzner sort, the diminishing increment sort, and the merge-exchange sort. The sort is basically an extension of the sifting sort described in the previous section, but instead of comparing adjacent elements it compares elements at various distances from each other. The sort consists of a fixed number of passes, so for arrays which are already in sequence or almost in sequence it can be slower than the bubble sort or sifting sort.

The first pass compares elements a distance N1 from each other so that all elements of the form A(N1 * x + c) will be in sequence where c is a given constant. Thus for c=0 the condition

$$A(0) \leq A(N1) \leq A(N1 * 2) \leq A(N1 * 3) \text{ etc.}$$

will be true after the pass has been completed. The next pass uses a distance N2 where N2 is less than N1. The sort terminates when the the pass with distance 1 between elements is complete. If the first pass uses distance 1 then the sort is merely a sifting sort. The sort will work for all possible values of N1, N2 etc, as long as the given conditions are fulfilled, and the speed of the sort is dependent on the choice of values for the sequence. Shell originally suggested halving the value for each pass, starting with $(\text{number of elements})/2$, but later analyses indicate that a better starting value and sequence can be obtained.

If we use Shell's original suggestion for our small array of values to be sorted we will obtain the following sequence:

Original sequence	3	5	1	6	2	7	4
Distance = 7/2 = 3	*	*					
			4				6
	*	*					
				5			
	2						
		*					*
After first pass	3	2	1	4	5	7	6
Distance = 3/2 = 1	2	3					
		1	3				
	1	2					
			*	*			
			*	*			
			*	*			
				6	7		
				*	*		
Forward pass complete	1	2	3	4	5	6	7

The sifting sort can easily be seen in the final pass with distance = 1, but the number of exchanges required has been reduced by the first pass where some exchanges have taken place. The backward portion of each pass can obviously, like our sifting sort, be done by delayed replacement rather than by exchanges.

As mentioned earlier the choice of distances between elements on each pass influences the efficiency of the sort algorithm. Using the division by 2 for each pass, one of the best values to choose as the initial value N1 seems to be $N1 = 2^{**}N - 1$ where $2^{**}(N + 1)$ is the highest value less than the number of elements in the array (** indicates exponentiation). Thus for a 100 element array N will be 5 since $2^{**}6 = 64$ and $2^{**}7 = 128$, which is larger than 100. Thus N1 will be 32 - 1 or 31 for the first pass. The distances for the succeeding passes will be 15, 7, 3 and 1. Notice that these values are all odd, and it has been suggested that distances between elements should be odd for all passes.

Another suggested sequence of distances gives fewer passes, and potentially fewer comparisons and exchanges. The sequence, starting with the final pass distance, is $N1 = 1, N2 = 3*N1 + 1, N3 = 3*N2 + 1$, etc, or 1, 4, 13, 40, 121, 364, etc. The distance for the first pass is chosen so that the next value in the sequence will be the highest value less than the number of elements in the array. Thus for an array with 100 elements the distance for the first pass will be 13, since 40 is the highest value less than 100. For an array with 500 elements the value will be 121, and for 7 elements the suggested distance is 1, or a normal sifting sort. The algorithm will be tested for each of the three suggested starting values and sequences.

The algorithm, using the successive distance calculation suggested by Shell, but ensuring that each distance is an odd value, gives the following code:

```

100 DST = 1: IF AE < 2 THEN 220 :REM Already in sequence
110 IF 4 * DST + 3 < AE THEN DST = DST * 2 + 1: GOTO 110
120 FOR I = 0 TO DST - 1
130 FOR FI = I TO AE - DST - 1 STEP DST
140 IF A(FI) <= A(FI + DST) THEN 190: REM Sequence OK
150 AW = A(FI + DST): A(FI + DST) = A(FI)
160 BI = FI
170 IF BI - DST >= 0:
    IF A(BI - DST) > AW THEN A(BI) = A(BI - DST):
        BI = BI - DST: GOTO 170
180 A(BI) = AW
190 NEXT FI
200 NEXT I
210 DST = INT(DST / 2): IF DST > 0 THEN 120
220 :REM Sort completed

```

In this sort routine there are 3 nested loops. The first one spans the range from line 120 to 200, the next one from 130 to 190, and the innermost one is line 170. The outer loop controls the starting position of each of the forward passes, the middle loop is a single forward pass, and the inner loop is the backward pass which is initiated when two elements are exchanged in the forward loop. The variable DST is the distance between two compared elements, FI is the forward loop index, and BI is the backward loop index.

The timing test was run with different array sizes, and with random and almost sequential keys. The three

methods for calculating the distance are shown as N/2 for Shell's original suggestion, $N^{*2} - 1$ for the improved starting point but similar continuation, and $3*N + 1$ for the suggested improvement in starting point and successive calculation. The times were as follows:

Array size	N / 2 Random	N / 2 Alm seq	2**N - 1 Random	2**N - 1 Alm seq	3*N + 1 Random	3*N + 1 Alm seq
20	3.7	2.2	3.1	1.9	3.3	1.3
50	11.8	5.4	9.8	4.5	10.7	3.5
100	24.9	12.1	24.1	10.1	24.7	6.6
250	78.8	33.2	78.5	27.2	77.3	18.9
500	185.5	73.4	184.2	61.5	188.7	46.8
1000	489.9	160.3	470.8	138.0	443.9	87.9

For smaller random arrays there seems to be very little difference between the different methods, but with the 1000 element array there seems to be a significant difference. Also for arrays almost in sequence there is a significant difference, presumably because of the different number of passes. It is interesting to note that all of them are slower than the plain sifting sort for arrays almost in sequence, irrespective of the size of the array. For random arrays, however, the Shell sort is much faster than any of the other methods we have examined, and since it is almost as simple to code it should probably be used in preference to the other methods.

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SOFTWARE REVIEW

Tax/Saver II

Micromatic Programming Company

Richard Kaplan

With April 15 soon approaching, no doubt you have begun to think about filing your income tax return. (Note that I said you have begun to *think about* filing a return. If your habits are anything like mine, I'm sure you will not actually *complete* your return until midnight, April 15. But that's another story.) But seriously, whether your involvement with the IRS is as simple as filing a personal 1040A, or as complex as running a tax preparation service, you could no doubt benefit from computerized tax calculation.

TAX/SAVER II, written by Micromatic Programming Company (Georgetown, Connecticut), is truly a professionally prepared, turnkey tax calculation package. Details of the program's unsurpassed user-friendliness will be discussed later; for now, suffice it to say that the first time I used this program I produced a perfect copy of my own income tax return — without one programming glitch — before I ever even opened the program's manual.

SPECIFICATIONS

TAX/SAVER II may be used on the Model I or III with a minimum of 32K and two disk drives. The Model I version contains three program disks, while the Model III only has two. In both cases, the user is prompted for diskette switching, so program operation runs very smoothly.

TAX/SAVER II will generate information for both the 1040 and 1040A (the "long" and "short" forms), as well as the following schedules:

- **SCHEDULE A (Itemized Deductions)**
- **SCHEDULE B (Interest and Dividends)**
- **SCHEDULES C & SE (Business Income)**
- **SCHEDULE D (Capital Gains)**

TAX/SAVER II can use both the federal tax tables and tax rates; income averaging is also supported. In addition, this year's version of the TAX/SAVER II includes the new 1040 EZ and SCHEDULE W.

RUNNING THE PROGRAM

The instructions for operating this program are quite explicit. An operating system must always remain in drive 0 (either TRSDOS or NEWDOS/80 may be used — Model III NEWDOS/80 users must, of course, use PDRIVE to convert the original TRSDOS files) and a TAX/SAVER II program disk is placed into drive 1. From this point on, the program literally runs by itself.

TAX/SAVER II is composed of over a dozen individual modules, which are operated in a pre-determined order. For example, the first module to appear is one which allows you to enter your name, address, and other personal information. Another module permits entry of wages. Itemized deductions might be entered in another module,

etc. The user may stop after any module and continue at a later time. All data is saved at these points, and TAX/SAVER II will "remember" the precise point at which the user has exited the program.

Some comment is warranted regarding the modular structure of TAX/SAVER II. Error checking routines throughout each module are superb. Every single entry may be changed in at least two points throughout the program, almost without exception. However, if a data entry error is discovered too late — such as in a later module — no recourse exists except to re-start the entire program again, which can take some time. (Actually, I should comment that the program's manual states that the entire program must be re-started. I was actually able to resume entry at the beginning of the module in error by KILLING certain files and RUNning the appropriate program. Obviously, inexperienced users should obey the operator's manual. But those readers who are daring and somewhat familiar with BASIC may find similar methods to adjust the program to their own needs.)

This criticism regarding correcting data entry is not meant to be construed as particularly serious. In actual practice, I found that the program's own data entry routines made it very difficult for me not to catch my errors. In many cases, the program actually informs the user that data which was entered would not logically make sense.

As one final comment regarding the inability to change prior entries, the program's manual includes a justification of this aspect of the program's design. According to the Micromatic, the program was intentionally designed to operate "forward only" in order to eliminate errors which are often made in changing early portions of a tax return which affect later calculations.

MULTI-LEVEL HELP FACILITY

Very often business programs will fall into one of two broad groups: 1) The program will be excellent, but its operational instructions will be poor. In other words, the net result will be that only experienced computer users will be able to use the package; or 2) The program will be extremely user-friendly, but an abundance of on-screen prompts will bore or insult knowledgeable users. Micromatic's programmers have found a solution to this dilemma.

TAX/SAVER II allows the user to specify two different types of help levels. A non-CPA can utilize an option which gives him on-screen explanations of all tax concepts used throughout the program. An experienced tax preparer, however, can avoid these informative prompts. Similarly, operational prompts within the program may be suppressed for the benefit of an experienced operator. Therefore, anyone can use this program — from a non-CPA who has

never touched a computer to a systems analyst at IBM who also is familiar with tax preparation.

For example, if you have chosen explanations of tax concepts, when you are asked if you wish to contribute to the Presidential Election fund, a brief explanation of this fund will be shown. If you are recently divorced and you do not know what your filing status should be, TAX/SAVER II will give you guidance along these lines.

THE PRINT(?)OUT

Output from TAX/SAVER II can be generated in any of the following ways: 1) Print on blank paper with overlays; 2) Print on tractor-feed tax forms; or 3) Copy information from the screen. These options should satisfy any budget and/or computer configuration.

An interesting option available for printout of the final form is the use of plastic overlays, which are transparencies with blank tax forms printed on them. The overlays are available for \$39.95. In order to use the overlays, you simply print the final form on blank paper using a standard line printer. When this is complete, you place the printed sheet into a copying machine, with the plastic transparency in front of it. The copying machine will then produce a form which has on it both your information and the headings for the appropriate form.

The ability to print on tractor-feed forms is useful for the owner who does not wish to spend a great deal of extra money on overlays, but who does want the computer to print the form for him. These forms are available at a

nominal cost, and the final output is in acceptable IRS format — the only thing TAX/SAVER II does not do for you is sign your return. (But maybe next year's version...)

The third and final method of output is simply an on-screen simulation of a completed form. I stress that this option is actually a simulation of the form, not simply a reiteration of information you have entered. Boxes to be checked on the final form are simulated, and numbers are shown in the appropriate columns. Even a person who has never seen a tax return in his life could fill in a form correctly with these instructions.

IN GENERAL: THE GOOD...

TAX/SAVER II has a number of outstanding features — particularly outstanding in view of the system's price (\$139.95). The one area, however, which deserves to be singled out is its unsurpassed user-friendliness.

Without question, anyone can easily use TAX/SAVER II to prepare a tax return, even someone without any previous computer experience. This comment is meant sincerely. Many software packages — particularly business software — virtually require the user to be a programmer. (Sometimes this is inherent in the nature of the program, and therefore it is not the author's fault.) With TAX/SAVER II, all you must do is load BASIC and start the program running (clearly outlined in the manual). After this, anything you might not understand is explained within the program. It is conceivable that a completed return could be generated in under an hour — less than half an hour for someone

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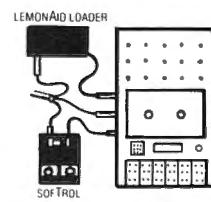
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familiar both with computers and tax preparation.

Hand in hand with user-friendliness is error checking, another area in which TAX/SAVER II excels. Aside from catching obvious input errors, such as entering letters in a field which should be numerical, TAX/SAVER II analyzes your responses to see if they logically conform to tax regulations. For example, if you enter a negative item at some point, the program will ask you if you really wish to do so. If you itemize your deductions and the total of your deductions is less than the standard deduction, the program will alert you to this and advise against doing so. In short, this program works with you to try to calculate your lowest possible tax.

Perhaps the best example of TAX/SAVER II's ability to verify the integrity of your tax return is its comparison of itemized deductions to national averages. For each category entered, the program displays the national average for this category for people with a similar gross adjusted income. With this to serve as a broad guideline, gross errors in deductions may be avoided.

Another good point of TAX/SAVER II is its universality. As was already explained, the program's help facility helps the program to fit virtually any level of user sophistication. In addition, information can be stored on disk with specific filenames. The result? TAX/SAVER II can be used by a CPA operating a tax preparation service to easily store information for many different clients. And, of course, TAX/SAVER II will "remember" how much data has been input for each client at any given time.

...AND THE BAD?

At first, the fact that data entry is forced in a certain order disturbed me. Most programs of this nature that I have seen are menu driven — you decide the order in which you wish to operate various options. Why should I be told in what order to enter my information?

After I began to use the system, the answer to this question became very clear. TAX/SAVER II, as I said before, works with you to help you find your lowest possible tax. Therefore, the system "knows" when each option should be run. It is not necessary to choose between menu options such as "PRINT LONG FORM" and "PRINT SHORT FORM" because TAX/SAVER II will tell you, "I think you should use the long form. Would you like to do this?" Thus, in actual practice, you are not restricted at all in not having a menu to choose from. The computer helps you decide what options to run at what times.

Another criticism I have of this program — and actually it could be considered a criticism or a commendation — relates to the actual program code. TAX/SAVER II is written in unprotected BASIC, so the user has an opportunity to examine and even modify the program.

I am very familiar with business applications in BASIC, and I found the code to be fairly difficult to understand. This is primarily due to frequent machine language calls, lack of spaces in many parts of the program, and infrequent use of REM statements.

As I said, this program code is both a selling point and a drawback. To be able to see the program code is certainly a nice feature, especially if you may want to customize the

program somehow. However, customization of this particular program — beyond mere aesthetics such as screen prompts or printout formats — would tend to be rather tedious.

In final analysis of the code, it is only fair to realize that most programs you have purchased are probably either in machine language or on a protected operating system, or both. Therefore, simply to be able to see the code is an advantage. Complaining about its readability may be asking for too much on my part.

OPTIONAL PROFESSIONAL TAX/FORECASTER

An companion to TAX/SAVER II — which is actually a standalone product by itself — is available to assist with tax planning. PROFESSIONAL TAX/FORECASTER, which is available at a discount to purchasers of TAX/SAVER II, allows you to play "What If?" with tax figures. PROFESSIONAL TAX/FORECASTER, which will estimate both 1982 and 1983 tax, is an excellent tool to calculate your lowest legal (or illegal?) tax.

EXTRAS

Purchasers of TAX/SAVER II have several extra features available to them, which are definite selling points for this program. These include a discount on future purchases, a free tax newsletter, and discount on PROFESSIONAL TAX/FORECASTER.

TAX/SAVER II is perhaps the only program around which can be purchased with a discount in future years. If you purchased TAX/SAVER II last year, for example, you could receive the 1982 version at a 40% discount. (You would not receive a new manual in this case, but a new one would not be necessary.) TAX/SAVER II has been around for several years and sales have been very good, so there is good reason to believe new versions will be released for many years to come.

All registered owners of TAX/SAVER II receive an annual tax newsletter describing changes in tax law and tips in filling out your return. This is further evidence of a company which is truly interested in helping its customers, not simply making a fast dollar.

Finally, PROFESSIONAL TAX/FORECASTER is available at a \$15 discount to purchasers of TAX/SAVER II.

CONCLUSION

TAX/SAVER II is a highly recommended tax-preparation program suitable for both personal and commercial use. The program's strong points include unsurpassed user-friendliness and tax assistance, not merely calculation. Finally, don't forget: TAX/SAVER II is tax deductible!

TAX/SAVER II (\$139.95) and PROFESSIONAL TAX/FORECASTER (\$99.95 — \$84.95 with TAX/SAVER II), are available directly from H & E Computronics.

Richard Kaplan
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COLOR COMPUTER CORNER

Andrew Hofer

Assembly Language Graphics

How can a complete novice go about learning assembly language for the Color Computer without being overwhelmed — and without getting bored by sample routines that do nothing that's immediately useful or aesthetically pleasing? A newly published book may provide the answers.

Assembly Language Graphics for the TRS-80 Color Computer, written by Don and Kurt Inman (copyright 1983 by Reston Publishing Company, Inc., Reston, Virginia 22090), sets out to teach assembly language to beginners, using sound and graphics as the vehicle for learning rather than sticking to a completely mathematical approach. This is a very good idea, since many people who would otherwise lack the motivation needed to learn assembly language may be coaxed into learning in spite of themselves. Learning assembly language does take a great deal of effort, and the prospect of real machine language graphics and sound will provide all the excitement needed to inspire beginners to make the effort. Besides, the sample programs explained in the book will give you graphic results immediately, providing further motivation.

The authors have used two software tools produced by The Micro Works of Del Mar, California. They highly recommend the use of the CBUG machine language monitor and the SDS80C Software Development System (an editor/assembler package). It's not essential to use this specific software, since other editor/assembler and monitor software will be similar in action. But the book does contain certain references that are specific to the software from The Micro Works.

Chapter 1, "Introduction to Machine Language", gives the reader a gentle start on understanding binary notation, bits, bytes, hexadecimal notation, and the machine language monitor. A sample sound-generator program is entered using the monitor, and then its operation is explained. Examination of and alterations to the sample program serve as a working tutorial — learning the monitor by using it. A discussion of signed numbers follows, and then a complete summary of the Introduction, with exercises.

Each chapter introduces a new type of program and proceeds to cover new instructions used, how the program works, modifications or suggestions for playing with the new technique, and finally a full chapter summary with exercises.

Chapter 2, "Sound," starts you right off making your own sounds, and explains how to create a sound table in memory, for storage of a sequence of notes to be played back together. Instructions on how to save your programs to tape are given here, so you can compose and save your "music".

Chapter 3 introduces the editor/assembler, which will be needed for longer, more advanced programs. Two simple graphics programs are assembled, giving the student

continued on page 62

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PRACTICAL BUSINESS PROGRAMS

Month #2: Startup Routines

S. M. Zimmerman and L. M. Conrad

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This is the second article in a series of eight, detailing the design and operation of general ledger program. This month we will review two routines; the start up routine for initializing the chart of accounts and the routine for inputting the name and address of the business involved. The publication schedule for the eight articles follows:

No	Month	Program
1.	GLMENU (Controls use of routines)
2.	NAME & START (Initializes chart of accounts and firms name).
3.	TRANSACTIONS (Inputs monthly transactions).
4.	CPA (Produces Balance sheet & Income and Expense statements, Profit & Loss statement).
5.	UPDATE & YEAR (Changes chart of accounts and performs year end closing tasks).
6.	TRIAL (Produces trial balance).
7.	BALANCE (Balances check book).
8.	MILES & MOVE (Calculates gas milage and moves files between disks).

When starting a new system it will necessary to begin with the program START. This program sets up the chart of accounts, the initial year to date profit and loss data and initial balance sheet for your business. It is very important to work with your accountant in the selection of the chart of accounts for your business. Care must be taken when setting up the chart of accounts and their initial values. If the initial balance sheet is not in balance you will not be able to get the system to operate.

Another program which must be used before the system becomes operational is NAME. This program is used to change the name or to initialize the name on the accounting report. The system will not operate unless you have initialized some name to be used in the computer runs.

RUNNING START

Before you use START you determine the chart of accounts you want to use. It is not difficult to change your chart of accounts once set, but is not recommended you do so very often. In our program we have assumed account #1 is the cash account and the only cash account. You will not be able to do a check reconciliation unless you number your cash account #1.

You may have any number of accounts in the chart of accounts. It is a trade-off between the number of accounts and the number of monthly transactions that may be handled. You are working on a microcomputer, and it has a limited amount of internal memory.

All runs start in GLMENU, which was presented in the

January 1983 issue of this magazine. After typing "S" through the keyboard and hitting ENTER, the computer will wipe out the GLMENU program and load START. You will see on the screen.

START UP OF SYSTEM ESTABLISHES THE CHART OF ACCOUNTS DISK?

The above question is designed to allow you to specify which disk is to be used for the storage of the various files needed in our accounting system programs. We will assume you specified (1) for our sample run.

Be careful to use this program once and only once for each application. If you reinitialize your files through START when you have a working system you will destroy all the historical information you have collected.

Next on the screen, after you have answered the above question, will be:

NO. LIQUID ASSETS?

We carry a single liquid asset account, our cash account. You may have a number of such accounts. For the example we will assume an answer of one (1).

Now a series of similar question follow. Rather than going through these questions one at a time we will list all the questions and then review our answers.

NO. OF FIXED ASSETS?

NO. INCOME FILES?

NO. EXPENSE FILES?

NO. LIABILITIES FILES?

NO. STOCKHOLDERS EQUITY?

For the example our chart of accounts has 18 accounts. One (1) account is the cash account, the only account listed as an liquid asset. Four (4) accounts will be fixed assets, two (2) will be income accounts, six (6) of the accounts will be expenses, three (3) of the accounts will be liabilities, and two (2) for stockholder equity accounts.

One limitation of our system is that all accounts must be numbered sequentially. This allows us to fit the maximum number of accounts into the minimum space. If you wish to build in expansion room you may do so with the use of dummy accounts. This procedure will allow you to add accounts with ease later on and not change the numbering system.

We will assume you answered 1,4,2,6,13,2 to the above set of questions. This means for the number of liabilities you inputted the wrong answer (13 rather than 3). We will review the correction procedure shortly. After completing the last input, the following will appear on the CRT.

(see top of next column for chart)

Since we made an error, we answer (Y) to this question. (We planned the error to illustrate a point.)

INPUT NUMBER TO BE CHANGED AND NEW RESULTS?

1	NO. LIQUID ASSETS	1
2	NO. FIXED ASSETS	4
3	NO. INCOME FILES	2
4	NO. EXPENSE FILES	6
5	NO. LIABILITIES FILES	13
6	NO. STOCKHOLDER EQUITY	2

DO YOU WISH TO MAKE ANY CHANGES (Y/N)?

The error we made was for item five above. The right answer to five should have been 3; we input 13. Answer the question with 5 for the number of the item to be corrected, followed by a comma and a 3 for the new value, i.e. 5,3. The above list of items and numbers will then be printed on the CRT with the correct information. Now you answer "N" to the question relative to making changes. The disk drives may be heard recording the above information. Following the recording the program continues with the next question.

INPUT FILE NAMES, DEBIT VALUE, CREDIT VALUE

NO. LIQUID ASSETS

1?

You must know the values to be used to initialize all accounts in the chart of accounts. For the balance sheet information this is not a problem. The year to date sales and expense information may not be available. You may initialize the income and expense year to date information with zero and run for the first year, from computer start up to date, rather than year to date. We have chosen to input this information.

Each question relative to the name of account and their debit and credit balances must be answered. The answers and the computer's response will be shown below with the minimum of narrative. The question asked by the computer precedes the question mark, and the answer given by the user (YOU) follows the question mark.

1? CASH, 5845.22,0

The question was 1? The answer was CASH,5845.22,0, meaning the first account is named CASH and it has a debit balance of \$5845.22 and a credit balance of \$0.00. The computer now responds;

1 CASH 5845.22
DO YOU WISH TO MAKE CHANGES (Y/N)? N

This completes the liquid assets information input. We now answer the questions relative to fixed assets.

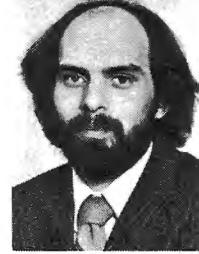
NO. FIXED ASSETS
2? HOUSE#1,30651.22,0
3? ...RES FOR DEP,0,2888.44
4? TRS-80 COMPUTER,3202.00,0.00
5? ...RES FOR DEXXX,0,506.22

Having completed the fixed assets questions and answers the computer gives you the opportunity to make corrections.

continued on page 36

A LITTLE BIT OF "GREEN" GOES A LONG WAY!!!

Micro Data Supplies is quickly becoming famous for its high quality products at low warehouse prices. We have helped thousands of people just like yourself with all their computer needs. We have accomplished this not only because of our prompt service, but because we believe in a long forgotten phrase, "Value for your money." You have my word with M.D.S., "a little bit of green goes a long way."



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32I Serial	\$289.00
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T100-2 40/40 Track SCALL

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T100-4 80/80 Track \$359.00

* * * * * * * * * * * * * * *

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Facts About RACET COMPUTES Utility Programs:

***ALL PROGRAMS ARE WRITTEN IN MACHINE LANGUAGE

***ABSOLUTELY NO KNOWLEDGE OF MACHINE LANGUAGE IS NECESSARY TO USE ANY OF THE UTILITY PROGRAMS

***EACH UTILITY PROGRAM IS CALLED UP FROM BASIC USING THE SIMPLE BASIC COMMANDS PROVIDED

***EACH UTILITY PROGRAM COMES WITH A RACET COMPUTES INSTRUCTION MANUAL

***EACH INSTRUCTION MANUAL INCLUDES SEVERAL EXAMPLES OF UTILITY USAGE

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- SORTS 1000-ELEMENT ARRAYS IN 9 SECONDS
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- COMPRESS AND UNCOMPRESS DATA IN MEMORY
- MOVE ARRAYS IN MEMORY
- DUPLICATE MEMORY
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- SCREEN CONTROLS FOR SCROLLING THE SCREEN UP, DOWN, LEFT, RIGHT AND FOR GENERATING INVERSE GRAPHIC DISPLAYS
- ADDS PEEKS AND POKEs (MOD-II VERSION ONLY)

MODEL-I VERSION	\$25.00
MODEL-II VERSION	\$50.00
MODEL-III VERSION	\$30.00

KFS-80 (KEYED FILE SYSTEM)

- CREATE ISAM FILES (INDEX SEQUENTIAL METHOD)
- ALLOWS INSTANT ACCESS TO ANY RECORD ON YOUR DISKETTE
- INSTANTLY RETRIEVE RECORDS FROM MAILING LISTS, INVENTORY, ACCOUNTS RECEIVABLE OR VIRTUALLY ANY APPLICATION WHERE RAPID ACCESS IS REQUIRED TO NAMED RECORDS
- PROVIDES THE BASIC PROGRAMMERS THE ABILITY TO RAPIDLY INSERT OR ACCESS KEYED RECORDS IN ONE OR MORE DATA FILES
- RECORDS ARE MAINTAINED IN SORTED ORDER BY A SPECIFIED KEY
- RECORDS MAY BE INSERTED OR RETRIEVED BY SUPPLYING THE KEY
- RECORDS MAY BE RETRIEVED SEQUENTIALLY IN SORTED ORDER
- RAPID ACCESS TO ANY FILE REGARDLESS OF THE NUMBER OF RECORDS
- MULTIPLE INDEX FILES CAN BE EASILY CREATED WHICH ALLOWS ACCESS OF A SINGLE DATABASE BY MULTIPLE KEYS (FOR EXAMPLE, BY BOTH NAME AND ZIP CODE)

MODEL-I VERSION	\$100.00
MODEL-II VERSION	\$175.00
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- SORT AN 85K DISKETTE IN LESS THAN THREE MINUTES!
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- ALL RECORDS ARE PHYSICALLY REARRANGED-NO KEY FILES ARE REQUIRED
- SORTS RANDOM FILES CREATED BY BASIC, INCLUDING FILES CONTAINING SUB-RECORDS SPANNING SECTORS
- SORTS ON ONE OR MORE FIELDS IN ASCENDING OR DESCENDING ORDER
- FIELDS MAY BE STRINGS, INTEGER, BINARY INTEGER OR FLOATING POINT
- THE SORTED OUTPUT FILE MAY OPTIONALLY HAVE FIELDS DELETED, RE-ARRANGED OR PADDED
- SORT COMMANDS CAN BE SAVED FOR REUSE
- SINGLE SORT, MERGE, OR MIXED SORT/MERGE OPERATIONS MAY BE PERFORMED
- SORTED OUTPUT MAY BE WRITTEN TO A NEW FILE, OR REPLACE THE ORIGINAL INPUT FILE

MODEL-I VERSION	\$75.00
MODEL-II VERSION	\$150.00
MODEL-III VERSION	\$90.00

INFINITE BASIC

- ADDS OVER 80 COMMANDS TO BASIC
- SORTING...STRING...CENTERING/ROTATION/TRUNCATION...JUSTIFICATION...DATA COMPRESSION...STRING...TRANSLATION/COPYING...SCREEN DISPLAY...SCROLLING...MATRIX OPERATIONS...SIMULTANEOUS EQUATIONS (THROUGH MATRIX INVERSION)...DYNAMIC ARRAY RESHAPING

MODEL-VERSION	\$50.00
MODEL-III VERSION	\$60.00
NOT AVAILABLE ON MODEL-II	

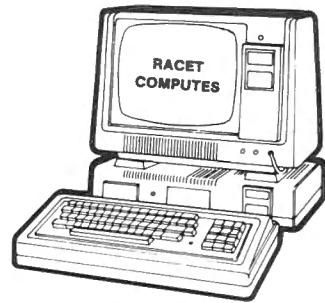
INFINITE BUSINESS

- ADD ON PACKAGE TO INFINITE BASIC (REQUIRES INFINITE BASIC)
- ADDS PACKED DECIMAL ARITHMETIC WITH 127 DIGIT ACCURACY (+, -, /)
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- HASH CODES

MODEL-I VERSION	\$30.00
MODEL-III VERSION	\$30.00
NOT AVAILABLE ON MODEL-II	

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CREATED BY  RACET COMPUTES



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MODEL II SPEEDUP—FAST DISK I/O

THIS IS AN ENHANCEMENT FOR TRSDOS 2.0 THAT WILL RADICALLY DECREASE DISK ACCESS TIME.

- DISKS BOOT FASTER TO DOS
- IMPROVE DISK I/O UNDER BASIC

MODEL-II ONLY \$99.95



HSDS HARD DISK DRIVE SOFTWARE

- MAKES TRSDOS COMPATIBLE WITH MOST HARD DISK DRIVES
- ADDS MANY EXTRA FEATURES TO TRSDOS..... \$400.00

COMPROC (COMMAND PROCESSOR)

- AUTO YOUR DISK TO PERFORM ANY SEQUENCE OF INSTRUCTIONS THAT YOU NORMALLY GIVE FROM THE KEYBOARD (FOR EXAMPLE, INSERT THE DISKETTE, PRESS THE RESET BUTTON. YOUR COMMAND FILE COULD AUTOMATICALLY SHOW YOU THE DIRECTORY, SHOW THE FREE SPACE ON THE DISKETTE, LOAD A MACHINE LANGUAGE SUBROUTINE, LOAD BASIC, LOAD AND RUN A BASIC PROGRAM, AND SELECT A GIVEN ITEM ON YOUR MENU...ALL WITHOUT TOUCHING THE KEYBOARD!)

MODEL-I VERSION \$20.00
MODEL-III VERSION \$30.00
NOT AVAILABLE FOR MODEL-II

DISCAT (DISKETTE CATALOG SYSTEM)

- THIS COMPREHENSIVE DISKETTE CATALOGUING/INDEXING UTILITY ALLOWS THE USER TO KEEP TRACK OF THOUSANDS OF PROGRAMS IN A CATEGORIZED LIBRARY...FILE INCLUDES PROGRAM NAMES AND EXTENSIONS, PROGRAM LENGTH, DISKETTE NUMBERS AND FREE SPACE ON EACH DISKETTE...KEEP A COMPLETE CATALOG OF THE DIRECTORIES ON ALL YOUR DISKETTES IN ALPHABETICAL ORDER (SORTED ON EACH DISKETTE)...OR COMPLETE ALPHABETICAL LIST OF PROGRAMS ON ALL YOUR DISKETTES)

MODEL-I VERSION \$50.00
MODEL-III VERSION \$50.00
MODEL-II VERSION (SEE MODEL-II UTILITY PACKAGE)

BLINK (BASIC LINK FACILITY)

- LINK FROM BASIC PROGRAM TO ANOTHER SAVING ALL VARIABLES
- THE CHAINED PROGRAM MAY EITHER REPLACE THE ORIGINAL PROGRAM OR CAN BE MERGED BY STATEMENT NUMBER

MODEL-I VERSION \$25.00
MODEL-III VERSION \$30.00
MODEL-II VERSION \$50.00

REMODEL-PROLOAD

- THE ULTIMATE RENUMBERING PROGRAM...RENUMBERS ALL OR PART OF A PROGRAM (ALLOWS PARTIAL RENUMBERING IN MIDDLE OF PROGRAMS)
- PARTIAL OR COMPLETE MERGE OF TWO CASSETTE PROGRAMS

MODEL-I VERSION \$35.00
MODEL-III VERSION \$35.00
NOT AVAILABLE ON MODEL-II

COPSYS

- COPY AND VERIFY ALL MACHINE LANGUAGE (SYSTEM) TAPES WRITTEN IN STANDARD FORMAT...IF YOU BUY A MACHINE LANGUAGE PROGRAM, COPSYS ALLOWS YOU TO EASILY COPY THE PROGRAM ONTO ANOTHER CASSETTE AS A BACKUP

MODEL-I VERSION \$15.00
MODEL-III VERSION \$20.00
NOT AVAILABLE ON MODEL-II

MODEL II FASTBACK—FULL DISK BACKUP IN 55 SECONDS

IN BUSINESS TIME IS MONEY, & ONE BACKUP IS WORTH A THOUSAND TEARS.

- WORKS ON SYSTEMS WITH 2 OR MORE DRIVES
- CAN REPLACE YOUR EXISTING TRSDOS 1.2 or 2.0 BACKUP UTILITY

MODEL-II ONLY \$75.00



MODEL-II UTILITY PACKAGE

- ESSENTIAL FOR EVERY MOD-II OWNER
- RECOVER AND REPAIR FILES AND DIRECTIONS (BY JUST ENTERING A SINGLE COMMAND)
- XCOPY...SIMILAR TO COPY BUT CAN COPY ANY NUMBER OF FILES AT ONE TIME FASTER AND MORE ACCURATE THAN COPY SINCE RECORDS ARE COPIED IN GROUPS RATHER THAN ONE RECORDS AT A TIME...USING XCOPY YOU CAN COPY FILES THAT CAN NOT BE COPIED USING THE COPY COMMAND
- SZAP...PROVIDES THE CAPABILITY TO READ AND MODIFY ANY SECTOR ON A DISKETTE
- XHIT...CAN BE USED TO REPAIR A DISKETTE DIRECTORY
- DCS...DIRECTOR CATALOG SYSTEM IS A UTILTY FOR THE MANAGEMENT OF USER DISKETTES...SETS OF A MULTIPLE DISKETTE DIRECTORY FILE (WITH UP TO 1200 INDIVIDUAL FILE NAMES)...ALLOWS SELECTIVELY LISTED OR PRINTED LISTS OF DIRECTORY FILES IN COMBINED SORTED ORDER (FOR EXAMPLE, LISTED ALPHABETICALLY BY DISKETTE...OR A COMPOSITE ALPHABETICAL LIST OF ALL YOUR DISKETTES)
- DEBUG II...ADDS SEVERAL FEATURES TO THE PRESENT TRSDOS DEBUG UTILITY INCLUDING SINGLE INSTRUCTION CYCLE, AUTO (LOOP) BREAKPOINTS, SUBROUTINE CALLING, BREAK-KEY DETECTION AND MANY OTHERS.

MODEL-II ONLY \$150.00

MODEL-II DEVELOPMENT SYSTEM

- THIS PACKAGE IS A MUST FOR ASSEMBLY LANGUAGE PROGRAMMERS
- INCLUDES THE MICROSOFT EDITOR ASSEMBLER PLUS WITH ENHANCEMENTS FOR THE MODEL-II
- A COMPLETE DISASSEMBLER
- SUPERZAP FOR READING AND MODIFY ANY SELECTOR ON A DISKETTE

MODEL-II ONLY \$125.00

MOD-II BASIC CROSS REFERENCE UTILITY

- LIST OR PRINT A SORTED CROSS REFERENCE TO ALL NUMBERS OR VARIABLES WITHIN A PROGRAM
- LIST OF PRINT ALL LINE NUMBERS CONTAINING A SPECIFIED STRING OF CHARACTERS

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(714) 997-4950

PRACTICAL BUSINESS PROGRAMS

continued from page 33

2	HOUSE#1	30651.22	0
3	...RES FOR DEP	0	2888.44
4	TRS-80 COMPUTER	3203.00	0
5	...RES FOR DEXXX	0	506.22

DO YOU WISH TO MAKE CHANGES (Y/N)?

You will note there was an error in item 5 above which should be corrected. To save space we will assume you have answered (Y) to the last question and then made the proper correction to obtain the correct results.

We now continue with the input of our chart of accounts.

NO. INCOME FILES

6?RENTAL INCOME,5000,0

7?CONSULTING INCOME,4000,0

6 RENTAL INCOME 5000.00

7 CONSULTING INCO 4000.00

0

DO YOU WISH TO MAKE CHANGES (Y/N)? N

NO. EXPENSE FILES

8?MAINTENANCE,0,3000

9?SUPPLIES,0,2000

10?OPERATIONS,0,1000

11?TRAVEL,0,1500

12?TELEPHONE,0,500

13?TAXES,0,6000

8 MAINTENANCE 0

3000.00

9 SUPPLIES 0

2000.00

10 OPERATIONS 0

1000.00

11 TRAVEL 0

1500.00

12 TELEPHONE 0

500.00

13 TAXES 0

600.00

DO YOU WISH TO MAKE CHANGES (Y/N)? N

NO. OF LIABILITIES FILES

14?MORTGAGE#1,0,25000

15?COMPUTER LOAN,0,2000

16?BUSINESS LOAN,0,1500

14 MORTGAGE#1 0

25000.00

15 COMPUTER LOAN 0

2000.00

16 BUSINESS LOAN 0

1500.00

DO YOU WISH TO MAKE CHANGES (Y/N)? N

NO. OF STOCKHOLDERS EQUITY

17?CAPITAL STOCK,0,0,6000

18?SURPLUS,0,1804.78

17 CAPITAL STOCK 0

6000.00

18 SURPLUS 0

1804.78

DO YOU WISH TO MAKE CHANGES (Y/N)? N

At this point the entire chart of accounts is printed out on the CRT again. To save space we have chosen not to repeat the print out here. The summary information is shown below:

FOR BALANCE SHEET

SUM OF DEBITS 39,699.44 SUM OF CREDITS 39,699.44

FOR PROFIT AND LOSS

SUM OF DEBITS 9,000.00 SUM OF CREDITS 8,600.00

PROFIT FOR PERIOD -400.00

For many people it is possible to simply fire up the

computer and RUN "GLMENU", call up START and go to it. It is not hard to create a sample set of data if you wish to do so. We assumed a two disk system such that you can keep your data on disk 1 and the program on disk 0. You may use the same set of programs for a number of different companies all on different disks. Place the program disk in drive 0 and the data disks in 1 as needed.

If you are using a practice disk, use file names such as JUNK and NOTHING. Then you can use the KILL "name of program" command to remove unwanted files at a later time.

Because of the size of the CRT, it is not possible to display all the above on the screen at the same time. We have used the procedure of paging through the information whenever the screen was not big enough to hold all information of interest. The user is asked to hit the ENTER key after reading the data presented or whenever they are ready to proceed.

The only problem associated with using this input startup routine for income and expense type of accounts is the determination of initial values of these accounts. If you are starting a new business with all zeros you would have no problem in identifying the entries. Close coordination with your accountant is highly recommended for this initialization activity.

When inputting the year to date information for sales data it will be a credit entry. When inputting year to date information for expense information it will be a debit entry. All other entries should be as they appear on the various books of account.

When you have completed all initial data input information you will have printed on the CRT a review of all information you have just put in as already noted.

In our example the sum of the debits and the sum of the credits on the balance sheet are equal. They are not equal on the year to date listing of the profit and loss information. This is correct. One hopes to have a balance sheet in balance and a net profit on the profit and loss statement. In this case the profit for the period was a loss.

After printing out the summation information a menu type question will appear on the screen.

RECYCLE, PRINTER OR CONTINUE (R/P/C) ?

You may, if you wish, obtain a hard copy of the information you have just put into the machine, or you can start over or continue. After the printer is finished you will be returned to the above menu. If you recycle it will look like you are starting over. This is not quite true. If you hit the ENTER key for any given question rather than inputting a new answer the old answer is saved.

After inputting "C" to the above you will be asked the file name.

FILE NAME OLD BALANCE ?

We use the name of the month plus 2 for the old balance question whenever we are asked for a name. Our answer to the above question would be AUGUST2.

You will see on the CRT AUGUST2:1 and AUGUST2p:1 and you will hear the file being saved on your disk. These two files are used to save the updated information of the balance sheet and the profit and loss statement

MOD I/III SPEED MOD

The only resource you can't replace is TIME. PLUG IN A SPRINTEN (by Holmes Engineering) and

TRIPLE THE SPEED of your TRS-80 MODEL I OR MODEL 3.

YES! A NEW Z-80B MICROPROCESSOR IS INCLUDED!

YES! Special circuitry handles your slower memory chips.

YES! Automatic switch down to "normal" for disk I/O.

YES! IT IS ABSOLUTELY FANTASTIC and only 99.50 COMPLETE!!

Only the cream of the crop -- for you, from HACKS.

SCRIPPLUS v3.0 (by ROSTEK) is the software "patch" for SCRIPSIT (c) that lets you output control codes to CHANGE TYPE STYLES, UNDERLINE, etc. from within your text files. Written especially for the MX-80 but works fine with most any printer that accepts control codes. Makes your printer do all the tricks it was designed for. +DIR, KILL, MERGE, and MORE. WHILE IN SCRIPSIT (c).

How many times have you wished? Here 'tiz ON DISK 39.95

Need a SUPERFINE lowercase CHARACTER GENERATOR for your MOD I? KSG Technology builds 'em, and we've got one just for you. Beautiful lowercase -FULL DECENDERS- All of the graphics, of course. INCLUDES the SPECIAL GRAPHICS for CHR\$(0) thru CHR\$(31) omitted in the later Radio Shack lower case chips. Ask for the CGA-2. You'll love it! Only 29.95

Did you ever bomb a disk? SUPER UTILITY (by Kim Watt) WILL AUTOMATICALLY RECOVER BOOT SECTIONS, GAT TABLES, READ AND COPY PROTECTED MEDIA, TRANSFER FROM ONE DOS TO ANOTHER, SINGLE OR DOUBLE DENSITY, and on, and on, and on . . . You just wouldn't believe . . . Includes a hundred and some odd vital functions. The BEST (no doubt!) and very, very highly recommended for ANYONE that uses a TRS-80 MOD I or MOD 3 with any kind of DISK and any kind of DOS. You just got to use it to realize what you've got here! The name "SUPER UTILITY" is a gross under-statement. One use can easily pay for the program. 48K required. Specify 35tk, 40tk or 80 tk media for your Mod 1 or Mod 3. Absolutely professional! You need this! Don't get caught without it. 74.95

respectively. The name AUGUST2 is the name you put in. The name AUGUST2P is your name plus 2. This is added automatically by the computer. The :1 at the end of both names indicates the disk the file is being stored on.

You will then return to GLMENU.

RUNNING NAME

The second program in the start up series is NAME. This program is used to record the name and address of the company for which the accounting system is being run. Name is one of the smallest programs in the accounting set.

Your only option is to input a new name and address. You can only wipe out the old name and address, you may not update. The amount of information and the number of times this program is used did not justify a sophisticated program.

The program starts with a question relative to what disk is being used and asks you to input the company's name and address. Five lines are allowed.

DISK?

INPUT COMPANY NAME AND ADDRESS FIVE LINE

?

If you do not need five lines input a blank by hitting the enter key. After you have completed the required input the results will be printed on the CRT.

You will be given the option of correcting any of the lines in which you may have made an error.

ALL HARDWARE Model I Lowercase

TRS-80 is a trademark of Tandy Corp

DUALCASE

UPPER/lowercase, full time from power-up; NO software; Standard typewriter keyboard operation (shift to UPPERCASE); Control characters can be displayed; 128 Total character set plus full graphics.

ELECTRONIC SHIFT-LOCK

No extra keys or switches. Simply tap either shift key. UPPERCASE lock normal shift unlocks

DE-B-B-BOUNCE At no extra cost
(At your option)

BLOCK CURSOR If you like (No chg)
SWITCHABLE from key board

"THE PATCH" is compatible with any word processor, any DOS and also other languages which use ROM subroutines. Assembled and tested. \$127.00

"THE PATCH" unit plugs into the ROM sockets (does not replace existing ROM). Lowercase does require installation of the extra video ROM (supplied with "THE PATCH")

Detailed instructions guide even the most inexperienced owner to complete installation in about 30 minutes

WHEN ORDERING SPECIFY:

"Mem Size" "Memory Size"
Any your choice of any/all options

To order, send payment plus \$2.00 shipping and handling. Texas residents add 5% sales tax/

WHEN ORDERING SPECIFY:

"Mem Size" "Memory Size"
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National Distributors

713-455-3276

CHANGES (Y/N) ?

When you have completed all your corrections and have answered (N) to the above question you will be given the option of printing the results on your printer. After this the data will be recorded and you will be returned to GLMENU.

EXAMINING THE PROGRAMS

"START" is the program used to initialize the names and values in the chart of accounts. The first six statements in the program define the strings associated with the variable A\$ which are used as prompts throughout the program. Line 70 begins the input of data to be used by the program. In this line the disk upon which the file is to be placed is input.

Line 80 adds the disk information to the name of the file to be used in the program.

Lines 90 through 220 are designed to input the name and value of each account in the chart of accounts. Line 230 begins the printing of the input information for verification by the user. This task is completed in line 320.

An option for obtaining hardcopy begins in line 330 and continues through line 380. The final part of the program from 390 on is designed to store the information on your disks as specified.

"NAME" is an eight line program designed to store the name and address of your company in a disk file. This program was kept simple since it is used so seldom. Line 20

inputs the disk to be used, line 30 inputs the company's name and address, line 40 prints the input for verification, and lines 50-60 allows the user to make changes if needed.

The last two lines of the program saves the results for future use.

PROGRAM LISTINGS

```

10 CLEAR 1000: REM "START" TO OPEN FILES....NUMBERS
20 CLS: AX$="INPUT NUMBER TO BE CHANGED AND NEW RESULTS"
30 A$(1)="NO. LIQUID ASSETS":A$(2)="NO. FIXED ASSETS":
   A$(3)="NO. INCOME FILES"
40 A$(4)="NO. EXPENSE FILES":A$(5)="NO. LIABILITIES FILES"
50 AAS$="DO YOU WISH TO MAKE CHANGES (Y/N)":A$(6)="NO.
   STOCKHOLDERS EQUITY":BB$="#,,##,##.##"
60 CCS="#" % % #####.##": CLS
70 PRINT "START UP OF SYSTEM ESTABLISHES THE CHART OF
   ACCOUNTS": INPUT "DISK ";DD$: NO$="NO": FF$="FILE":
   FJ$=FF$+"N":+DD$:
80 NO$=NO$+": "+DD$:FF$=FF$+": "+DD$:
90 FOR I=1 TO 6: PRINT A$(I):; INPUT J(I): NEXT I
100 SS=0: FOR I=1 TO 6: SS=SS+J(I): PRINT I,A$(I),J(I):
   NEXT I: DD=SS
110 PRINT AAS:; INPUT Y$: IF Y$="N" THEN DIM FIS(DD),X#(DD,2):
   GOTO 140
120 IF Y$<"Y" THEN 110
130 PRINT AX$: INPUT I,J(I): GOTO 100
140 OPEN "0",1,NO$: FOR I=1 TO 6: PRINT #1,J(I): NEXT I:
   CLOSE 1
150 PRINT "INPUT FILE NAMES,DEBIT VALUE, CREDIT VALUE":
   SUM=0:J(0)=1:XX=0
160 FOR P=1 TO 6:SUM=SUM+J(P):XX=XX+J(P-1):TT=SUM
170 PRINT A$(P): FOR I=XX TO SUM: PRINT I,:; INPUT
   FI$(I),X#(I,1),X#(I,2): NEXT I
180 G=0: FOR I=XX TO SUM: G=G+1: PRINT USING CCS;
   I,FI$(I),X#(I,1),X#(I,2): IF G=13 THEN G=0:
   INPUT "ENTER TO PAGE";DU$
190 NEXT I
200 PRINT AA$;: INPUT Y$: IF Y$="N" THEN NEXT: GOTO 230
210 IF Y$<"Y" THEN 200
220 PRINT AX$: INPUT I,FI$(I),X#(I,1),X#(I,2): GOTO 180
230 V=0:SU=0:XX=0: FOR P=1 TO 6: SU=SU+J(P): XX=XX+J(P-1):
   PRINT A$(P)
240 FOR I=XX TO SU: V=V+1: PRINT USING CCS;I,FI$(I),X#(I,1),
   X#(I,2): IF V=9 THEN V=0: INPUT "ENTER TO CONTINUE";DU$
250 NEXT I,P
260 PC#=0:PD#=0:SC#=0:SD#=0: FOR I=1 TO J(1)+J(2):
   SC#=SC#+X#(I,2):SD#=SD#+X#(I,1): NEXT I
270 O=J(1)+J(2):P=O+J(3)+J(4): FOR I=O+1 TO P:
   PC#=PC#+X#(I,2): PD#=PD#+X#(I,1): NEXT I
280 FOR I=P+1 TO P+J(5)+J(6): SD#=SD#+X#(I,1):
   SC#=SC#+X#(I,2): NEXT I
290 PRINT "FOR BALANCE SHEET": PRINT "SUM DEBITS ";
   PRINT USING BB$;SD#:; PRINT " SUM CREDITS ";
   PRINT USING BB$;SC#
300 PRINT "FOR PROFIT & LOSS": PRINT "SUM DEBITS ";
   PRINT USING BB$;PD#:
310 PRINT " SUM OF CREDITS ";: PRINT USING BB$;PC#:
   PRINT " PROFIT FOR PERIOD";: PRINT USING BB$;PC#-PD#
320 INPUT "RECYCLE, PRINTER OR CONTINUA (R/P/C)";Y$:
   IF Y$="P" LPRINT"CHART OF ACCOUNTS" ELSE GOTO 350

```

```

330 FOR I=1 TO TT: LPRINT USING CCS;I,FI$(I),X#(I,1),
   X#(I,2): NEXT I
340 LPRINT "FOR BALANCE SHEET": LPRINT "SUM OF DEBITS";:
   LPRINT USING BB$;SD#:; LPRINT " SUM OF CREDITS ";
350 IF Y$="P" THEN LPRINT USING BB$;SC#
360 IF Y$="P" THEN LPRINT "FOR PROFIT & LOSS": LPRINT "SUM
   OF DEBITS ";: LPRINT USING BB$;PD#:; LPRINT " SUM OF
   CREDITS ";: LPRINT USING BB$;PC#: LPRINT " PROFIT FOR
   PERIOD ";: LPRINT USING BB$;PC#-PD#: GOTO 320
370 IF Y$="R" THEN 150
380 IF Y$<"C" THEN 320
390 OPEN "0",1,FF$: FOR I=1 TO SUM: PRINT #1,CHR$(34);
   FI$(I);CHR$(34): NEXT I: CLOSE 1
400 INPUT "FILE NAME OF OLD BALANCE";OP$: OB$=OP$+": "+DD$:
   OP$=OP$+"P+": "+DD$: PRINT OB$,OP$
410 OPEN "0",1,OB$: OPEN "0",2,OP$
420 A=1:B=J(1)+J(2):C=B
430 FOR I=A TO B: PRINT #1,X#(I,1),X#(I,2): NEXT I:
   IF B=C THEN 470
440 A=1+B: B=B+J(3)+J(4)
450 FOR I=A TO B: PRINT #2,X#(I,1),X#(I,2): PRINT #1,0,0:
   NEXT I
460 A=B+1:B=B+J(5)+J(6): GOTO 430
470 CLOSE 1: CLOSE 2
480 LOAD "GLMENU",R

```

```

10 CLS: CLEAR 1000:REM "NAME"
20 INPUT "DISK";DD$:FJ$="FILEN":+DD$:
30 PRINT "INPUT COMPANY NAME AND ADDRESS FIVE LINES":
   FOR I=1 TO 5: LINE INPUT NA$(I): NEXT I
40 FOR I=1 TO 5: PRINT I,NA$(I): NEXT I: PRINT "CHANGES
   (Y/N)":; INPUT Y$: IF Y$="N" THEN 70
50 IF Y$<"Y" THEN 40
60 INPUT "NUMBER";I: PRINT I:; LINE INPUT "NEW DATA ";
   NA$(I): GOTO 40
70 OPEN "0",1,FJ$: FOR I=1 TO 5: PRINT #1,CHR$(34),NA$(I),
   CHR$(34): NEXT I: CLOSE 1: INPUT "HARD COPY (Y/N)":Y$:
   IF Y$="Y" THEN FOR I=1 TO 5: LPRINT NA$(I): NEXT I
80 LOAD "GLMENU",R

```

SUMMARY

The two programs presented this month are designed for the user to input the initial values of the chart of accounts and the name and address of the company. With the program from last month you can now start to structure the accounting system you plan to use.

Next month we'll review the TRANSAction program, which inputs periodic transactions into the system. For a complete publication schedule we refer you to the list printed at the beginning of this article.

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BEGINNER'S CORNER

Spencer Koenig

A User's Tool from the Magic Box: Your BASIC Editor

Welcome to the Beginner's Corner. This is your corner if you happen to be starting out for the first time on the trek towards computer literacy and know-how. If you're like me and are starting as I did, then I can help make some of those bumps on the road to success less noticeable.

When I began, I started by typing in listings of programs that I had collected from magazines and books that contained games and assorted graphics dazzlers. As I recall, I was one of those too impatient to read thoroughly through the manual about the BASIC editor (it's built into every TRS-80). If I had, I am sure I would have found the experience a lot less frustrating.

FIRST: A LITTLE ADVICE

You should become fluent in using the editor, and then as you continue to learn more about other languages available for the TRS-80, you will find out something that might seem a little bit surprising. Many editors that come with other languages and compilers (some languages are compiled, such as PASCAL, and some are interpreted, like the BASIC in your Model I/III) are similar to, if not the same as, the editor of the TRS-80 Model I/III, regardless of the package with which they come.

When I started learning to use the Microsoft Fortran package, the editor was very similar. This is also true of the EDTASM, T-BUG, and Tiny PASCAL programs that are around for the Model I and III. So a little extra time can pay off in bigger dividends. Read those manuals carefully!

ENOUGH ADVICE. NOW SOME FACTS

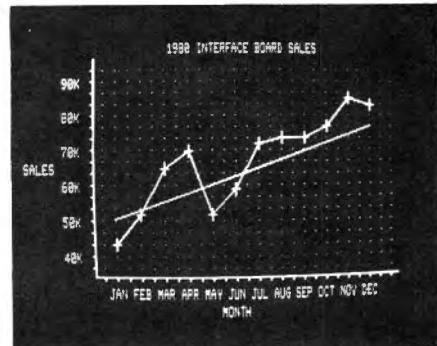
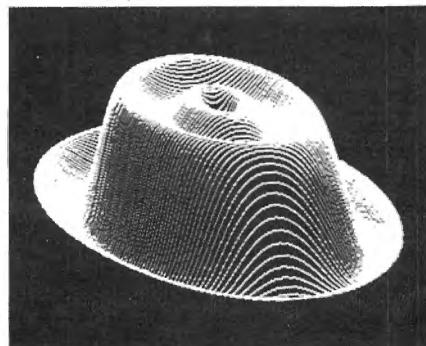
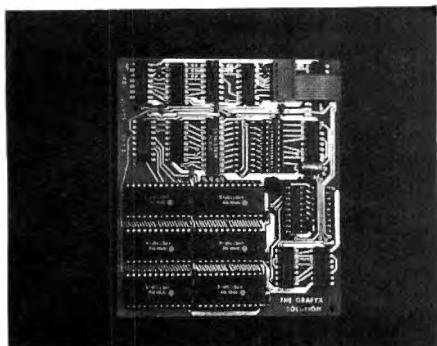
In EXAMPLE 1, we have the list of the editor function control keys in the order in which they appear in the manual that comes with every machine.

(See top of next page.)

I've added something that might help you remember what each of the control keys do. If you remove the hyphen in the word L-list, for example, you get List. If it makes it any easier, good. If not, then I suggest that you make a photocopy of the chart and pin it somewhere in sight for easy access.

Just to make sure that you understand how the system works, I'm going to give you some problems to solve, some tips to remember and some interesting things to try. But first things first.

Let's pretend that this is the first time you've typed in a



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EXAMPLE 1

EDIT
<ENTER> exits the editing session with all changes
nS-pace Bar (move over n = any number of times)
n<- (BACK-ARROW) (move back)
SHIFT + UP-ARROW (escape from sub-mode) (sounds like
a new game)

Basic sub-modes

L-ist
X-tend (the line)
I-nsert
A-bort ("do over" from scratch)
E-xit or End (ends the edit session and all changes
are accepted) <ENTER> is as good.
Q-uit (no changes are made and ends EDIT mode)
H-ack (new end of line)
nD-elete
nC-hange
nSc-each
nK-ill (more like search and destroy)

code you're on or the line that was last entered. THIS IS IMPORTANT, because it doesn't work! (The Model III manual is corrected.)

If you're in Level II BASIC and you type in EDIT and <ENTER>, then you get a message from the computer that says "UL ERROR," which everyone knows means Umbrae Laxity (if you don't believe me look it up). This is all right too, because if you happen to look up LAXITY in your thesaurus you'll find then that ERROR is redundant (gotcha, but seriously folks)!

If you're debugging a program and the program crashes, then you enter EDIT mode automatically on the line that apparently has an error. (Notice that I said apparently, because it's not always the case. There will be a future article on logical and not-so-logical errors.) Usually, you have to remember to specify the line number you wish to edit.

The next most important key is the SHIFT UP-ARROW combination. When you go into the edit mode you then have several choices from which to choose. These choices are called sub-modes by the manual but are really the BASIC edit functions. If you make a choice and then find it wasn't the one you wanted, the way to get to the correct mode is to first press SHIFT and then UP ARROW at the same time. You should find that this command will become a habit after a while because of constant use.

The SHIFT UP-ARROW is perfect for changing modes in mid-line or mid-edit, but what if you made a mistake and want to start over? To exit without any changes, you have to go to the A-bort sub-mode, but before you do that, first press our old friend SHIFT UP-ARROW (see what I mean, it WILL become a habit). If you want to exit but include all your changes, then you have two choices: (1) press <ENTER> (the easiest), or (2) press the "E" key. The <ENTER> key and the "E" key will end the edit session with all changes as you left them.

Now that you know what to do if you make a mistake using the editor, what do we do about the mistake in the program? Good question. I am glad I thought of it.

Going back to EXAMPLE 2, first we have to decide which sub-mode we want to use. Obviously, there are several alternatives. The most reasonable is to l-nsert the additional letters NOTHER in the word ANOTHER. Now that we know what we want to do, we have to figure out the way to do it.

STEP 1: Go into edit mode by typing EDIT 10. What should appear on your screen should look like EXAMPLE 4.

EXAMPLE 4

10-

Don't worry, the line is still there. The cursor is placed at the beginning of the line ready for you to edit.

STEP 2: Space over to the space just past the letter A(NOTHER).

There are three ways to accomplish this task. The first is to count out loud and find that there are 16 spaces (17?) up to the letter "A". You would then hit the Space bar 16 (or is it 17?) times until you see the letter "A". The second method is to hit the number 16 (any doubts?) and then the

program, and you're nervous (OK everybody be intimidated. Ready? Good.), and naturally you make a mistake. If you want to have fun, kids, force your mom to sit at the machine to type something in, and as soon as she's made a mistake make lots of noise about the machine being broken and tell her she has to buy you the new IBM-PC (only 4 grand) to make up for it. Nice, huh? (ONLY KIDDING!)

I remember the first time I had my hands on a machine, boy was I nervous. If you'd taken my pulse you'd have thought that I was playing and winning a game of SPACE INVADERS or something crucial like that. OK, lets say you have a line that looks something like EXAMPLE 2.

EXAMPLE 2

10 PRINT "THIS IS A FINE MESS YOU'VE GOTTEN ME INTO"

The only problem is that you wanted it to look like EXAMPLE 3.

EXAMPLE 3

10 PRINT "THIS IS ANOTHER FINE MESS YOU'VE GOTTEN ME INTO."

OK. What do you do? A reasonable thing would be to type the whole line over again. In this case the line isn't very long, so it really isn't a big problem, but multiply this for a thousand-line program and you've got much bigger problems.

First of all, the obvious thing to do is to get into the edit mode by typing EDIT 10. The Radio Shack manual (Model I 2nd edition) says that if you only type EDIT then the computer assumes you want to edit the current line of

space bar to automatically space over 16 spaces. The third, and by far the easiest (so why didn't you say so in the first place?), is to use the S-each feature.

The S-each feature requires two pieces of information. The first is the number (that's what the "n" is for) of the occurrence of the character you want. The second is the character you're looking for (nSc <- See the "c"? That stands for character). You can get away with not specifying the number. The computer will assume that the number is 1 or that you want the first occurrence of the character.

The steps in using the search feature are as follows:

- (1) Type in 1 (as in "n" = 1 for nSc)
- (2) Then press the S key
- (3) Then press the A key (as in "c"haracter = A)

What you should be left with is something like EXAMPLE 5.

```
:::::::::::::::::::  
EXAMPLE 5  
10 PRINT "THIS IS -  
:::::::::::::::::::
```

The next step is to space over 1 more time and press the I-nsert key, but just to get into the habit, first press SHIFT UP-ARROW. Then press the I-nsert key. I think you'll find that if you've typed in as many programs as I have, you will make many mistakes using the editor by going from one sub-mode to another and getting unusual results. Get the SHIFT UP-ARROW habit first and save yourself trouble.

Next, insert the letters NOTHER. Did I hear you say "OOPS!"? If you made another mistake, don't worry. Simply press the SHIFT UP-ARROW (S-U-A from now on) and then press "A" to abort and "L" to list the line (don't forget S-U-A first). At this point you'll still be in EDIT mode on line 10.

OK, suppose we've made the correction we intended but now we want to X-tend the line. Fine. Press the X-tend key, and the cursor will move to the end of the line where you can erase characters by moving back over them, or add to the line by typing in what you will.

What happens here is that the X-tend mode puts you into automatic I-nsert (aye, aye, captain) and/or BACK ARROW delete at the same time. Nifty, huh? Be aware, however, if you are at the end of the line (so to speak) but you want to back up a bit without erasing then you need our old friend S-U-A first. Then you can use the n<- (BACK ARROW) and back up any number of spaces or characters.

There'll be some points where a bit of shorthand is appreciated. The keys that I'm talking about are the nD-lete, nC-hange and nKc-ill. These commands can save you a great deal of hacking energy. Let's look at EXAMPLE 6 so I can show you what I mean.

```
:::::::::::::::::::  
EXAMPLE 6  
20 PRINT" THIS IS THE LINE I WANT TO EDIT "  
PRINT" BUT THIS IS THE LINE I DON'T WANT TO EDIT"  
30 PRINT" NOW THIS IS THE LINE I DON'T WANT TO EDIT:  
PRINT" BUT THIS IS THE LINE I WANT TO EDIT "  
:::::::::::::::::::
```

OK, this looks like a pretty good problem to solve with any number of interesting solutions. But, before we get to

the solutions, first let me clarify the problems.

- (1) Line 20
 - (a) delete IS THE LINE from the top
 - (b) change the first EDIT to DISPLAY
- (2) Line 30
 - (a) quickly get to the 2nd occurrence of LINE
 - (b) shorten the second part of line 30 to read "time for leaving"

By now, you should be aware that the keys needed are the S-each, H-ack, nC-hange, L-ist, and nD-lete, but you could have also used the nKc-ill key. This is a little like the nD-lete key in that it allows you to get rid of many characters with a few key strokes. The difference is that the nD-lete key is meant for mid-line edits of a few characters, and nKc-ill is more for whole sections. For example, see EXAMPLE 7.

```
:::::::::::::::::::  
EXAMPLE 7  
10 PRINT ": THIS IS THE LINE I WANT TO EDIT : "  
:::::::::::::::::::
```

If I wanted EXAMPLE 7 to read like EXAMPLE 8,

```
:::::::::::::::::::  
EXAMPLE 8  
10 PRINT ": THIS LINE, I WANT TO EDIT : "  
:::::::::::::::::::
```

I could accomplish this simply by typing:

- (1) 2SI (search for the 2nd occurrence of I)
- (2) 6D (don't forget that the space between "IS" and "The" counts as a character)
- (3) L
- (4) I
- (5) ,
- (6) <ENTER>

and that about covers it. But what if I had a more complex line like EXAMPLE 9?

```
:::::::::::::::::::  
EXAMPLE 9  
10 PRINT "I WANT TO EDIT THIS": "BUT I DON'T WANT TO EDIT THIS":  
" BUT I DO WANT TO EDIT THIS "  
:::::::::::::::::::
```

Obviously, there are some errors in line 10 of EXAMPLE 8. The syntax error (SN error) arising because you have no PRINT command for each of the quotes but that's not the problem we want to solve here. What we want is to be left with only the middle statement.

The way to accomplish this using only a few strokes is as following;

- (1) get past the PRINT statement by using the 5-SPACE BAR command.
- (2) 1K:-ill tells the computer that you want to kill all characters up to the first colon (:).
- (3) S-each will get the cursor to the next colon where you can again use the
- (4) 1K:-ill to eliminate everything to the end of the line.

continued on page 45

FINDIT

Ken Knecht

Here is a simple data base program for storing some types of data. I use it for references to magazine articles or books. As you will see, it could be used for many other types of information:

The program will run on a TRS-80 Model III, or on a TRS-80 Model I with a disk BASIC that will support the OPEN "E" statement for sequential files, such as NEWDOS/80, VTOS or LDOS. It will not run under NEWDOS or TRSDOS on the Model I as written. See Table 1 for the changes that will permit running under these operating systems. Note that if you use this version of the program you will waste 256 minus the length of entry bytes of disk space for each entry stored. That's why I used the sequential files instead.

If you select the "E" (Enter) mode from the menu and select a file name (the group you wish to enter your data under) and then enter the data. Don't use the "*" character in your entry except for an abbreviation (more later).

It would be best to use several files to keep the search time short when accessing the information, but not too many to keep from overloading the disk. Also, it is hard to remember a large number of group names. The file name (group name) is a standard TRS-80 file name. See your manual for details if you don't know how to name a file. Normally it would be up to eight letters or digits, with the first character a letter.

The information can be whatever you wish, up to 240 characters including spaces. If the entry is shorter, no disk space is wasted.

If you are entering magazine articles, you might use the article name, author, a brief resume or the contents, the magazine name, issue, and page number. For example:

DO NOT ENTER. WEINTRAUB. USING INKEY\$ FOR PROMPTS.

80 MICROCOMPUTING 3/81 PAGE 104.

or
MICRO-BASKETBALL. WEINDORF. GAME. LEVEL II
BASIC.

80 MICROCOMPUTING 3/81 PAGE 118.

Get the idea?

To make typing entries a little easier, you can use abbreviations in your entries, which will be expanded when the line is printed. To use these, set them up first with the "A" mode from the menu. Just enter the abbreviation first, then the expanded word(s). Thus

ABBREVIATION? 80

WORD TO PRINT? 80 MICROCOMPUTING

ALL OK? Y

ABBREVIATION? P

WORD TO PRINT? PAGE

ALL OK? Y

ABBREVIATION? <ENTER>

and back to the menu.

To use the abbreviation, place an asterisk (*) before the abbreviation. Thus

DO NOT ENTER. WEINTRAUB. USING INKEY\$ FOR PROMPTS.

*80 3/81 *P 104.

These abbreviations will work for any entry in any group now.

The ALL OK? question lets you re-enter an abbreviation if you goofed. Just answer "N" to re-enter. You will find this feature used elsewhere in the program too.

The "S" (Show) choice on the menu displays all the abbreviations to refresh your memory.

To find an entry and display it, just select "F" (Find) from the menu. Give the number of keywords to search for (up to 10). Only if all the keyword are found will an entry be printed. A keyword can be any word in an entry and can be embedded in another word. If you wish to use an abbreviation as a keyword you must use the abbreviation (preferably with the asterisk), not the expanded word(s).

Some possible group names might be:

GAMES

SOFTREV (for software reviews)

HARDREV (for hardware reviews)

ML (for machine language articles)

OPSYS (articles about operating systems)

HARDWARE (hardware construction articles)

etc.

You could just use a REVIEW group and differentiate with the word HARDWARE or SOFTWARE in the entry. Here's where keywords come in handy.

Before you start making entries, it would be best to think of all the abbreviations you might use and enter them. Then make a list of all the files (groups) and refer to it when making an entry. This is so you put your entry under the proper group and use the exact same group name for that group each time. Otherwise you'll have entries in REVIEW and REVIEWS, for example. It also helps you remember under which group name you stored an entry. Of course, you can put the same entry in several groups to provide cross-referencing for those nebulous ones.

Also consider how much diskette space you have available for your files. You may need to use several diskettes if you have a lot of groups and entries. Be sure that each file will fit completely on a diskette, including future entries. The program will tell you if you don't have a file available when searching for an entry. Of course, unfortunately, it will happily let you start a second file of the same name if it can't find the original on one of the diskettes in your drives, so be careful. To send a new file name to a specific disk drive, add a colon and the drive number (0 to 3) after the file name. If you are changing the diskettes in the drives, I would write the group name on each diskette envelope label (without the diskette inside it!) or on a 3X5 file card stored in the diskette envelope. Also, if you are using several diskettes and switching them in one drive, be sure to start and stop the program with a specific diskette in the drive, as the abbreviation list will be read from and stored on that diskette.

The program is set for up to ten keywords and 100 abbreviations. To change the number of abbreviations,

change the DIM C\$(100,1) in line 10 and the C=100 in lines 210 and 270. To change the number of keywords, change the K\$(10) in line 10 and the A>10 in line 420. Adjust the number following CLEAR in line 10 to the largest that will not give you an "OUT OF MEMORY" error when you run your program. The larger the number, the less you will be troubles with BASIC's "garbage collecting" routine, which will bring the program to a sudden halt for up to a minute. This will usually show up when you are searching your files. If the program just suddenly dies, relax and wait for it to come back to life. Unless your computer has been stricken by the dreaded "silent death", it will recover and go on with the program.

Be sure to end the session with the "D" menu selection, or you will lose any abbreviations you entered during your last session.

To print the entries found on your line printer, add LPRINT A\$ after the PRINT A\$ in line 510 and LPRINT B\$ after the PRINT B\$ in line 550. To print the abbreviation list, add the line

915 LPRINT C\$(X,0),C\$(X,1)

While this is not the fastest or most sophisticated data base program in the world, it does a nice job and will serve you well doing the type of data handling it was designed to do. Besides, the price is right!

```

5 'PROGRAM COPYRIGHT 1981 BY KENNETH B. KNECHT
10 CLS:CLEAR30000:DIMC$(100,1),K$(10)
20 GOSUB800:ONERRORGOTO1000
30 CLS:PRINT"          MENU"
40 PRINT"F - Find"
50 PRINT"E - Enter"
60 PRINT"A - Abbreviation"
70 PRINT"S - Show Abbreviations"
80 PRINT"D - Done"
90 INPUT"Choice (use letter on left)":A$
100 IF A$="F"THEN400
110 IF A$="E"THEN300
120 IF A$="A"THEN200
130 IF A$="D"THEN700
140 IF A$="S"THEN900
150 PRINT"Invalid choice":GOTO30
200 IFC$(0,0)="":THENC=0:C$(0,0)="":ELSE=C=VAL(C$(0,0))
210 IFC=100THEN270ELSEINPUT"Abbreviation (press enter key to
quit? ";B$:IFB$=""THEN30
220 LINEINPUT"Word(s) to print? ";C$
240 INPUT"All OK (Y/N)":D$:IFLEFT$(D$,1)<"Y"THEN210
250 C=C+1
260 C$(C,0)=B$:C$(C,1)=C$:C$(0,0)=STR$(C)
270 IFC=100THENPRINT"Abbreviation list full":FORX=1TO150:NEXTX:
GOTO30ELSE210
300 LINEINPUT"Filename? ";F$
310 OPEN"E",1,F$
320 PRINT"Entry line must be 240 characters or less. Use *
directly"
330 PRINT"in front of abbreviations."
340 LINEINPUT"Entry? ";B$
350 IFLEN(B$)>240THENPRINT"Too long":GOTO340
355 INPUT"All OK (Y/N)":A$:IFLEFT$(A$,1)<"Y"THEN340
360 PRINT#1,CHR$(34);B$:CHR$(34)
370 INPUT"Another in the same group (Y/N)":A$:
IFLEFT$(A$,1)="Y"THEN340

```

```

380 CLOSE1:GOTO30
400 LINEINPUT"Filename? ";F$
410 OPEN"I",1,F$
420 INPUT"How many key words to look for";A:IFA>10THENPRINT"Too
many, 10 maximum":GOTO420
430 FORX=1TOA
440 LINEINPUT"Key word? ";K$(X)
450 NEXTX
460 IFE0(1)THENCLOSE1:GOTO30
470 INPUT#1,A$
480 FORX=1TOA
490 IFINSTR(A$,K$(X))=0THENX=A:NEXTX:GOTO460
500 NEXTX
510 B=INSTR(A$,"*"):IFB=0THENPRINTA$:GOTO630
520 B$="":FORX=1TOLEN(A$)
530 C$=MID$(A$,X,1):IFC$="*"THEN560
540 B$=B$+C$
550 NEXTX:PRINTB$:GOTO630
560 D$=""
570 X=X+1:IFX>LEN(A$)THENX=X-1:GOT0600
580 IFMID$(A$,X,1)=" "THENX=X-1:GOT0600
590 D$=D$+MID$(A$,X,1):GOTO570
600 C$="":FORY=1TOC
610 IFC$(Y,0)=D$THENC$=C$(Y,1):Y=C
620 NEXTX:GOT0540
630 INPUT"Press enter for next match":A$:GOT0460
700 OPEN"0",1,"ABBREV":PRINT#1,CHR$(34);C$(0,0);CHR$(34)
710 IFC=0THENCLOSE:END
720 FORX=1TOC
730 PRINT#1,CHR$(34);C$(X,0);CHR$(34);CHR$(34);C$(X,1);CHR$(34)
740 NEXTX:CLOSE:END
800 OPEN"E",1,"ABBREV":CLOSE.
810 OPEN"I",1,"ABBREV"
820 IFE0(1)THENCLOSE:RETURN
830 INPUT#1,C$(0,0):C=VAL(C$(0,0))
840 FORX=1TOVAL(C$(0,0))
850 INPUT#1,C$(X,0),C$(X,1)
860 NEXTX:CLOSE:RETURN
900 CT=0:FORX=1TOC
910 PRINTC$(X,0),C$(X,1):CT=CT+1
920 IFCT=15THEN940
930 NEXTX:PRINT"End of list":INPUT"Press enter to continue";A$:
GOT030
940 INPUT"Press enter for more";A$:CT=0:GOT0930
1000 IFERL=410THENPRINT"File not found":RESUME400
1010 IFERL=310THENPRINT"Bad file name or disk full":GOT01040
1020 IFERL=360THENPRINT"Disk full":GOT01040
1030 ONERRORGOTO0:RESUME
1040 FORX=1TO1000:NEXTX:RESUME30

```

TABLE 1

To use NEWDOS or TRSDOS on the Model I, change or add the following lines:

CHANGE

```

310 OPEN "R",1,F$: FIELD 1,240 AS C$
360 LSET C$=B$: PUT 1,LOF(1)+1
410 OPEN "R",1,F$: FIELD 1,240 AS E$
460 FOR Y=1 TO LOF(1)

```

continued on page 55

POCKET COMPUTER CORNER

Steven M. Zimmerman, Leo M. Conrad, and Stanley M. Zimmerman
This Month: PHONE LIST

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This application for your pocket computer is to maintain a phone number and name list. This program performs this task. It allows us to update the list easily at any time, to add names up to a capacity of 30, and to search for a specific name and phone number.

We have not tried to push the limit of our computer as far as the maximum number of names in a data file. This task is left to you. We will detail how the program is written so you may experiment in finding the maximum capacity of your computer.

USING THE PROGRAM

Shown below is the first menu:

1-INPUT 2-FIND 3-LIST?

The menu allows you to enter, search, and scan through your phone list. We chose number one by typing 1 ENTER to see the following:

#,NAME,NUMBER?

As the program is prepared, there are 30 spaces available for you to enter names and numbers. Start with location number one, input the number and press ENTER. Next, type a name and press ENTER, finally type the phone number — without the dash (there is room for only seven digits in each location), and press ENTER.

The name and number are both limited to seven digits in length. The only prompt you will see for the name and number is a question mark.

Each time you input a name you will be returned to the original menu. You must tell the computer you want to input an additional name or perform some other function.

There are two search and retrieval methods available in the main menu. Let's select 2-FIND to examine the first.

Type 2 ENTER and you will see the following question:

NAME

The computer is asking you to input the name of the person whose phone number you are seeking. You must type the name exactly as it is listed in your phone list. If you have two identical names, don't worry. The computer will find both, one at a time.

Depending on the number of names in memory, the amount of time needed to perform this task may not be short. When the computer has found the name, it and the phone number will be printed on the display.

After you have obtained the information, press ENTER again, the computer will search for a second name. If there is none, it will search the entire file of 30 names, taking up to 15 seconds to complete the task.

The final selection is the search routine called 3-LIST. Depending on the availability of a printer, this routine will yield different results. If you have a printer the entire file

will be reproduced. If you do not, you will only see one name and phone number at a time on the display. After typing 3 ENTER the headings will first appear on the display. Each time you press ENTER the next name and phone number in the file will appear on the screen.

EXAMINING THE PROGRAM

In your pocket computer, be careful when writing such a program such as a phone list. If we push the memory past its limit, the program and data will conflict with each other and the program or data will be lost. One task we have left for you to complete is to determine the maximum capacity of the phone list program. We will detail how you can investigate increasing the number of names on the list.

Let's first examine the use of our variables. Listed below is their use in the program.

Variable	Use
A	To route the program from the menu To input the file number of a name/phone number
	As a counter in the FOR/NEXT statement in line 21
	As a counter in the FOR/NEXT statement in line 31
B\$	To input a person's name
C\$	To input a phone number
C	As a counter to locate the phone number in line 21
A(11)-A(39)	Names
A(40)-A(69)	Phone numbers

Line 1 is an input statement which allows the computer to accept information while the program is being run. Line 2 is a GOTO statement routing the computer to the code to perform the tasks defined in the main menu. 10A means 10 times A. If A is 2, then this statement means GOTO 20.

Lines 10 and 11 perform the task of inputting the name and phone number of an individual. Notice the +10 and +40 results in the information being placed in A(11) and A(41) if the value of A is 1. These are the numbers which must be changed if you wish to try to increase the capacity of the system. Try adding five or ten to each of these numbers to see how far the system may be pushed.

Lines 20-22 perform the task of searching for a particular name. Again the value of 40 must be changed in an increment equal to the one selected above to experiment with increasing the capacity of the system. Also in line 21 change the value of 30 by a like increment.

The last routine is contained in lines 30-32. Line 30 prints the headings on the display or printer, and line 31 prints the names and phone numbers in the order in which they were placed in the file. Line 32 returns us to the main menu when the task is complete. For increasing capacity,

the value 40 and 30 in line 31 must be changed.

PROGRAM LISTING

```
1:INPUT "1-INPUT 2-FIND 3-LIST?";A
2:GOTO 10A
10:INPUT "#,NAME,NUMBER?";A,B$,C$:A$(A+10)=B$:A$(A+40)=C$
11:GOTO 1
20:INPUT "NAME";B$
21:FOR A=11 TO 40:C=A+30:IF B$=A$(A) PRINT A$(A);";A$(C)
22:NEXT A
23:GOTO 1
30:PRINT "NAME PHONE"
31:FOR A=11 TO 40:B=A+30:C=A-10:PRINT C;" ";A$(A);";A$(B):NEXT A
32:GOTO 1
```

SUMMARY

This phone list program is capable of inputting a name and phone number, updating the information by simply overwriting what is in the file. Searching for a specific name and number, and listing the names and numbers on both the computer's display and printer are also available attributes of the program.

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BEGINNER'S CORNER

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Well, I think that about covers all of the commands and how you can use them. I have one more thing to offer you before I give you some problems to solve, and that's EXAMPLE 10. EXAMPLE 10 is a re-ordered listing of the commands according to their similarities. Some of them are really very much alike, and I find them easier to work with when thought of this way.

(See top of next column.)

OK, now it's time to play "WHAT IF." This is the exciting game where I give you solutions to unknown problems and you try to figure out what's left. You can find the solutions to these by trying them out on your machine. All "WHAT IFs" can be performed on EXAMPLE 2 or any example you choose.

(See next column.)

Next time I'll discuss some of the added editing features for those who have disks and other mysteries. See you next time at the B.C.

EXAMPLE 10	
COLUMN 1	COLUMN 2
EDIT line number	n--
SHIFT UP-ARROW	nSpace-bar
L-ist	nSc-search
<ENTER>	H-ack
E-XIT	X-tend
Q-uit	I-nsert
A-BORT	nC-hange
nD-elete	
nKc-ill	

EXAMPLE 11

I- WHAT IF you do the following:

- 1) EDIT
- 2) X-tend
- 3) 3<--
- 4) S-U-A
- 5) L
- 6) A
- 7) <ENTER>
- 8) list the program to find out the results

WHAT WILL YOU SEE ?

- 1) line with all edits
- 2) line without edits

II- WHAT IF you do the following

- 1) EDIT
- 2) 3Space-bar
- 3) H
- 4) L
- 5) S-U-A
- 6) 1<--
- 7) C (hint: no S-U-A after the C)
- 8) A
- 9) S-U-A
- 10) L
- 11) A
- 12) <ENTER>

WHAT WILL YOU SEE ?

- 1) line with all edits
- 2) line without edits
- 3) what edits will remain ?

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BOXER: AN EXPERIMENT IN ANIMATION

Steve Brown

If you want to write animated programs or just like to play animated games, then this program is for you. It gives you an example of an animated game, BOXER.

After entering the assembler code, creating the object code, and dumping it to tape, you are ready to box!

How to Play "Boxer"

1. Load BOXER.
2. Type /18432 <ENTER>.
3. "1 or 2 Players?" will appear on the screen. Enter 1 if you wish to play with the computer, or 2 if you have 2 players.
4. "Right boxer" and the 3 punch choices will appear on the screen. Press 1, 2, or 3, then press ENTER. Repeat three times.
5. "Left boxer" and the 3 punch choices will appear on the screen. Press 1, 2, or 3 and ENTER. Repeat three times.
6. The animated boxers have at it.
7. Repeat steps 3-5.

Note: The punches you enter will determine the outcome of the game. Specifically, a 3 punch beats a 4 punch, a 4 punch beats a 5 punch, and a 5 punch beats a 3 punch.

```
00020      ORG    4800H
00040 INIT   LD     DE,FN-F1
00060      LD     HL,F1
00080 I0    LD     A,(HL)
00100      ADD   A,96
00120      CP    162
00140      JR    NZ,I1
00160      LD     A,187
00180 I1    CP    165
00200      JR    NZ,I2
00220      LD     A,188
00240 I2    CP    166
00260      JR    NZ,I3
00280      LD     A,189
00300 I3    CP    167
00320      JR    NZ,I4
00340      LD     A,190
00360 I4    CP    185
00380      JR    NZ,I5
00400      LD     A,191
00420 I5    CP    155
00440      JR    NZ,I6
00460      LD     A,135
00480 I6    LD     (HL),A
00500      INC   HL
00520      DEC   DE
00540      XOR   A
00560      CP    E
00580      JR    NZ,I0
00600      CP    D
00620      JR    NZ,I0
00640      LD     HL,F1
```

```
00660      LD     DE,F0
00680      LD     BC,F2-F1
00700      LDIR
00720 REINIT LD     HL,0
00740      LD     (RH),HL
00760      CALL  01C9H
00780      LD     HL,MS
00800      LD     DE,3D90H
00820      LD     BC,20
00840      LDIR
00860      LD     HL,NO
00880 M0    LD     A,(3810H)
00900      BIT   1,A
00920      JR    Z,M1
00940      LD     (HL),1
00960      JR    M2
00980 M1    BIT   2,A
01000      JR    Z,M0
01020      LD     (HL),2
01040 M2    LD     HL,PL
01060      LD     (AL),HL
01080      LD     B,3
01100 KK    LD     A,R
01120      AND  3
01140      CALL  Z,00
01160      ADD   A,2
01180      LD     (HL),A
01200      INC   HL
01220      DJNZ KK
01240      CALL  01C9H
01260      LD     B,255
01280      CALL  DELAY
01300      LD     HL,RR
01320      LD     DE,3C70H
01340      LD     BC,11
01360      LDIR
01380      CALL  NS
01400      LD     HL,EN
01420      LD     DE,3CB0H
01440      LD     BC,14
01460      LDIR
01480      LD     HL,PR
01500      LD     (AR),HL
01520      LD     IX,3CBDH
01540      CALL  AN
01560      CALL  01C9H
01580      LD     A,(NO)
01600      CP    1
01620      JR    Z,BG
01640      LD     HL,LL
01660      LD     DE,3C40H
01680      LD     BC,10
01700      LDIR
01720      CALL  NS
01740      LD     HL,EN
01760      LD     DE,3C80H
01780      LD     BC,14
```

01800	LDIR		03020	JP	RMOV	04240	LD	(IY+34),160
01820	LD	HL,PL	03040	LD	HL,LF	04260	LD	(IY+35),144
01840	LD	(AL),HL	03060	LD	(HL),0	04280	LD	HL,F1
01860	LD	IX,3C8DH	03080 RMOV	LD	A,R	04300	JP	Q1
01880	CALL	AN	03100	AND	15	04320 L1	LD	IX,F3
01900	CALL	01C9H	03120	CP	9	04340	LD	(IX+9),160
01920	BG	LD,3DC0H	03140	JP	P,RGOR	04360	LD	(IX+10),180
01940	LD	B,64	03160 RGOL	CALL	IH	04380	LD	(IX+11),157
01960	I7	LD,(HL),188	03180	CP	6	04400	LD	(IX+16),177
01980	INC	HL	03200	JP	Z,PREJ0	04420	LD	HL,F7
02000	DJNZ	I7	03220	CALL	Z4	04440	JP	Q1
02020	LD	HL,3E42H	03240	CALL	IG	04460 L3	LD	IX,F3
02040	LD	(X),HL	03260	CALL	DELAY	04480	LD	(IX+36),146
02060	LD	HL,3E72H	03280	RET		04500	LD	(IX+37),147
02080	LD	(Y),HL	03300 RGOR	LD	A,(C2)	04520	LD	(IX+38),179
02100	LD	HL,C1	03320	CP	17	04540	LD	(IX+46),130
02120	LD	(HL),0	03340	JR	NZ,IE	04560	LD	(IX+47),131
02140	LD	HL,C2	03360	LD	HL,RF	04580	LD	(IX+48),131
02160	LD	(HL),24	03380	LD	(HL),0	04600	LD	HL,F8
02180	LD	B,7	03400	RET		04620	JP	Q1
02200	WALKIN	PUSH BC	03420 IE	CALL	IG	04640 R1	LD	IX,F3
02220	CALL	Z1	03440	CALL	DELAY	04660	LD	(IX+11),141
02240	CALL	Z4	03460	CALL	Z2	04680	LD	(IX+16),137
02260	CALL	IF	03480	RET		04700	LD	(IX+17),180
02280	CALL	DELAY	03500 IF	LD	HL,(X)	04720	LD	(IX+26),160
02300	CALL	IG	03520	LD	(OA),HL	04740	LD	(IX+27),144
02320	CALL	DELAY	03540	LD	HL,F2	04760	LD	IY,F1
02340	CALL	II	03560	CALL	J	04780	LD	(IY+13),174
02360	CALL	DELAY	03580	LD	HL,LF	04800	LD	(IY+14),184
02380	CALL	IJ	03600	LD	(HL),1	04820	LD	(IY+15),144
02400	CALL	DELAY	03620	RET		04840	LD	(IY+25),178
02420	POP	BC	03640 IG	LD	HL,(Y)	04860	LD	HL,F3
02440	DJNZ	WALKIN	03660	LD	(OA),HL	04880	JP	Q2
02460	MAIN0	CALL LMOV	03680	LD	HL,F4	04900 R2	LD	IX,F1
02480	LD	A,(LF)	03700	CALL	J	04920	LD	(IX+13),174
02500	OR	A	03720	LD	HL,RF	04940	LD	(IX+14),180
02520	JR	Z,MAIN1	03740	LD	(HL),1	04960	LD	(IX+15),148
02540	CALL	II	03760	RET		04980	LD	(IX+25),178
02560	CALL	DELAY	03780 IH	LD	A,(C1)	05000	LD	HL,F9
02580	MAIN1	LD A,(RF)	03800	LD	B,A	05020	JP	Q2
02600	OR	A	03820	LD	A,(C2)	05040 R3	LD	IX,F1
02620	JR	Z,MAIN0	03840	SUB	B	05060	LD	(IX+43),179
02640	CALL	IJ	03860	RET		05080	LD	(IX+44),163
02660	CALL	DELAY	03880 II	LD	HL,(X)	05100	LD	(IX+45),177
02680	JP	MAIN0	03900	LD	(OA),HL	05120	LD	(IX+50),131
02700	LMOV	LD A,R	03920	LD	HL,F1	05140	LD	(IX+51),131
02720	AND	15	03940	CALL	J	05160	LD	(IX+52),129
02740	CP	7	03960	RET		05180	LD	HL,F10
02760	JP	M,LGOL	03980 IJ	LD	HL,(Y)	05200	JP	Q2
02780	LGOR	CALL IH	04000	LD	(OA),HL	05220 DRA	LD	IX,(OA)
02800	CP	6	04020	LD	HL,F3	05240	LD	IY,(FA)
02820	JP	Z,T0	04040	CALL	J	05260	LD	D,7
02840	CALL	Z1	04060	RET		05280	LD	E,12
02860	JP	RMOV	04080 L2	LD	IX,F3	05300 X0	LD	A,(IY)
02880	LGOL	LD HL,C1	04100	LD	(IX+9),168	05320	CP	138
02900	LD	A,(HL)	04120	LD	(IX+10),184	05340	JR	NZ,X1
02920	CP	7	04140	LD	(IX+11),157	05360	LD	B,2
02940	JP	Z,RMOV-5	04160	LD	(IX+16),177	05380	JR	X7
02960	CALL	IF	04180	LD	IY,F1	05400 X1	CP	142
02980	CALL	DELAY	04200	LD	(IY+24),184	05420	JR	NZ,X2
03000	CALL	Z3	04220	LD	(IY+25),134	05440	LD	B,3

05460	JR	X7	06680	DEC	HL	08200	LD	HL,PR
05480 X2	CP	99H	06700	LD	(Y),HL	08220	LD	A,(PR)
05500	JR	NZ,X3	06720	LD	HL,C2	08240 Z7	INC	HL
05520	LD	B,4	06740	DEC	(HL)	08260	LD	(AR),HL
05540	JR	X7	06760	CALL	IG	08280	RET	
05560 X3	CP	154	06780	RET		08300 DELAY	LD	HL,VAR
05580	JR	NZ,X4	06800 Q1	LD	(FA),HL	08301	LD	A,(HL)
05600	LD	B,5	06820	LD	HL,(X)	08302	AND	6
05620	JR	X7	06860	LD	(OA),HL	08303	CP	6
05640 X4	LD	(IX),A	06880	CALL	DRA	08304	JR	NZ,YEP
05660	INC	IX	06900	CALL	IJ	08305	LD	(HL),0
05680	INC	IY	06940	LD	HL,03F0H	08306	LD	A,1
05700	DEC	E	06960	CALL	SO	08307 YEP	INC	(HL)
05720	JR	NZ,X0	06972	CALL	B7	08308	LD	B,A
05740 RS	LD	BC,52	06980	CALL	II	08309	LD	A,R
05760	ADD	IX,BC	07000	LD	HL,(Y)	08310	ADD	A,B
05780	DEC	D	07020	LD	(OA),HL	08311	LD	B,A
05800	JR	NZ,X6	07040	LD	HL,F6	08312	CALL	96
05820	RET		07060	CALL	J	08313	RET	
05840 X6	JR	X0-2	07080	LD	B,64	08400 Z8	POP	HL
05860 X7	LD	(IX),32	07100	CALL	96	08600	CALL	II
05880	INC	IX	07120	LD	HL,RH	08620	CALL	IJ
05900	DEC	E	07140	INC	(HL)	08640	JP	MAIN0
05920	JR	NZ,X8	07160	LD	A,(HL)	08660 J	LD	(FA),HL
05940	INC	IY	07180	CP	15	08680	CALL	DRA
05960	JR	RS	07200	JP	Z,FB	08700	RET	
05980 X8	DJNZ	X7	07220	JP	Z8	08720 B7	CALL	NN
06000	INC	IY	07240 Q2	LD	(FA),HL	08740	LD	B,80
06020	LD	A,E	07260	LD	HL,(Y)	08760	CALL	96
06040	OR	A	07300	LD	(OA),HL	08800	RET	
06060	JR	NZ,X0	07320	CALL	DRA	08820 AN	LD	B,3
06080	JR	RS	07340	CALL	II	08840 E1	LD	A,(3810H)
06100 NN	LD	HL,F0	07380	LD	HL,03F0H	08860	BIT	3,A
06120	LD	DE,F1	07400	CALL	SO	08880	JR	Z,E2
06140	LD	BC,F2-F1	07410	CALL	B7	08900	CALL	BL
06160	LDIR		07420	CALL	IJ	08920	LD	(HL),3
06180	RET		07440	LD	HL,(X)	08940	INC	HL
06200 Z1	LD	HL,(X)	07460	LD	(OA),HL	08960	INC	(IX)
06220	INC	HL	07480	LD	HL,F5	08980	DJNZ	E1
06240	INC	HL	07500	CALL	J	09000	RET	
06260	LD	(X),HL	07520	LD	B,64	09020 E2	BIT	4,A
06280	LD	HL,C1	07540	CALL	96	09040	JR	Z,E3
06300	INC	(HL)	07560	LD	HL,LH	09060	CALL	BL
06320	CALL	IF	07580	INC	(HL)	09080	LD	(HL),4
06340	RET		07600	LD	A,(HL)	09100	INC	HL
06360 Z2	LD	HL,(Y)	07620	CP	15	09120	INC	(IX)
06380	INC	HL	07640	JP	Z,FC	09140	DJNZ	E1
06400	INC	HL	07660	JP	Z8	09160	RET	
06420	LD	(Y),HL	07940 LP	LD	HL,(AL)	09180 E3	BIT	5,A
06440	LD	HL,C2	07960	LD	A,(HL)	09200	JR	Z,E1
06460	INC	(HL)	07980	OR	A	09220	CALL	BL
06480	RET		08000	JP	NZ,IQ	09240	LD	(HL),5
06500 Z3	LD	HL,(X)	08020	LD	HL,PL	09260	INC	HL
06520	DEC	HL	08040	LD	A,(PL)	09280	INC	(IX)
06540	DEC	HL	08060 IQ	INC	HL	09300	DJNZ	E1
06560	LD	(X),HL	08080	LD	(AL),HL	09320	RET	
06580	LD	HL,C1	08100	RET		09340 NS	LD	HL,N1
06600	DEC	(HL)	08120 RP	LD	HL,(AR)	09360	LD	DE,3C18H
06620	RET		08140	LD	A,(HL)	09380	LD	BC,17
06640 Z4	LD	HL,(Y)	08160	OR	A	09400	LDIR	
06660	DEC	HL	08180	JR	NZ,Z7	09420	LD	DE,3C58H

09440	LD	BC,16	10560	JP	L3		11880	DEFB	Ø
09460	LDIR		10760 J1	CP	4		11900 RD	DEFS	1
09480	LD	DE,3C98H	10780	JP	Z,R2		11920 N1	DEFM	'3 - RIGHT TO FACE'
09500	LD	BC,13	10800	CP	5		11940	DEFM	'4 - LEFT TO FACE'
09520	LDIR		10820	JP	Z,R3		11960	DEFM	'5 - GUT PUNCH'
09540	RET		10840	JP	R1		11980 EN	DEFM	'ENTER PUNCH #1'
09560 00	LD	A,3	11040 S0	LD	E,Ø		12000 PS	DEFM	'PRESS ENTER'
09580	RET		11060	LD	D,H		12020 BK	DEFM	' '
09600 FB	CALL	S1	11080	SET	7,D		12040 X	DEFS	2
09620	LD	HL,F12	11100	LD	A,1		12060 Y	DEFS	2
09640	LD	(FA),HL	11120 SZ	LD	B,L		12080 C1	DEFS	1
09660	JP	S2	11140 SQ	OUT	(0FFH),A		12100 C2	DEFS	1
09680 FC	CALL	S1	11160	DEC	DE		12120 OA	DEFS	2
09700	LD	HL,F11	11180	BIT	7,D		12140 FA	DEFS	2
09720	LD	(FA),HL	11200	RET	Z		12160 FØ	DEFS	13Ø
09740	LD	HL,(X)	11220	DJNZ	SQ		12180 F1	DEFM	'.E!!A!)T*.Y9H6
09780	DEC	HL	11240	CPL			K4 +W#ØP.J5H4"FC3.JURSS?##!9Y*Y		
09800	LD	(OA),HL	11260	AND	3		9YT YT.'		
09820	JP	S2	11280	JR	SZ		12200 F3	DEFM	'*X&"2""E. I49Y.PØ
09840 S1	LD	HL,DRA+11	11300 BL	PUSH	HL		#B; H7.C33G!H4J5."##OSSQZ5.	YY	
09860	LD	(HL),13	11320	PUSH	BC		9.XXY9'		
09880	LD	HL,RS+1	11340	LD	HL,PS		12220 F2	DEFM	' E!!A!)T9 Y9H6 E*
09900	LD	(HL),51	11360	LD	DE,3D98H		K4 +W#Ø>!*J5ØØF#ØP* JURSS?##* Y		
09920	RET		11380	LD	BC,11		*+T: YT**FT.'		
09940 S2	CALL	DRA	11400	LDIR			12240 F4	DEFM	'*X&"2""E *E I49Y
09960	LD	HL,DRA+11	11420 HH	LD	A,(384ØH)		*"MØ#B; H7*PØ#G!ØØJ5 *##OSSQZ5 :X		
09980	LD	(HL),12	11440	BIT	Ø,A		;*Y .XG!*XY'		
10000	LD	HL,RS+1	11460	JR	Z,HH		12260 F5	DEFM	'::: @<TP9ØØ
10020	LD	(HL),52	11480	LD	HL,BK		+T!"MPØ>#!*MØ+WØ;XX49+T"Ø!*:KTPB		
10040	LD	B,4Ø	11500	LD	DE,3D98H		4*:"OT2MTØ'		
10060 UU	PUSH	BC	11520	LD	BC,11		12280 F6	DEFM	'::: *ØØ.ØP>)T*#MØØ
10080	CALL	96	11540	LDIR			X; A>!HTT+L>X;.*"F;Ø>!9ØGØPG!:ØX?		
10100	POP	BC	11560	POP	BC		ØG;:		
10120	DJNZ	UU	11580	POP	HL		12300 F7	DEFM	'.E!!A!)T*.Y9H6X/.
10140	POP	HL	11600	RET			K4 +WC>A>.J5*F,;.JUPPP?.9Y*Y99YT		
10160	JP	REINIT	11601 OT	LD	HL,OH		YT.'		
10162 PREJØ	LD	A,(LF)	11602	BIT	Ø,(HL)		12320 F8	DEFM	'.E!!A!)T*.Y9H6*.K
10164	OR	A	11603	JR	NZ,HU		4 +W#ØØ.J5*RG3#!.JUPPPY")D9Y*Y99YT		
10166	CALL	NZ,II	11604	SET	Ø,(HL)		YT.'		
10180 TØ	CALL	RP	11605	JP	T1		12340 F9	DEFM	'*X&"2""E./TI49Y.M
10200	LD	B,A	11606 HU	RES	Ø,(HL)		2M3B; H7.+,G!*J5..OPPPZ5.9Y*Y9.XY		
10220	CALL	LP	11607	JP	J1		XY9'		
10240	CP	B	11612 VAR	DEFS	1		12360 F1Ø	DEFM	'*X&"2""E.*I49Y.ØØ
10260	JP	Z,OT	11619 OH	DEFS	1		#B;H7."#CGQ*J5.8&!OPPPZ5.9Y*Y9.XY		
10280	JP	P,T2	11620 LF	DEFS	1		XY9'		
10300 T1	CP	4	11640 RF	DEFS	1		12380 F11	DEFM	':::::::::::B5:
10320	JP	Z,L2	11660 RH	DEFS	1		PXTØ@ZUPP9UQPSSRQPZPPG'		
10340	CP	5	11680 LH	DEFS	1		12400 F12	DEFM	'::::::::::: Y1:.
10360	JP	Z,L3	11700 LL	DEFM	'LEFT BOXER'		@PPYP PEPPFPZZPPSRSPQZ'		
10380	LD	A,B	11720 RR	DEFM	'RIGHT BOXER'		12420 FN	DEFS	1
10400	CP	5	11740 NO	DEFS	1		12440	END	INIT
10420	JP	Z,R3	11760 MS	DEFM	'# OF PLAYERS 1 OR				
10440	JP	L1	2?'						
10460 T2	CP	5	11780 AL	DEFS	2				
10480	LD	A,B	11800 PL	DEFS	3				
10500	JP	NZ,J1	11820	DEFB	Ø				
10520	CP	3	11840 AR	DEFS	2				
10540	JP	NZ,J1	11860 PR	DEFS	3				

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ASK RICHARD

Richard Kaplan

How much RAM should I purchase for my computer?

This is perhaps the most frequently asked question in microcomputing. Of course, there is no one answer for everyone. However, in general 4K is sufficient for someone who just wants to learn what a computer is about. 16K is a good idea for someone who uses a cassette system for learning and some applications. And, most importantly, you should always purchase 48K with a disk system.

I've heard that it is possible to purchase a 32K disk system. Why do you advise against this?

When you attach disk drives to your computer, some memory is used up by the operating system (see last month's "Ask Richard"). This means that a 48K Model I or Model III disk system system only has about 39K left for you to use. A 32K system would have 16K less, or about 23K for your use. In general, 23K is not sufficient for programs which use disk drives, such as business software.

I don't mean to sound really stupid, but what is this "K" that you keep referring to?

Quite simply, K tells you how many characters the computer can store in memory. 1K equals 1,024 characters, so a 48K machine can (theoretically) store 49,152 characters of information.

Why did you say it can "theoretically" hold that many characters of information?

In actuality, certain places in the computer's memory are "reserved" for certain things. For example, the operating system takes up some memory, as I noted previously. In some computers, each location on the screen uses up one character in RAM. Whatever memory is left cannot all be used to store a program. Some room must be left for the numbers you will use to run your program — called variables.

You keep mentioning RAM being used to hold the computer's own information. I don't understand. I thought that's what ROM is supposed to be for.

First, let's be sure we both understand exactly what RAM and ROM are. RAM ("Random Access Memory") is information which is only temporarily stored in memory. You can change it very easily, but once the computer is turned off everything in RAM gets erased. ROM (Read Only Memory") cannot be changed; it is permanently stored in the computer.

Usually, RAM is used to hold your own programs and data used by your programs, while ROM is used to hold the instructions for BASIC. However, RAM is sometimes used for other things, particularly for operating systems.

Why not put the operating system in ROM instead of wasting memory?

Much of the operating system is in the TRS-80's ROM. Only items like the variables mentioned above and the disk operating system are kept in RAM. The problem with putting the operating system in ROM is that, in case errors are

found, the only way to correct them is to replace a "chip" — a computer circuit — which is far more expensive than simply replacing a disk with a new operating system.

I just purchased a terrific general ledger program, but I don't like waiting for report printouts. I've heard that a "spooler" would help me. What is a "spooler", and would it help me?

Apparently, waiting time for printouts is a common annoyance:

A spooler is a way to let the computer's printer print out reports while you use the computer to do other things. There are two types of spoolers — software spoolers and hardware spoolers. Let's examine each of these alternatives.

A software spooler is a machine language program — usually a feature of an operating system — which sends your printed output to a disk instead of directly to your printer. You can continue to run other programs while the printing takes place. In between running your other programs, the operating system will take information out of the disk file and send it to the printer. The end result is that both calculations and printing are somewhat slower (the slower calculations are not very noticeable; the slower printing is quite obvious), but your computer is not tied up all day waiting for a report to be printed.

Hardware spoolers are more expensive than software spoolers (about \$350, as compared to \$150 for an operating system which includes software spooling). However, their efficiency is far greater than that of a software spooler.

A hardware spooler is literally a box with tremendous memory capacity — anywhere from 4K to 512K — devoted solely to storing your printed output. When you print out a report, the report is stored in the hardware spooler. The hardware spooler is actually a computer all by itself, so as soon as your printed output enters the spooler, your computer is free to do other things at full speed. In fact, with some hardware spoolers, you can even turn your computer off and the spooler will continue printing.

I've heard the terms "strobe hole," "write protect notch," and "write enable notch" dozens of times. All I know is that my disk has several curious holes in it. What are they?

Let's examine these one at a time. First, we will deal with the write protect and write enable notches, which essentially refer to the same thing.

All 5½-inch disks have a rectangular notch in one corner called a "write protect notch." When the disk is put into a drive, a mechanical device senses this hole. If a label is covering the hole, the disk is said to be "write-protected" and the computer will not allow the data to be written to the disk.

8-inch disks operate in a manner opposite that of 5½-inch disks. If the label is covered, data on the disk may be

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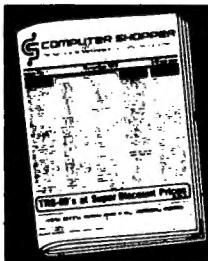
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ASK RICHARD

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changed. If the label is uncovered, the disk is considered to be write-protected and, therefore, no data can be saved.

Why do some 8-inch disks not have a write-enable notch?

Since lack of a write-enable notch on an 8-inch disk would be the same as covering the hole, data can still be stored on this type of disk. Some manufacturers have simply decided, for whatever reason, not to place a notch on their disk. Their disks are always write-enabled.

How do write-protect notches work?

On 5½-inch disks, covering the hole with a label will prevent data from being stored or altered by the computer. On 8-inch diskettes, the reverse is true. That is, the label over the hole is necessary in order to write on the disk.

I had a 5½-inch disk with a label over it that was destroyed by a magnet. How can this be so if you say the write-protect label prevents data from being destroyed?

The write-protect label prevents information from being changed by the computer. It does not, and cannot, prevent damage from external forces, such as physical diskette damage.

Getting back to my original question, what is a "strobe hole?"

A strobe hole is the very small hole near the center of any floppy disk on one side. It helps the computer to find sector information on the diskette.

How can one hole help locate things on another part of a disk?

When the disk spins, the disk controller is notified each time that the hole passes the sensor. This marks the start of data on the diskette track. The diskette spins at a speed of 300 revolutions per minute, or five per second. Since data is written to the entire track when the diskette is formatted, any sector on the track can be located in slightly more than one fifth of a second, provided that the head is positioned at the proper track.

I've seen some disks with 10 strobe holes in the diskette. What is the difference between these and "normal" TRS-80 diskettes?

If you spin a TRS-80 floppy disk and look through the opening in the disk jacket, you will see only one strobe hole in the diskette. This type of diskette is called soft-Diskettes with 10 or 16 holes are called hard-sectored.

What computers use hard-sectored disks? Why?

Hard-sectored disks, though not as common as soft-sectored disks, are used on a number of computers, including Northstar computers. On a hard-sectored diskette, instead of using a single sector hole to locate the beginning of a track, the disk controller uses each hole to locate the start of a sector.

What would happen if I inserted a hard-sectored disk into my soft-sectored TRS-80 drives?

That is a very amusing thing to try on your computer. Basically, you will not damage your computer (although we take no responsibility for this!), but the disk controller will

not be able to read or write data on the diskette. One of the TRS-80 FORMAT programs even has an error message that says "Hard-Sectored Diskette" if it detects too many holes while the diskette spins.

I've heard that by cutting out a strobe hole, you can use the back side of a diskette. Is this true?

That statement is mostly correct. If you carefully cut out a hole in the paper wrapper on the opposite side of the one that is already on a single-sided diskette, and if you also cut out a new write protect notch, you can use both sides of your diskette by simply flipping it over.

But aren't single-sided diskettes different from double-sided diskettes?

Not really. The only difference between them is that the double-sided diskettes are tested on both sides. In some cases, a coating may be missing on the second side of the diskette. I certainly would not recommend this technique for crucial data. However, for third or fourth copies of relatively insignificant programs or data, this technique is quite reliable. In fact, I recently walked into a local high school where every single student used this technique, with no adverse effects.

Incidentally, this same technique applies to using single-density disks in double-density drives. The only real difference (usually) is that tolerance levels are higher for double-density disks. I would not use single-density disks in double-density drives for crucial data, but if you test the disks and they work, it would have to be acceptable.

Speaking of double-sided diskettes, what are double-sided disk drives?

Double-sided disk drives are drives which can access both sides of a double-sided diskette at the same time, thus allowing you to store twice as much data as a single-sided diskette. (This is the proper meaning of "double-sided" disks; the double-sided disks described above should properly be called "flippy" disks.)

What is the advantage of using "double-sided" drive over "flippy" disks?

If you have a very large amount of data, such as a mailing list, with "flippy" disks you will have to flip the diskette over to access the other side. With double-sided drives, the computer always has the other side of the diskette on line. Also, "flippy" diskettes or disk drives can be used just as standard single-sided diskettes, whereas double-sided drives require a different disk operating system.

Questions from readers on all aspects of personal computing are welcomed. I will try to reply to all inquiries, either personally or through this column. Please enclose a self-addressed, stamped envelope with your letter.

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CLOCK/BAS

Lyndon B. Mitchell

DATE\$	MM/DD/YY HH:MM:SS
WWW DD MMM	
YYYY CCC	TIME\$

"CLOCK/BAS" is a TRSDOS BASIC program for the Radio Shack TRS-80 Model I Level II computer system including an expansion interface and mini disk drive(s).

BACKGROUND

When the local Radio Shack store introduced the TRS-80 Model II, I became curious about one feature that this model offered: "DATE\$".

In one of the working programs for my TRS-80 Model I, I was using a subroutine for day of the week using data read techniques.

I wanted a program that would provide the day of the week and what many people call the Julian calendar day (day of the year).

I also wanted a program that did not use data read techniques for the alphabetic data required to support a DATE\$. I wanted to save that technique for the working program.

While computing this program, I discovered that it is a simple matter to find the day of the week if one can count the number of days from a given date when the day of the week was known. I choose for this program the starting date TUE 01 JAN 1980, day one of the computer count.

As an aside to the programmers who will want to tear into this program, I will tell you up front that the variable TD is the accumulation of the total days for any given date. (01/01/80=1). This might be useful to someone wanting days between dates information over a many-year period.

The technique I used for avoiding data read is of my own design, as I have yet to see strings manipulated this way. I find it will run as fast as data read procedures. I also find that this program runs between one and two seconds whether or not I define the variables as integers.

I experimented with poking the final result in unused memory locations and decided to keep things simple and store DATE\$ in a disk file. I did leave it on the screen for those who would want to PEEK it from the video memory.

CLOCK/BAS will run with the latest version of TRSDOS or NEWDOS 2.1

CLOCK/BAS is a TRSDOS BASIC program that will compute the alphabetic information required to support DATE\$.

DATE\$ is always a 19 character string variable with the format:

WWW DD MMM YYYY CCC

VARIABLES:

MID\$(DATE\$,1,3) = WWW = week day (FIRST 3 LETTER IDENTIFIER)
MID\$(DATE\$,5,2) = DD = DATE day (TWO LETTER IDENTIFIER)
MID\$(DATE\$,8,3) = MMM = MONTH (FIRST THREE LETTER IDENTIFIER)

MID\$(DATE\$,12,4) = YYYY = YEAR (ALWAYS 4 CHARACTERS)
MID\$(DATE\$,17,3) = CCC = COMPUTER CALCULATED COUNTER day
(day of the YEAR)

WWW DD MMM YYYY CCC	MM/DD/YY HH:MM:SS
WWW DD MMM YYYY CCC	MM/DD/YY HH:MM:SS
	01/01/80 10:00:00

CLOCK/BAS will load TIME\$ with the numeric date and time information. (Note: the clock is running when the TRS-80 is turned on and will continue to run until CMD"T" is executed.)

READY

>_

CLOCK/BAS will store DATE\$ on disk with the filespec "DATE/DAT".

TUE 01 JAN 1980 001

READY

>PRINT MEM

38289

READY

>PRINT FRE(A\$)

50

READY

>RUN

READY

>LIST

READY

>PRINT TIME\$

01/01/80 10:00:07

READY

>-

CLOCK/BAS will leave the computer memory in the power up status with the clock set and running.

WWW DD MMM YYYY CCC

MM/DD/YY HH:MM:SS

AB/CD/EF GH:IJ:KL

MM/DD/YY HH:MM:SS

CLOCK BAS will prompt alphabetic input with correct format.

WWW DD MMM YYYY CCC

MM/DD/YY HH:MM:SS

01:01:80 10:00:00

BAD FORMAT

01:01:80 10:00:00

MM/DD/YY HH:MM:SS

CLOCK/BAS will prompt input format errors with correct format.

WWW DD MMM YYYY CCC

MM/DD/YY HH:MM:SS
13/01/80 10:00:00

BAD MONTH

13/01/80 10:00:00

MM/DD/YY HH:MM:SS

CLOCK/BAS will prompt input month errors with correct format.

WWW DD MMM YYYY CCC

MM/DD/YY HH:MM:SS
01/32/80 10:00:00

BAD DAY

01/32/80 10:00:00

MM/DD/YY HH:MM:SS

CLOCK/BAS will prompt input day errors with correct format.

WWW DD MMM YYYY CCC

MM/DD/YY HH:MM:SS
01/01/80 66:77:88

BAD TIME

01/01/80 66:77:88

MM/DD/YY HH:MM:SS

CLOCK/BAS will prompt input time errors with correct format.

WWW DD MMM YYYY CCC

MM/DD/YY HH:MM:SS
01/01/00 10:00:00

There are no bad year entries.

YEAR ENTRIES >=80 GIVE 19YY RESULTS.
YEAR ENTRIES < 80 GIVE 20YY RESULTS.

TUE 01 JAN 1980 001

READY

>AUTO

10 OPEN "I",1,"DATE/DAT"

20 LINE INPUT#1,DATE\$

30 CLOSE

40 STOP

50

READY

>RUN

BREAK IN 40

READY

>PRINT DATE\$

TUE 01 JAN 1980 001

READY

>-

This sample program is the easiest way to retrieve DATE\$ from the disk file for use in follow on programs. The program can be a one-liner if desired.

OPEN"1",1,"DATE/DAT":LINE INPUT#1,DATE\$:CLOSE

TRSDOS - DISK OPERATING SYSTEM - VER.2.3

DOS READY
CLOCK

WWW DD MMM YYYY CCC

MM/DD/YY 00/00/07

CLOCK/BAS will operate with the CLOCK ON display.
"HH:MM:SS" are printed over by the clock display.

```
READY
>PRINT DATE$
TUE 01 JAN 1980 001
READY
>PRINT LEFT$(DATE$,3)
TUE
READY
>PRINT MID$(DATE$,5,11)
01 JAN 1980
READY
>PRINT RIGHT$(DATE$,3),VAL(RIGHT$(DATE$,3))
001      1
READY
>.
```

Manipulating DATE\$ with the string functions of the TRS-80 are simple.

CLOCK/BAS VARIABLES:

A	ASC CODE FOR INPUT STROKES OF THE KEYBOARD
CC	COMPUTER COUNTER STRING FOR DAY OF THE YEAR
DA	DATE\$
DD	NUMERIC AND STRING FOR DAY
EM	NUMERIC AND STRING FOR END OF MONTH DAY
HH	NUMERIC AND STRING FOR HOUR
I	NUMERIC ARRAY AND FOR NEXT COUNTER
LY	NUMERIC FOR LEAP YEARS
MM	NUMERIC AND STRING FOR MONTH
MO	STRING HOLDING MONTH IDENTIFIERS
SS	NUMERIC AND STRING FOR SECONDS
TD	NUMERIC ACCUMULATOR FOR TOTAL DAYS
TT	STRING FOR LINE INPUT OF TIME\$ VALUES
TY	NUMERIC FOR TOTAL YEARS FROM 1980
VV	STRING FOR FORMAT OF TIME\$
WD	STRING HOLDING WEEKDAY IDENTIFIERS
WW	NUMERIC AND STRING FOR THE DAY OF THE WEEK
YD	NUMERIC FOR DAYS TO THE FIRST OF THE MONTH
YY	NUMERIC AND STRING FOR YEAR

NOTE: DEFINT did not significantly improve run time.

The following listing will serve as a subroutine if CLEAR and DIM statements are initialized properly. This routine will convert the numeric data for month, day and year in TIME\$ to the alphanumeric data for DATE\$.

```
30000 REMARK CLEAR 200:DIM WW$(7),MM$(12),EM(12),YD(12)
30010 WD$="MONTUEWEDTHUFRISATSUN"
30020 EM$="3128313031303130313031"
30030 MO$="JANFEBMARAPR MAY JUN JULAUGSEP OCT NOV DEC"
30040 FOR I=1TO7:WW$(I)=MID$(WD$,I*3-2,3):NEXT
```

```

30050 FOR I=1TO12:MM$(I)=MID$(MO$,I*3-2,3):NEXT
30060 FOR I=1TO12:EM(I)=VAL(MID$(EM$,I*2-1,2)):NEXT
30070 YY$=MID$(TIME$,7,2):YY=VAL(YY$)
30080 IF YY/4-FIX(YY/4)=0 THEN EM(2)=29
30090 MM$=MID$(TIME$,1,2):MM=VAL(MM$)
30100 DD$=MID$(TIME$,4,2):DD=VAL(DD$)
30110 YY=1900+YY:IF YY<1980 YY=YY+100
30120 FOR I=1TO12:YD(I)=YD(I-1)+EM(I-1):NEXT:YD=YD(MM)+DD
30130 TY=YY-1980:TD=TD+TY*365:LY=INT(TY/4)
30140 TD=TD+LY+YD:IF YY/4-FIX(YY/4)<>0 TD=TD+1
30150 WW=INT((TD/7-FIX(TD/7))*7+.5)+1
30160 WW$=WW$(WW):MM$=MM$(MM):YY$=RIGHT$(STR$(YY),4)
30170 CC$=STR$(YD):CC$=RIGHT$(CC$,LEN(CC$)-1)
30180 CC$=RIGHT$("00"+CC$,3)
30190 DATE$=WW$+" "+DD$+" "+MM$+" "+YY$+" "+CC$
30200 PRINT#3,DATE$,CHR$(31):REMARK RETURN

```

PROGRAM LISTING

10000	REMARK	REMARK	REMARK	REMARK	REMARK	REMARK
10010	REMARK		CLOCK/BAS		REMARK	
10020	REMARK		L B MITCHELL		REMARK	
10030	REMARK		01/01/80		REMARK	
10040	REMARK		94-1041 MAHUA PL		REMARK	
10050	REMARK		WAIPAHU HI 96797		REMARK	
10060	REMARK		808-671-7678		REMARK	
10070	REMARK	REMARK	REMARK	REMARK	REMARK	REMARK
10080	REMARK				REMARK	
10090	REMARK		INITIALIZE		REMARK	
10100	CLS:PRINT TAB(3);"WWW DD MMM YYYY CCC";					
10110	CLEAR 200:DIM WW\$(7),MM\$(12),EM(12),YD(12)					
10120	REMARK		SET VARIABLES		REMARK	
10130	VV\$="MM/DD/YY HH:MM:SS"					
10140	WD\$="MONTUEDWEDTHUFRISATSUN"					
10150	EM\$="3128313031303130313031"					
10160	MO\$="JANFEBMARAPRMRAYJUNJULAUGSEPOCTNOVDEC"					
10170	REMARK		LOAD ARRAYS		REMARK	
10180	FOR I=1TO7:WW\$(I)=MID\$(WD\$,I*3-2,3):NEXT					
10190	FOR I=1TO12:MM\$(I)=MID\$(MO\$,I*3-2,3):NEXT					
10200	FOR I=1TO12:EM(I)=VAL(MID\$(EM\$,I*2-1,2)):NEXT					
10210	REMARK		INPUT AND STROKE CHECK		REMARK	
10220	PRINT TAB(44);VV\$:PRINT TAB(44);:LINE INPUT TT\$					
10230	FOR I=1TO17:A=ASC(MID\$(TT\$,I,1)):IF I=9 GOTO 10250					
10240	IF A<47 OR A>58 GOTO 10660					
10250	NEXT:PRINT					
10260	REMARK		FORMAT CHECK		REMARK	
10270	IF LEN(TT\$)<17		GOTO 10670			
10280	IF MID\$(TT\$,3,1)="/"		GOTO 10670			
10290	IF MID\$(TT\$,6,1)="/"		GOTO 10670			
10300	IF MID\$(TT\$,9,1)="/"		GOTO 10670			
10310	IF MID\$(TT\$,12,1)="/"		GOTO 10670			
10320	IF MID\$(TT\$,15,1)="/"		GOTO 10670			
10330	REMARK		SECOND MINUTE HOUR		REMARK	

```

10340 SS$=MID$(TT$,16,2):SS=VAL(SS$):IF SS>59 GOTO 10680
10350 MM$=MID$(TT$,13,2):MM=VAL(MM$):IF MM>59 GOTO 10680
10360 HH$=MID$(TT$,10,2):HH=VAL(HH$):IF HH>23 GOTO 10680
10370 POKE &H4041,SS:POKE &H4042,MM:POKE &H4043,HH
10380 REMARK YEAR MONTH DAY REMARK
10390 YY$=MID$(TT$,7,2):YY=VAL(YY$)
10400 IF YY/4-FIX(YY/4)=0 THEN EM(2)=29
10410 MM$=MID$(TT$,1,2):MM=VAL(MM$)
10420 IF MM<1 OR MM>12 GOTO 10690
10430 DD$=MID$(TT$,4,2):DD=VAL(DD$)
10440 IF DD<1 OR DD>EM(MM) GOTO 10700
10450 POKE &H4044,YY:POKE &H4045,DD:POKE &H4046,MM
10460 REMARK CENTURY REMARK
10470 YY=YY+1900:IF YY<1980 THEN YY=YY+100
10480 REMARK YEAR DAY REMARK
10490 FOR I=1TO12:YD(I)=YD(I-1)+EM(I-1):NEXT:YD=YD(MM)+DD
10500 REMARK WEEKDAY REMARK
10510 TY=YY-1980:TD=TD+TY*365:LY=INT(TY/4)
10520 TD=TD+LY+YD:IF YY/4-FIX(YY/4)<>0 THEN TD=TD+1
10530 WW=INT((TD/7-FIX(TD/7))*7+.5)+1
10540 REMARK STRING REMARK
10550 WW$=WW$(WW):MM$=MM$(MM):YY$=RIGHT$(STR$(YY),4)
10560 CC$=STR$(YD):CC$=RIGHT$(CC$,LEN(CC$)-1)
10570 CC$=RIGHT$("00"+CC$,3)
10580 REMARK DATE$ REMARK
10590 DATE$=WW$+" "+DD$+" "+MM$+" "+YY$+" "+CC$+
10600 PRINT#3,DATE$,CHR$(31)
10610 REMARK SAVE CLEAR DELETE REMARK
10620 OPEN"O",1,"DATE/DAT":PRINT#1,DATE$:CLOSE
10630 CLEAR 50:DELETE 10000-10700
10640 GOTO 10220
10650 REMARK PROMPT REMARK
10660 PRINT"BAD STROKE":PRINT TT$:PRINT:GOTO 10220
10670 PRINT"BAD FORMAT":PRINT TT$:PRINT:GOTO 10220
10680 PRINT"BAD TIME ":PRINT TT$:PRINT:GOTO 10220
10690 PRINT"BAD MONTH ":PRINT TT$:PRINT:GOTO 10220
10700 PRINT"BAD DAY ".PRINT TT$:PRINT:GOTO 10220

```

Lyndon B. Mitchell
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Waipahu, HI 96797 ■

FINDIT

continued from page 43

```

470 GET 1,Y: A$=E$
490 IF INSTR(A$,K$(X))=0 THEN X=A: NEXT X: GOTO 640
630 INPUT "PRESS ENTER FOR NEXT MATCH";A$
800 OPEN "R",1,"ABBREV": CLOSE 1

```

ADD

640 NEXT Y: CLOSE: GOTO 30

Kenneth B. Knecht
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FROM 16K LEVEL II TO A DISK-BASED SYSTEM

Dave McGlumphy

I'm writing this article for those people who are thinking of upgrading their Model I 16K Level II (no peripherals) system to something that they can use for business. I considered starting a little business, and brother, am I learning a lot, fast! The first part of this article will deal mostly with the contortions I had to go through to upgrade my system, so it should be of special interest to you folks having trouble deciding whether or not to spend a good bit of money to buy that expansion interface.

I felt I needed to get away from tapes, because I've played my share of games. In many cases the best games take quite a while to load from tape, because of the size requirements for good graphics or logic. To go to something faster meant one of the following choices:

1. A CPU speed-up kit.
2. Some sort of fast-load device for my cassette recorder.
3. A stringy floppy.
4. A disk system.

I had mixed emotions about the CPU speed-up kits because one of our club members (Chattanooga Microcomputer Club) had a bad experience with a speed-up modification, and he's an electronics technician by profession. Besides, the CPU speed-up wouldn't change the speed of tape handling anyway, and that was one of the biggest things I was trying to eliminate.

I'd heard rumors floating around that the fast-load devices for tape loading weren't dependable, but in all fairness, I'd also heard from a person I respect very much in Sault Ste. Marie that one of these devices is O.K. Unfortunately, one fast-load system requires some sort of modification to my tape recorder, a CTR-41, and I just didn't have a comfortable feeling about the system.

That brings us to the stringy-floppy. This may very well be the way to go if you're sure that you won't ever go to disk. You don't need the expansion interface, and that's a mighty good thing, because the expansion interface with some memory in it costs more than the stringy floppy. I decided against the stringy-floppy, though, because I figured that my business would require me to store a fair-sized amount of data for a pretty good while without actually using that data very often. That meant that the cost of the media on which I stored my data would have to be kept as low as possible, yet the media had to be reliable. I eliminated tape because of the reliability factor and because of its s-l-o-w speed. I may have to reconsider tape for some customers, though, because it may get expensive to hold files for customers on disks when they may be processed infrequently. I've found that you can't hold everything in the world on just one disk. That's why quite a few people are getting so excited about Percom's DOUBLER. More on that later. I eliminated the stringy-floppy because of the media cost. The Exatron company seems to have a monopoly on their media, and while they may be really good devices, I wasn't sure that I wanted to be at their mercy when it came to buying their tapes, especially since I planned on needing a lot of them that

were going to get very little actual use. I've seen a stringy-floppy in action, and it's a good alternative for people who are looking for faster processing but don't really need disks.

That brings us to the last choice, the disk system. Somehow, I knew all along that this was where I was going to end up. As soon as I made up my mind to buy disks, I thought I had it made, but then these questions really hit:

1. Do I have to use Radio Shack disk drives? (No.)
2. If I use another brand of disk drives, will there be compatibility problems? (Perhaps.)
3. Are there hidden factors that affect setting up a working disk system? (You'd better believe it!)

I thought about using Radio Shack disk drives, but I noticed that the Shack wanted \$499 for their drives, while other companies either sold comparable drives cheaper or sold drives with more capacity for nearly the same price. That eliminated the Radio Shack (Shugart) drives.

Then I saw that many of the other drives offered 40 tracks or 77 tracks or 80 tracks. How neat! But will they work? Could I just plug them in and watch them go? Yes and no. Another club member had two MPI 40 track drives, and he told me that I would need an operating system that could handle all 40 tracks, unless I'd be satisfied with using only 35 tracks of the 40 track capability. I asked him to explain, and he said that TRSDOS, for example, was designed to use 35 track drives, but that it worked just fine on his 40 track system. It worked OK, but it still would access only 35 tracks. He was wasting the additional 5 tracks on each drive until such time as he could get another DOS or some sort of patch for TRSDOS.

I figured that I was going to need a lot of online storage, so I'd want 4 drives, and probably double density and the double-sided feature. Don't you hear those dollars rolling around? I did. I knew that I didn't have that kind of money to lay out all at once, tax deductions or not! So what was the minimum I could use? That depended on the money. I began asking about the double density and double-sided options.

Should I buy double density? It sure seemed like a good idea. Well, how could I get double density? Do all disk drives have double density? I'm still not sure about this stuff, but so far, the only people I know who sell a double density device is Percom, and they want around \$200 for it. [Editor's note: since this article was written, many additional companies, including Radio Shack, have introduced double density modifications.] You can get the device which plugs into your expansion interface from other suppliers for slightly less, but I haven't found it cheaper than \$190. By the way, it may not work until you do something to the DOS you're using. I'm confused by the details and will leave them to another author who owns double density to clear up, but to quote Robert Filipiak in the December TBUG newsletter, "BUT a double density diskette CANNOT be read by a single density operating system; and the reverse is also true; what a pain!" And I don't need the pain. The bottom line is that I won't buy

double density right now, but after I get some disk experience and hopefully a few bucks from the business, I'll consider double density again. (Note 12/28/81: Percom has a new "doubler" that is cheaper and does allow single/double density. I have also heard rumblings from a lot of different sources that double density is touchy and seems to have more reliability problems than single density, but double density is where all the new gear seems to be headed.)

A local businesswoman told me that she put a "bigger chip" in her expansion interface and that it eliminated a bunch of problems she'd been having with her disks. After talking with her, I found that what she had installed was Percom's Data Separator. She also told me that she got tired of waiting for someone to install it, so she did it herself, and she's had absolutely no experience doing that sort of thing. I believe her, especially after having ordered a separator from Percom and reading the instructions for installation. They are very explicit and have good illustrations. Good for Percom! I felt a little bit like I was throwing away some money when I got the separator, because Percom also has the separator built into their double density board. When and if I finally do go double density, I'll have to discard the separator I already have. (12/28/81: I haven't installed the separator because my system hasn't given me any problems. I'm running two 35-track single density drives that I bought used from LEVEL IV in Livonia, Michigan. Boy do I have a lot of good, good things to say about that company!)

Should I buy a double-sided disk drive? One that records on both sides of a disk? I have seen two references that say that it's not a good idea. One reference said that there is more mechanical wear in a double-sided drive than a single-sided drive. The other reference said that after a while (no specific time mentioned), images can transfer themselves through a disk that has been recorded on both sides. There's another consideration: evidently, the computer sees the double-sided drive as two separate disk drives, and this will cause a problem when you want to make a backup of a disk. I might be able to deal with the problem by doing a lot of disk switching (in and out...) but I thought I'd be better off to have two completely separate drives. If one goes down, I'll still have the other one to try to do work with during the other's repair time.

I don't have a double-sided drive, but I have cut extra holes in the cover of my floppies making them into "flippies," as has been described in other articles in *80 Microcomputing*. I haven't had any trouble at all from the modified floppies, even though I'm recording on both sides and though they turn in opposite directions inside their covers depending on how I insert them into the disk drives. I will admit that I haven't "flipped" those disks that I use quite a bit such as the disk that holds the DOS (Disk Operating System). Again, I quote Mr. Filipiak on flipping disks, "Since the diskette rotates in different directions, the inside liner is napped in one direction; then when the diskette is turned over, napped in the reverse direction. Premature failure is possible from diskettes that are in frequent use." Note that he says "possible". I've heard several people say that they've had good luck flipping their disks, and I have yet to hear anyone say they've had

trouble. I hope I don't get deluged with letters from people who've had trouble.

I saw a really tempting ad from Sirius Systems that says I could buy an MPI 51 (single sided, 40 track, single/double density) drive for only \$259, and that seemed too good to be true. It is, kind of. You should know that you don't get a power supply or cabinet to put the drive in for that price. They will tell you that fact if you call them on the phone, but they don't have a toll-free number. When I called them, they told me they have a five week shipping schedule on the MPI drives but that they just started handling Siemens drives and will sell a 40 track out of stock for \$300. Not bad. What is a Siemens? (12/28/81: Sirius Systems has established one of the worst track records I've seen in the microcomputer magazines and I wouldn't send them a wooden nickel.)

Then I saw an ad for Level IV Products, Inc. that mentioned MPI drives, and they said to "Call for our unbelievable low pricing." Since they provided an 800 number, I did call. I'm now the proud owner of — get this — two used Radio Shack disk drives! The salesgirl told me that they were shipping from stock (they had 7 in stock), and each drive was \$250. After all the hunting, reading, gnashing of teeth, inquiring, and so on, to think that I'd end up with a couple of Shugarts! They work just fine. They're not the fastest or the fanciest, but they're enough to get me started.

I've got to tell you about the service that Nancy (of the Level IV company) provided: somewhere between the time Level IV shipped the disk drives and the time that UPS delivered them four days later, the package was dropped or something. The power supplies on both the disk drives were physically broken off the cabinets. I called Level IV and talked to Nancy who told me that she'd have two more drives sent out that afternoon. She did, too, because I had those two more drives in another three or four days! UPS hadn't even picked up the two damaged ones yet. Now that's the way I like to see a company (meaning Level IV, of course) treat their customers.

Later on, I may go to Percom equipment, because of the marvelous help that Robert Helm of the Percom technical department provided me to try to decide what kind of equipment to get. He sent me a three page, single-spaced letter in response to quite a few questions I asked him. It was no form letter, either. It represented quite a bit of time and effort on his part. If he (and his company) care enough to do that, they must care enough to support their equipment.

Remember that the disks have to use some sort of expansion interface. You can save fifty dollars on the interface by buying one through the mail, and you can now buy 16K of memory for as low as twenty-five dollars. (12/28/81: \$13.95 or less! At this rate, they're going to have to pay us to take it.) You ought to have at least 16K of memory in the interface if you use disks, because the operating system to run the disks may leave you with only about 4K for you to play with if you started with only the 16K in the CPU. I could have bought a 0K interface from Micro Management Systems, Inc. in Cairo, Georgia for \$249. Another one of our club members bought a Model III computer from them and got marvelous response. He had

his computer in just a few of days from the time he ordered it! Unfortunately for them, I wanted to buy an Epson printer, and they don't advertise them. I found prices for the Epson MX80 running from the suggested retail of \$645 down to as low as \$499.

I called the \$499 people, Mark Gordon Computers, and ordered the printer, a 0K expansion interface for \$249, a 4-drive disk cable, and 32K of memory at the lowest price I'd seen. Unfortunately, Mark Gordon Computers "allegedly" (if you get my drift) does not ship all products from stock, and I had to wait more than a month for any of my stuff to come from them. A month might not seem like much for some mail order things. Remember seeing "please allow 4-6 weeks for delivery?" A month seems like forever when you're waiting for something as neat as a printer and the expansion interface to drive both it and the disk drives. It gets even worse when you realize that there are other companies which are shipping the same products from stock on the same day that you order.

Mark Gordon Computers evidently ships printers as soon as they can get their hands on them. They told me that they have three different suppliers feeding them printers, so I'd think they could get them out pretty fast, but like I said, I was still waiting after a month had past. Evidently, the price is so good that so many people are ordering, and they simply can't keep up with the demand. I printed this article on my new MX80, though, so you know that I finally did get it.

Now to try to summarize the disk/printer portion of my experiences:

1. Do you have to use Radio Shack disk drives? No.
2. Radio Shack says you have to have a "drive 0" with a terminating resistor block. Is that true? Yes, but it's not a problem.
3. Can you put disks from different companies on the computer at the same time? Yes.
4. Can you mix single-sided drives with double-sided drives at the same time? Yes.

5. Can you mix drives with different numbers of tracks at the same time? Yes, if you have an operating system that can handle drives with as many tracks as your drives have or else you are willing to sacrifice the extra tracks until you do get a capable operating system. TRSDOS is the cheapest DOS around, but it can't handle other than 35 tracks unless modified. (12/28/81: Model III TRSDOS handles 40 track double density drives.)

6. If a company says their disk drive is double density, does that mean I can put about twice as much data on it as a single-density drive? Yes, but only if you have an operating system and the extra double density board to make the drive work.

7. Can you use a cable intended for four disk drives if you have only two drives to start with? Yes.

8. Do I have to use the Radio Shack expansion interface? No. LNW makes a kit you can assemble, and Computex, 1771 Heritage Court, Webster TX, 713-332-4359, sells the completed board and a cabinet to put it in for about the same "sale" price as a 0k Radio Shack interface. Call them to get an accurate quote, of course. I don't have experience with it but have had it highly recommended to me.

9. What's a good source of blank diskettes? I found that Meta Technologies Corp. gave me the fastest possible service, and they have "such a deal" on what they call Plain-Jane disks. They work just fine for me, and if you were to quote me verbatim, you'd have to say, "I don't know who makes them," but they look very, very much like another popular brand which sells for a couple dollars more for a package of ten. I wish I could have had all my dealings with Meta. The guy who helped me was super.

10. Do you really have to wait a long time to get an MX80 at a good price? No sir. \$499 was the lowest price I could find, but I also found Orange Micro, Inc., 800-854-8275, who says they have the MX80 in stock for \$519 (plus 3% for shipping which comes to \$534.57). Notice that you don't see prices for ribbons for Epson printers anywhere. So far, I've found \$15 for one ribbon to be the norm, and if you know anybody who has them cheaper, drop me a line, please. (12/28/81: BT Enterprises has reloads for about \$3.50. That's the ribbon part without the cartridge.)

I said the last part of this article would deal more with the business end of my hoped-for mailing labels business. I don't have a lot to tell you, yet, because I'm still just getting started, but here's what I've found so far:

You can expect it to take twice as long as you first thought to get everything set up. Then allow more time after that to deal with all the new problems that have cropped up. It's simply not as easy as you might think it is, and certainly hasn't been as easy as some of the money-making books would lead you to believe it is. I think I'd have been making a big mistake if I had borrowed the money to get the business going, but of course, a man's gotta do what a man's gotta do, or something like that.

I program both as a hobby and as a profession. My experience told me that while I am capable of writing my own programs, I ought to look around and see what software is already available, especially since I was new to using a disk system and would have to go through the learning-curve for a new system. Since I don't believe in reinventing the wheel without a mighty good reason, I ended up buying two packages so far.

The Taranto & Associates, Inc., 121 Paul Drive, San Rafael, CA, 94903, version of the Osborne Accounts Receivable package seems to hang together quite well, and Taranto is reputed to give good assistance by phone when you need it. It's awfully hard to wait a couple weeks for the mail to handle your problems which need immediate attention. Thus far, I haven't had to call him anyway, and that should say something for his package!

The other package I bought is called MAIL-V by Micro Architect, 96 Dothan St., Arlington, Ma 02174. His programs seem to work better than the spelling in his documentation would indicate, but he did something that surprises me. He wrote the system to use labels that are 4.5 inches wide, and he makes no provision that I can find to adjust for other size labels. The stock size (meaning the one you can get cheapest) is 3.5 inches wide. I've looked at the program that prints the labels, and I can see that it's going to take a long time to figure out what his code does. It's not the same as the code that you'll find in Taranto's Osborne books. The Taranto stuff is straightforward, easy to continued on page 60

WE CAN COMPUTE!

Michael Herbert Shadick

The timing couldn't have been worse—or better . . . There we were, on the verge of a virtual computer-age renaissance:

- An age of personal computery for the masses, not just for us relatively few aficionados.
- Truly widespread use of home computers by tens and even hundreds of millions of world citizens.
- Computer communications linking virtually all homes, everywhere.
- An unprecedented expansion (nay, explosion) of hardware and software options for every conceivable application.
- A growth rate in personal computers alone, to make to phenomenal growth experienced so far look like nothing!

Yes, we were on the very verge of it all. But then, something happened.

The recession happened.

At first, it was widely held that high-technology industries in general—and personal computer firms in particular—would be somehow immune to the receding economy. And, for a while, this was indeed true. Yet those firms are hardly separate from the rest of the economy. Indeed, they interact with it, to—if anything—a greater degree than most companies do.

Thus, they and their fellow high-tech firms began to feel the recession themselves. In short, they are hurting, just like the rest of us.

Is an upswing just around the corner? Has the recession in fact bottomed out? Or is it about to do so?

I am not a sunshine-and-flowers futurist; neither am I a gloom-and-doom prognosticator. I cannot say with assurance whether the economy will go further down, or up, or sideways! This much, however, I can say: a lot depends on us.

Who do I mean by "us"? I mean nobody but us personal computer owners, operators, and programmers.

For we are in possession of the very technological tools which can revive America. A sweeping statement? Yes—and also a very realistic one. For our ability to accomplish this lies not in some futuristic tomorrow, but today.

The computing and communications technology which each of us has at his or her own fingertips (quite literally!) provides us with the potential to revive and restore our nation, not merely to its position of former world leadership, but to a new position: at the very forefront of world communications leadership.

But how, you might very well be wondering, can we do it?

I'm happy to say that, to some extent, we already are doing it. As but one example: How many friends of yours have you introduced to the world of home computery, and have thereby helped provide with the incentive to invest in systems of their own? I dare say that the number of "compuconverts" is highly significant indeed!

Yet this is clearly not the time to, as it were, rest on our laurels. No, this is the time for us to, in the down-to-earth words of the marketplace, get out there and sell!

continued on page 61

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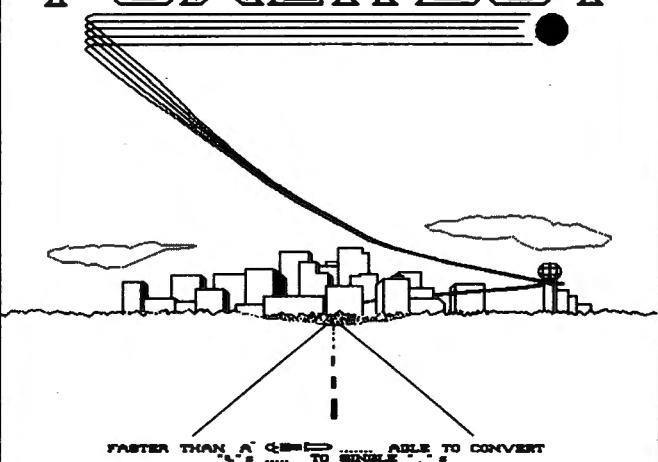
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CORRECTIONS AND ADDENDA

SERIOUS TBUG

There was one line that was incorrect in our publication of Steve Brown's "Serious TBUG" in the December 1982 issue. The line that begins 4998 should have appeared as follows:

4998-A0-EA-89-49-3E-43-32-81

Otherwise, the program was correct as published. We regret any inconvenience.

PHONE BILL SORTING PROGRAM

Two errors occurred in the "Phone Bill Sorting Program" in the November 1982 issue. These changes need to be made in order to prevent a BADFILE MODE error under certain conditions.

Change line 270 to read:

```
270 FOR DE=1 TO LOF(1): GET 1,DE: IF LEFT$(F$(0),1)<>""
    THEN NEXT
```

Change line 360 to read:

```
360 IF IK$="Y" THEN C0$(IK)="": LSET F$(0)=STRING$(42,"")
    PUT 1,C0(IK): CLOSE: KILL F0$: RUN ELSE CLOSE: RUN
```

Also, note that you cannot kill or delete a company name if it does not have at least one phone number stored in it. The program was designed this way.

BUILD WITH THE ELECTRIC PENCIL

In the fourth paragraph of Jerome Weintraub's "Build with the Electric Pencil" in the October 1982 issue, there is a reference to Earl Savage's article. This originally appeared in 80 Microcomputing, February 1982 (page 355).

For the convenience of our readers, Mr. Weintraub has furnished us with an updated annotated list of all the patches he has collected to date, together with the purpose and source of each patch:

PATCH *0 (ADD=5044, FIND=32, CHG=31)	1
PATCH *0 (ADD=503A, FIND=20536174204D, CHG=57656420204A)	2

FROM 16K LEVEL II TO A DISK-BASED SYSTEM continued from page 58

follow, and structured. MAIL-V is not. I picked this package because I saw it running, and it ran much better than a system from the Shack. The Shack's version appears to sort the entire file every single time you enter another name and address. I'm not sure I'll live long enough to enter the information I need to enter using that technique. MAIL-V also produces an audit log which in essence is just those names and addresses that you are currently adding or changing. That's important when you plan to charge customers by the number of changes you make to their files as well as by the number of labels you actually produce for them. There are more features to MAIL-V, but if you're that interested in this product, write to the company. I can't find a telephone number for them anywhere, either in advertising or through the information operator, so don't expect rapid field support from Micro

PATCH *0 (ADD=5040, FIND=6179, CHG=756C)	3
PATCH *6 (ADD=5850, FIND=6179, CHG=BF5F)	4
PATCH *6 (ADD=5FBF, FIND=20697320616374, CHG=0D116544C31C44)	5
PATCH *7 (ADD=579C, FIND=0955, CHG=3851)	6
PATCH *7 (ADD=5135, FIND=207468652064, CHG=3F20033A7D4E)	7
PATCH *7 (ADD=513B, FIND=69736B657474, CHG=FE81CA0D55C9)	8
PATCH *10 (ADD=4E2E, FIND=CD3E4B, CHG=CD8A50)	9
PATCH *10 (ADD=508A, FIND=4469736B, CHG=4FC33E4B)	10
PATCH *5 (ADD=4EDF, FIND=38E6, CHG=0000)	11
PATCH *5 (ADD=4F04, FIND=D0, CHG=D9)	12
PATCH *5 (ADD=506E, FIND=38E3, CHG=0000)	13
PATCH *5 (ADD=4ED9, FIND=0056, CHG=0000)	14
PATCH *5 (ADD=4EFF, FIND=0056, CHG=0000)	15
PATCH *5 (ADD=5068, FIND=0056, CHG=0000)	16
PATCH *5 (ADD=4E28, FIND=20, CHG=18)	17
PATCH *5 (ADD=4EA9, FIND=CA, CHG=C3)	18

FUNCTIONS

1, 2, 3: Changes date of diskette to July 1.

4, 5: Corrects problem loading large files.

6, 7, 8: Corrects error when diskette formatted in drive 0 (1-8 upgrades a May 2 diskette to a July 1 format). The above patches are from *TRS-80 Microcomputer News*, 10-81, page 13.

11, 12, 13: Allows DEBUG to see and change addresses in copyrighted code areas. *TRS-80 Microcomputer News*, 12-82, page 21, corrected in the 6-82 issue, page 33.

14, 15, 16: Allows DEBUG to view ALL memory. *Computronics*, 7-82, page 47.

17: Gives error messages in text rather than in code. *Computronics*, 7-82, page 34.

18: Deletes requirement to enter date when diskette is booted. *80 Micro*, 9-82, page 34. (Note: if you want your programs dated in the directory, or if you will call the date or time from memory, do not use patch 18.)

There are several additional patches that correct or update specific programs such as SCRIPSIT. Only those patches that are applicable to the DOS are referenced here.

Architect, Inc. (12/28/81: I asked the company for a fix, since their code wouldn't print on 3.5" labels and they made no such exclusion in their advertising. They wanted to charge me more money to make their program work, and when I asked for a refund on the whole system, they said it wasn't their policy to give refunds. I'm sorry I ever dealt with them, and I disagree with their claims that their mailing label system is the best.)

To get a better idea of what you'll be getting into in trying to start a business, contact the Small Business Administration and an organization called SCORE if there's one in your area. Those two groups have a lot of literature which will give you a better insight into the generalities of starting a new business than I can in this article.

Best of luck to you if you're trying to set up a "new" system or business.

Dave McGlumphy
4429 Paula Lane
Red Bank, TN 37415 ■

WE CAN COMPUTE!

continued from page 59

This, of course, is something which we've already proven ourselves to be very, very good at. Do you know of any consumer "group" which is more enthusiastic than personal computer owners? Why, there's no other group that can even touch us! Our enthusiasm knows few (if any) bounds. Thus, we can and are serving as a dynamic force in our country's rocky road towards recovery.

Not that we're alone in this regard, Heaven knows! Yet we are in fact at the very forefront.

Much, then, does depend on us: On our ability to stimulate further personal computer sales—and thus, stimulate the economy in general. We possess a most invincible sales tool, in that regard. Namely: our very enthusiasm!

But is economic recovery, spurred on by us, only a pipe dream? Perhaps. But if it is, we cannot blame the economy in general, or "Reganomics," or any other factor. No, if the personal computer renaissance fails to blossom into a true mass movement, and thus fails to provide the needed stimulus to the entire economy, it will not be something else's or somebody else's fault. It will be nobody's fault but our own.

Which means that the buck stops with us? Well, maybe that wasn't the case in 1970. Or in 1975. But in 1982, our nation's economic future can be at our very fingertips.

Whether such in fact is and will be the case, of course, is entirely up to us.

Michael Herbert Shadick
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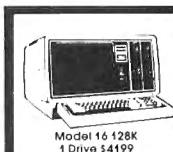
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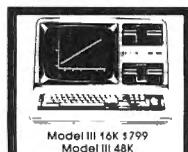
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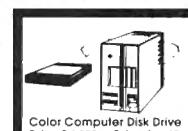
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COLOR COMPUTER CORNER

continued from page 31

experience in actually using the editor/assembler.

Chapter 4, "Color Graphics," introduces four-color graphics modes of different resolutions. The student is shown how to put the elements of a graphics program together, and two more programs demonstrate the different graphics modes. Using two-color graphics, Chapter 5 shows how to animate graphics displays, with sample programs that animate either by drawing, erasing and redrawing an image, or by switching between several complete graphic screens that are stored in memory at the same time.

Chapter 6, "Sound and Graphics," integrates these two major elements with sound effects that complement moving graphics displays.

Chapter 7 shows you how to use a joystick in your graphics programs. The sample programs will have you piloting a flying saucer around the screen, and adding obstacles and timing to create a joystick-controlled video game.

Many programs will require text, so Chapter 8 shows how to display text using assembly language, and Chapter 9 goes on to explain how graphics and text can be integrated in the same display. These chapters will have you write your own assembly language word processor, and give you two methods to create text characters using graphics.

Chapter 10, "Vistas Beyond," provides inspiration for further use of your new-found abilities. Among other things covered in this chapter is linking your machine language routines with your BASIC programs, designing graphic figures, and, perhaps most interesting, how to use an EPROM (Erasable Programmable Read-Only Memory) programmer to create your own graphics EPROM chips (the section refers to the EPROM Programmer from Spectral Associates, 141 Harvard Ave., Tacoma, Washington 98466).

The book finishes up with eight appendices of essential tables, specifications and other handy information, and another important feature in a book like this: a good index.

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This book seems to do the impossible: it introduces machine language without intimidating the reader. The instant feedback of seeing the results of your studies on screen and the lure of more sophisticated graphics techniques, combined with a very clear, well-thought out teaching style will keep even reluctant learners going. Each chapter builds on techniques learned in the previous chapter, and the student is made aware of how to apply the new techniques in future programs.

In short, this book is recommended for all Color Computer owners. Even if you don't think you want to learn assembly language, you'll find the graphics routines entertaining, and you'll probably end up learning in spite of yourself. ■

FREE DISK SPACE—GRATIS

continued from page 10

GETDISK/BAS and GETTAPE/BAS can be killed for a saving of two granules apiece. This user would hesitate to wipe out DISKDUMP/BAS as this file gets much use around here. Naturally, the criteria for eliminating any file is its frequency of use.

TEST2/BAS is a stress test for the entire system. Saving 12 granules (that's 15360 bytes, folks!) per diskette by unhooking this baby from the directory is a joy, indeed.

Try a "FREE" at "DOS READY" now!

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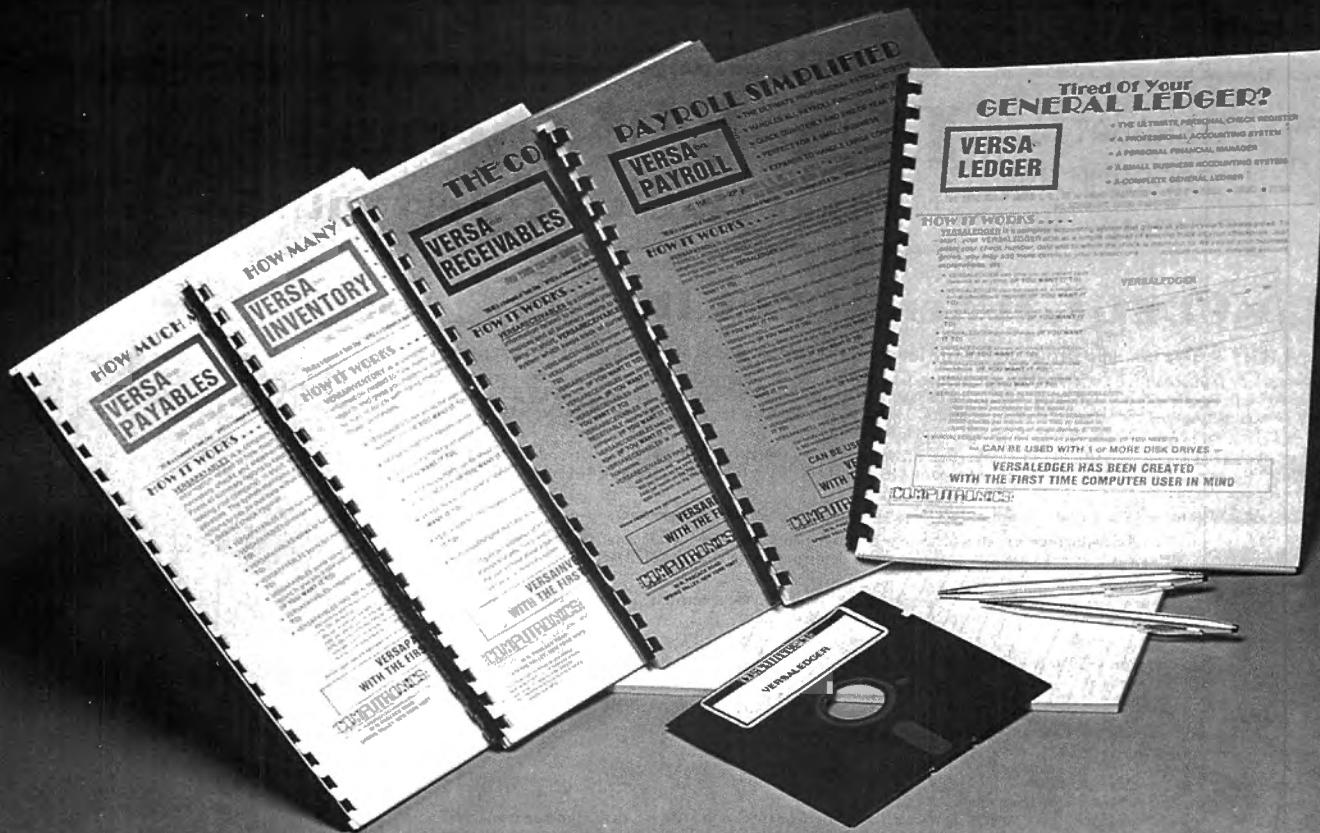
When Dr. Howe's BASIC TEXT EDITOR, which is being used to write this piece, has to deal with more than 100 lines of input, it tends to go into "suspend" mode. That is, the screen freezes up while this 32K machine rearranges its innards.

It's happening far too often now, approximately once for every second line of input. For that reason, I'll save for next time the other method I employ for getting more out of my diskettes. With that method, the saving is even greater.

Norman Cookson
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Spouse's occupation

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Yes

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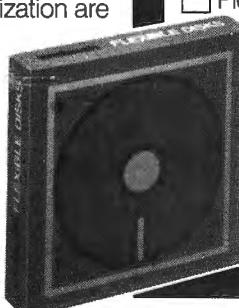
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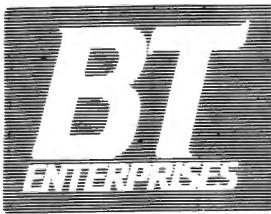
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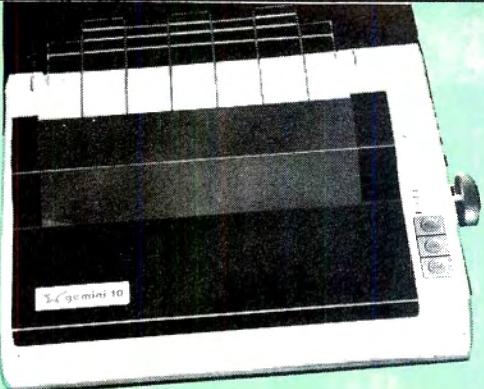


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