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THE ORIGINAL MAGAZINE FOR TRS-80™ OWNERS

H&E COMPUTRONICS INC.



Cover Photo by Harry Peterson
H&E COMPUTRONICS INC.

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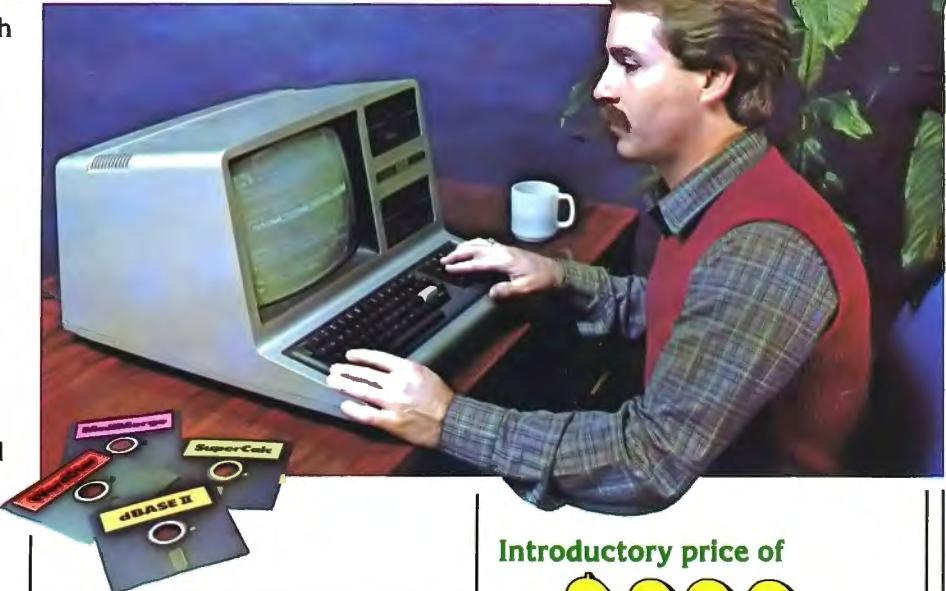
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BITS AND PIECES

Howard Y. Gosman

BUSINESS COMPUTING JOINS COMPUTRONICS

You'll notice something new in this month's issue: *Business Computing*, our newsletter for owners of under-\$10,000 small computers used in small businesses, has merged with the *Computronics* magazine, and we'd like to welcome all of the *Business Computing* subscribers to *Computronics*. *Business Computing* provides coverage of new products and software related to all small business computers, and you'll find news of software, hardware and services of all kinds in its pages. Subscribers to *Business Computing* will also find a wealth of information applicable to all computers throughout the rest of the *Computronics* magazine every month.

THE NEW POCKET COMPUTER

Radio Shack is now selling the PC-4, a new Pocket Computer that is the lowest priced yet: only \$69.95! The PC-4 comes with about 1/2K of memory (544 bytes) and

can be expanded with an addition 1K memory module (costing \$19.95). This Pocket Computer, unlike the PC-1 and PC-2, can only be programmed in BASIC, but the PC-4 is still the most sophisticated computer available for the price. The version of BASIC used has some 25 commands (including string handling functions such as MID\$, LEN and VAL) and 15 built-in functions that will be very helpful for engineers and mathematicians (including trig and inverse trig, radians and gradians, log, exponent, square root, angular conversions and absolute values).

The computer will run for 360 hours on two internal rechargeable lithium batteries. That's a long time.

Up to ten short programs can be stored in memory and recalled by pressing a single key. Programs and data can also be stored using the PC-4's optional cassette interface, which stores and retrieves data at

continued on page 8

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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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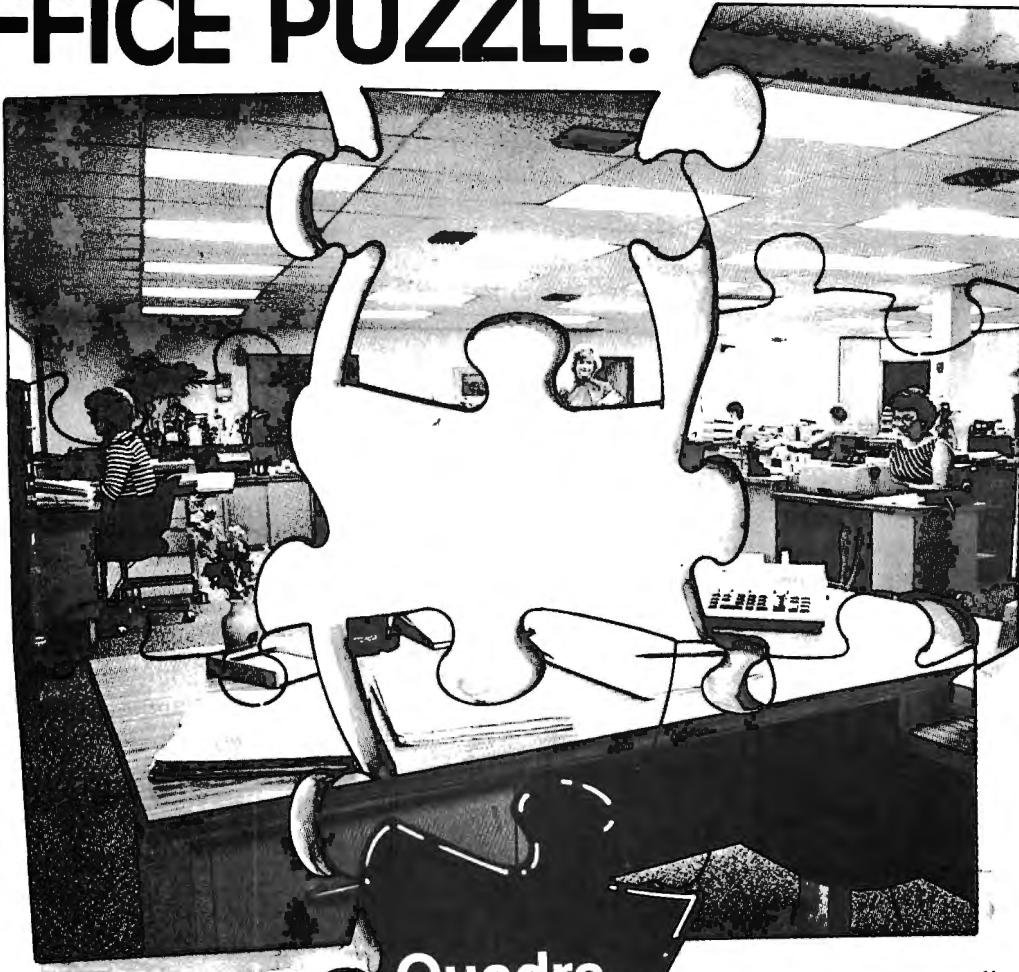
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The Quadra-MAC also allows each computer to use as much processor time as needed without affecting the other users because only the hard disk drive is being shared not the microprocessor.

In addition, each computer can run totally independently of the other computers without being affected by either hardware or software failure of another computer.

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The Quadra-MAC is available for only \$995.00 which includes the complete DOSPLUS Operating Systems. The cable costs only \$2.50 per foot.

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- Provides for duplicate labels.
- Deleted entries have "holes" on disk filled automatically.
- Automatic "repeat" feature.
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- Optional "ATTN:" line.
- Plenty of user defined fields with various options for simultaneously purging and selecting the printout.
- All 0's in address labels are replace by easier to read 0's.
- Continuous display of numbers of labels/envelopes printed.
- Each disk entry automatically "remembers" how many mailings have been made.
- Primarily written in BASIC for easy modification...embedded machine code for those speed sensitive areas.
- Hardware requirements: 32K, printer, and 1 or 2 drives.

Precision Prototypes
410-F East Roca
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THE CRYSTAL BALL

News and Rumors of Interest to TRS-80 Owners

TWO MORE PRODUCTS COMING

Earlier this year, Radio Shack placed an ad that showed six blank boxes, representing six new product releases to be made this year. So far this year they have introduced four: the Model 12, the PC-4 Pocket Computer, ARCNET (a local-area network that links multiple Model 11's and 12's with a shared remote Hard Disk Drive) and the new portable Model 100 (see this month's "Bits and Pieces" for a complete description of the Model 100). At least two more new products are still to be released by Radio Shack, but what are they?

There has been much speculation about what the new machines are. In fact, there's been talk about three new computers yet to be released. Apparently not all speculation is correct.

At the top of the list is the new TRS-80 Model 4, an upgraded and enhanced version of the Model III. This one we're sure of—there will be a Model 4, and it will appear soon (perhaps even by the time you read this column). The Model 4 will undoubtedly have an 80 column by 24 line display (like Models II, 12 and 16), an optional (perhaps built-in) hard disk drive, and more memory than the Model III—at least 64K and perhaps as much as 128K, accessible through bank switching. The Model 4 is also expected to be delivered with CP/M 3.0, which will make it compatible with thousands of already-existing CP/M programs. Other possible features include high-resolution graphics (we hope) and a built-in telephone modem.

There has also been a strong indication that Radio Shack has been working on a portable version of the Model III, about the size and configuration of the OSBORNE or KAYPRO computers. This also seems very likely, since Radio Shack has yet to enter the market for these "sewing machine" size portable computers. Since the market for this type of machine is suddenly very hot, Radio Shack would be foolish not to get into it.

There's been another story circulating recently that Radio Shack has

been working with a company in Korea to produce a new Color Computer. The new Color Computer is supposed to be a 64K machine, and to have significant enhancements over the present Color Computer. Hopefully these enhancements will include a real typist's keyboard, which would make the new computer much more useful as a small business machine (the keyboard is the present Color Computer's only significant flaw).

So that's three computers. Too many, right? If they're only going to release two new products, which two are they?

Here's a possible answer, and our wild prediction for this month: Radio Shack will introduce two new computers, but they'll have all of the attributes described above. Yes, there will be a new Color Computer from Korea. But what about the Model 4 and the Portable Model III? Our best guess is that these are actually one and the same computer. If Radio Shack can put a Model III into a portable case, they can do the same with the new Model 4, so why not kill two birds with one stone and introduce the new Portable Model 4? This way, a single new computer can satisfy everybody; the people who want an 80 column screen, the people who want a hard disk, and the people who want an OSBORNE-type portable computer. As we've seen with some of the new portables on the market (especially the KAYPRO), putting a computer in a portable case does not make the computer more difficult to use as a desktop machine, it just makes it more convenient to carry the computer around. It would make a lot of sense for Radio Shack to combine all of these attributes in one machine, and since Radio Shack has shown a lot of good sense lately (especially regarding the design of the Models 12 and 100), this is probably exactly what they have in mind. (Of course, if the Model 4 comes out before this column appears in print, then we may already be proven right or wrong about this one. In any case, you can expect to see the Model 4 very soon.) ■

LETTERS TO THE EDITOR

An Omission

Thank you for sending a copy of the April 1983 issue in which you published my article "Good Programs Do It on a Disk." After reading through the published version I noticed one omission which may cause a problem for some readers. Near the bottom of the first column on page 53 the following line is shown:

21nnnn11oooo01ssssEDB0C3eeee
<ENTER>.

Below this line are explanations for what the uncapitalized letters stand for in this command. The explanation for the series eeee was omitted during editing. It should read:

The original entry point is eeee.

This is the only problem I found that may need a correction printed. I am looking forward to submitting more articles to you in the future.

Ken Hippel
127 Plum Tree Road
Brandon, MS 39042

Problems with Compuserve

About a year ago I purchased a Compuserve Information Service package and a Direct Connect Modem I from Radio Shack. Little did I realize the problems this acquisition would later cause.

The modem worked just fine, which is more than can be said for Compuserve. Compuserve's on-line features work as promised. I have no complaints about this facet of their operation. Compuserve's billing system, however, is a shambles.

My first bill, received in May of 1982, was for \$14.00. This amount was paid within ten days. Compuserve cashed my check but refused to credit my account.

I have made nine phone calls, written seven letters, and mailed five copies of the cancelled check with no results. I have not received a reply of any kind from Compuserve pertaining to this matter. I don't know what more I could have done.

Despite my efforts to correct Compuserve's error, I continue to receive insulting letters and have been terminated from the service.

I would like to warn your other readers about this situation so they can avoid, if possible, the problems I have encountered with Compuserve.

Timothy J. Gosch
Route 4, Box 309
Albemarle, NC 28001

Praise for the Abacus

We who are non-Asiatics have been handicapped by being deprived of the knowledge of the use of the Abacus, which is not the child's toy illustrated on your November cover.

Note that the Japanese version is not as clumsy as the Chinese. I stumbled along until about 1955, when I picked up my first one in Chinatown, Cleveland, Ohio. I could not afford the electric desk calculator at that time when I learned that the Abacus in trained hands was at least as fast, if not faster, than the Marchands, Monroes and Friedens.

It was the HP35 calculator which put my Abacus on the shelf.

I would suggest that you get someone better qualified than I to write more about the Abacus, because there is a possibility that an electronic adaptation of the Abacus could result in a better performance than the present use of binary methods.

Homer S. Powley
Petra Lane, R.R. 1
Eldridge, IA 52748

Solution for Contact Problem

I was recently introduced to a product that might be of interest to your readers. During a "coffee time" discussion of bus connector contact problems—the standard cure being "take it apart, clean it with an eraser, and put it back together and hope that it doesn't happen again at a critical time"—one of the troops, who is a local field representative of a commercial microwave data transmission net, mentioned a product called "Cramolin-Spray R-5" that they use on all their JF plug board contacts to help alleviate just this problem. He showed us how it worked on an old, dirty board, brightening and cleaning the edge connectors with

no abrasion.

I have tried it on both my TRS-80 Model I and a little ZX-81 with a 16K memory addition (the connector being very critical, any vibration/movement resulting in hang-ups before). It works great. Since starting to use the stuff, I have had no more contact problems on either unit.

L. A. Linde
Box 1072
Alpine, TX 79831

Criticism of "Pirate Software"

I recently read an article in your April, 1983 issue and was more than a little disturbed by parts of it. Mike Shadick's "Pirate Software, HBO Dishes, Off-the-Air VTR, and Other Alleged 'Crimes' of the Computer Age" had, in my opinion, some rather twisted thinking involved in its presentation. The following represents my personal opinion, and fairly well represents that of our company:

WHEN I WAS YOUNG

Is this familiar? You're six or seven years old. You're in K-Mart, or some drug-store. You're single urge is that candy bar, or bubble gum. You know your mom will say no, and you don't have any money. You make a decision, and in your pocket it goes. Then, in the store, or perhaps when you get home, you feel your mother's hand on your shoulder. Your face tells it all. Hopefully, you learn a lesson that will stay with you the rest of your life; that stealing is wrong, even at the level of a single piece of bubble gum.

You're older now, and you own a computer. Is software any different from bubble gum? Everyone realizes that the microcomputer industry is young and mistakes will be made. That's natural for any industry. However, let the facts be known, and let's define our terms.

It certainly takes little mental gymnastics to understand that illicit software duplication or pirating is stealing. There is no way around it. A person who accepts or gives a copy of a program without paying for it is a thief. Now, I'm not talking about a backup for a legitimate purchaser. This individual has cer-



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tain rights, and a backup should be available to that individual.

Soft Sector Marketing, Inc. has been in the software business since 1980. We know how much we spend for advertising, rent, overhead and the like. We also know how much we invest in research and development, in reviewing and debugging software, and in general quality control. Like most American companies, our motive, of course, is profit. But our commitment is to service and quality, and both of these cost. Further, without some profits, entertainment, educational or business software would not and could not be brought to the masses at even the prices that are now being charged.

And who really cares if software is "protected?" Usually, only Bluebeard, the Pirate; that individual who wants an illegal copy. It is very rare that we hear any complaints of this type from a legitimate purchaser. The police tell us to lock our car doors, and the insurance companies inform us that our homes should be locked. If everyone were totally honest we wouldn't need locks. But who is it that can get in the locked car the easiest? Who is it that can walk into the home the easiest? The person who has the right to be there. He has paid for the house or car and has its use and pleasure. Does this apply? I think so.

There exist in this world naive people, who think that all corporations reap huge profits and give nothing in return. I would like simply to point out for these people some readily available statistics, the most important of which is that, of all the companies that form in any given year, only 10 to 15 percent will be in existence the following year. Also, Dun and Bradstreet publishes percentage returns on various business, not the least of which concerns the microcomputer hardware/software industry. In one recent report they indicated that there were average net profits of 5-6 percent for companies that were large enough to be reporting and were in business for more than one year.

Like most things, solutions will come in time. It may mean going to ROM cartridges, or it may mean going to some as-of-yet unknown process. It will mean that the industry, purchasers and sellers, will

have to come into adulthood and face the situation.

I would have no objection to any reply being sent to me at Box 368, Bloomfield Hills, MI 48013.

Edward Hru
Soft Sector Marketing, Inc.
6250 Middlebelt Road
Garden City, Michigan 48135

Comments about Products Reviewed

It is difficult for me to believe that your contributing editors, Richard Kaplan and A. A. Wicks, thoroughly try out the products covered in your product and program reviews.

The following instances are at hand:

1. TAXSAVER by Micromatic Programming Company: I purchased the TAXSAVER I program, which is identical with TAXSAVER II, in the preliminary programs. The program would not correctly designate the disk drive to use for data storage. A telephone call (at my expense) cleared the problem and let me proceed to the next difficulty. Telephone calls cleared this problem, which was caused by not correctly interpreting screen instructions which were not described in the instruction book. While this was taking place, two pages of program changes were received, some of them mandatory. When applied to the program, it worked as advertised. Because of the delay in getting the program corrected, I purchased a tax preparation program from another company, at a price of \$15.00, which worked perfectly the first time run. Both programs agreed on the computations.

2. LemonAid and KWIK Software: I purchased both items and found LemonAid quite satisfactory until I tried to load the Computronics cassette given to renewal subscribers. It would not stop loading at the end of a program, although it would load properly without it. The unit and cassette have been returned for servicing. KWIK software does not state specifically in their advertising that the program will not work with Disk BASIC, only Level II BASIC. The review article alluded to this fact, but not

continued on page 8



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LETTERS TO THE EDITOR

continued from page 6

specifically. The software was returned and credit received without question.

3. ARRANGER by Triple-D Software: I am in agreement with most of the review. However, I found the accompanying instructions fairly complete and easy to follow. The major fault, at least to me, is that it does not provide for deletion of files, as does Super-Directory. Deletions may be made, but by an involved procedure which I found difficult to follow. Clarification has been requested.

My purpose in writing you is to emphasize the need for a product and program review that will examine all facets of the item, to insure that you readers will not be led astray by the sometimes promotional aspect of the review. I might suggest that one of your neophyte readers be given the opportunity to evaluate new products and programs from the viewpoint of the non-technical user. Your staff reviewers would appear to be too experienced and knowledgeable to provide the kind of product and program evaluation that could be of value to a less experienced user.

Thank you for listening.

Verne B. Morrison
9642 Roe Avenue
Overland Park, KS 66207 ■

BITS AND PIECES

continued from page 2

300 baud. The cassette interface costs \$39.95.

The PC-4 also has an optional printer which prints 20 characters per line at 60 lines per minute with an electrothermal dot-matrix print head. The printer runs either on AC power or rechargeable Nickel-Cadmium batteries and costs \$79.95. (Hmm . . . that's 10 bucks more than the computer itself!)

THE TRS-80 MODEL 100

The big news this month: Radio Shack has released the new TRS-80 Model 100 portable computer (also known as the Micro Executive Work Station), and we were so impressed that we bought the first one available at our local Radio Shack

Computer Center. The Model 100 is a truly portable, battery-powered "notebook" computer—this means that it's about the size of a standard three-ring notebook binder, and very lightweight (about 4 pounds).

The basic Model 100, with 8K of RAM (and 32K of programs in ROM) costs \$799, and a 24K version is expected to sell for \$999. Add-on 8K memory chips can raise memory to 32K, and there's room for an additional 32K of programs in ROM.

The Model 100 features the largest liquid crystal display (LCD) we've seen yet. It displays 8 lines of text with 40 characters on each line, and is very clear and legible. The size and clarity of the screen and the full size typewriter keyboard make this a very good little computer for word processing. The screen provides a good-sized window on your text file and the keyboard is a real typewriter keyboard, with the solid, responsive feel of a very high quality machine. Many computers out there have poor keyboards—for reasons ranging from calculator-style pushbutton keys to rearrangement of standard keyboard layout, which can result in a computer keyboard with a very good feel, but a layout that is unfamiliar and very difficult to use. IBM made this mistake with their Personal Computer, and created a computer with several serious flaws in the keyboard layout, the worst of which are misplaced left shift and return keys—they should have stuck with the basic design of their Selectric keyboard. Radio Shack has created poor keyboards too—just think of how popular the Color Computer might be now if only they had used a real typist's keyboard instead of pushbutton keys. You might expect that a computer that weighs only four pounds would be an unstable surface for typing, but this keyboard is so good that you really can touch-type at high speeds, even with the computer on your lap. A writer for the *Wall Street Journal* wrote a column about the Model 100 while flying between Atlanta and New York, with the Model 100 keyboard in his lap, and he praised the machine as a very useful tool for people who travel a lot on business. He was able to store his whole column plus notes and the text of a short speech that he gave (using

the LCD screen for prompting during the speech).

This keyboard also has eight programmable function keys (F1-F8), and they can be used to issue single-keystroke commands to the computer—to save and load files, return to the program menu, etc. Titles for the functions appear on the last line of the LCD display. The keyboard also includes cursor movement keys and more standard function keys than some desktop personal computers, including Escape, Tab, Control, Caps Lock, Break/Pause, Num (which activates a special numeric keypad laid out on three rows of keys) and Paste, Label, Grph, and Code keys.

Another extremely important feature is a keyboard "type-ahead" buffer. This means that, no matter how fast you may type, the computer will never drop characters due to too-rapid input. If you use the Model I or III for word processing and you are a touch typist, you will find that while the computer is doing its screen "wrap-around" (moving the last word on the end of the line to the beginning of the next line) it misses a character or two. Even with the Electric Pencil 2.0, there is a problem if you type too fast—a missing letter or two in the first word on every line! It's not the program's fault, but the computer's. But the Model 100's keyboard buffer is very good—in fact, it is even better than the Model II/12's keyboard buffer. On the Model II, if you do an operation such as saving a program under BASIC, and then quickly type "LIST" while the disk is still running, the keyboard buffer usually drops the first character typed, so that when the computer finishes saving the file and returns to the READY state, the command "IST" suddenly appears, causing a syntax error. The Model 100 has no such problem, so that, in this example, the command "LIST" would appear onscreen as soon as the computer is READY, and your listing would then be displayed.

The Model 100 is built by the same company that is now manufacturing the NEC portable computer, which has many of the same features as the TRS-80 version. But only the TRS-80 will be available in the United States—NEC has no plans to market their notebook computer in the U.S. Thus, the

Model 100 is the first (and so far the only) computer to bring these new features to the American market.

Unlike previous lap-sized portable computers, this new portable has full desktop-computer power. The Model 100 comes with several software packages built in, including BASIC, a word processing program, a telecommunications program, an address file program and an appointment-scheduling program (all stored in ROM). The Model 100's BASIC seems to be quite standard, so it will run many BASIC programs written for other Radio Shack computers. When you turn the computer on, a menu of your files appears, with the first file (BASIC) highlighted in "reverse video." When you press the space bar, the reverse block moves to highlight the next file. You just press the space bar until the program file you want is highlighted, then press ENTER to run that program.

The Model 100 has been designed for easy expansion and attachment to peripherals and communication lines. It has a parallel printer port, an RS-232 serial port, a cassette port, a built-in direct-connect telephone modem, a 40-pin expansion bus, a bar-code reader port, and a socket for an additional 32K of ROM. The cassette port will allow storage of programs and data, but there are no confirmed plans to add a disk drive or operating system. This could be a shortcoming, but it should be easily possible to have a "base station" expansion interface with disk drives, monitor, printer and more memory.

Radio Shack does have a good strategy for the application of the present Model 100, without disk drives. They want you to connect your Model 100 to a desktop TRS-80, using the serial port. One of the most heavily stressed points made in the manual is how easy it is to transfer data between the portable unit and other TRS-80's, and they give step-by-step instructions on how to do it with each model. It should be a simple matter to, for instance, use the Model 100's word processing program to enter and edit text files, then use the TELCOM program to transfer the files through the serial port and into a desktop TRS-80 for further editing and final

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continued on page 10

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BITS AND PIECES

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printout. Since this column is already composed on a TRS-80 (Model 12 now), perhaps in the near future we'll be using the Model 100 as well.

The Model 100's built in direct connect telephone modem (something which should be a standard built in feature of all computers by now) works with the built-in software, allowing the Model 100 to serve as an automatic telephone dialer as well as an address file/phone directory and appointments calendar. It is able to place calls to electronic information services (such as The Source) and fetch and store data such as the latest prices of stocks, electronic mail, etc.

The bar code reader port may become very useful, especially if Radio Shack starts to publish software in bar code form. This port can be used with several available bar code wands, including the Hewlett-Packard HEDS-3000.

The Model 100 runs on 4 AA batteries when on the road, and uses an adaptor for AC power where available. Even when the unit is shut off, the programs and data in RAM are saved by a very small amount of power from internal Nickel-Cadmium batteries. If you shut off the computer, even in the middle of, for example, editing a text file, it returns directly to the same operation when turned back on—right to the middle of your text file. Also, if the unit is unused for 10 minutes, it shuts itself off.

This type of computer is going to become very popular soon, and although Radio Shack has gotten a head start on other U.S. manufacturers, they can expect stiff competition very soon—we'll probably see quite a few introductions of this new breed of portable computer in the next year. The word is out that Apple is working on a notebook-size computer called the "Elf" which is a \$500 portable version of the Apple IIe.

MOORE BUSINESS FORMS

The Catalog Group of Moore Business Center has announced the addition of CLEAN PRINT carbonless computer business forms to its line of computer forms and supplies. This offering, made through their

new Spring computer forms and supplies catalog, marks the first time that Moore business forms are available on a direct basis to small businesses using desktop or personal computers.

CLEAN PRINT forms provide ease of storage and convenience of handling because there is no carbon to smudge on files or hands. They are designed to complement a variety of software, including Radio Shack, BPI Systems, Peachtree and TCS.

Many carbonless forms are available, including invoices, statements, multi-purpose forms, picking slips, sales orders, purchase orders, accounts payable checks, payroll checks and multi-purpose checking. A programming grid is provided with every purchase of continuous forms.

A new flexible format allows for ease of writing individual programs to include important messages to customers or other confidential communication. Open forms are available for invoices, statements, multi-purpose forms and picking slips. "Many customers prefer to write their own programs because of individual specific applications. Our CLEAN PRINT open forms allow them to do that. Customers also can choose typestyle and optional stock logo at no extra charge," says Jack Scanlan, general manager.

Storage caddies, binders and racks for storing the carbonless forms are also available from Moore Business Center or through the catalog. For a free catalog, contact the Catalog Group, Moore Business Center, Dept. 303311, 1400 South Wolf Road, Suite 300, Wheeling, IL 60090, or telephone 800-323-6230 (in Illinois, call 312-459-0210).

LINK TRS-80'S WITH IBM PC'S

A new product has been released that will link any Model I or III with an IBM PC for transfer of programs and data. The package includes communications software for both computers, a connecting adapter, and a test communication file. The surprising thing about this package is the price: just \$39.95. Baud rates from 110 to 9600 are supported. For more information, contact Personal Computer Products, 1400

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PROGRAM PREVIEWS

A. A. Wicks

This Month: Small Business Accounting

Several years ago, I owned and operated an electro-mechanical repair business, in addition to my full-time employment. This was a small business, and at peak periods the maximum number of persons employed was only two, in addition to myself. With a business this size, the amount of paperwork was minimal, and the greatest problem was in processing business license matters, State Sales Tax records and the annual reports for these, and—income tax.

For the latter, I had an "income tax man," and the fact that I kept a record of all of my financial transactions using the Dome Simplified Monthly Bookkeeping Record, made his job at tax time an easy one, at the same time saving me money for his services because of the small amount of time he needed to spend on my records. The Dome System not only allowed me to keep good records; it also gave me an instant appraisal of my business posture at all times.

The Dome System is probably the easiest system to learn and use for the "non-accountant" type of business person. How much easier it would have been if I could have maintained my records using a computer, but that was a couple of years before "TRS-80 time."

It was, then, with considerable interest that I noticed that Howe Software was offering a program, SMALL BUSINESS ACCOUNTING, which is based on the Dome Bookkeeping Record No. 612—the very one that I had used and actually enjoyed working with, even though I dislike keeping financial records. A program for small businesses, working within the scope of the Dome, should meet the needs of any business entity having a limited number of employees (or one self-employed person), which does not have large production and operating costs and similar complexities. (Look to VERSALEDGER or MAXI C.R.A.S., reviewed in this column in the November 1982, and January 1983 issues respectively, as programs for large corporation accounting operations.)

OVERVIEW

Actually, SMALL BUSINESS ACCOUNTING is a group of BASIC programs prepared in a way that permits the small business operator to insert the day's income-expenditure records in a few minutes at the end of a business day—or even less frequently, as long as the information is recorded as being daily. Then, totals may be computed on a daily, monthly or year-to-date basis, at the user's convenience.

The expenditure categories and code numbers used in the program are the same as those used in the Dome Journal. For those who are familiar with the Journal, the association will be quite natural; for those who are not, it is not a prerequisite to the use of the program. The Journals are available in most large stationery stores at a very modest cost, if you would like to familiarize yourself beforehand.

The SMALL BUSINESS ACCOUNTING programs are supplied on one non-system disk, and can be used on either the Model I, II, or III. It will operate using a one-disk system; however, in this case the program set must be placed on a system disk (TRSDOS recommended), which means finding someone who has two drives to do it for you. (Note: The program is advertised as also being available on cassette. A comment regarding this appears below.) Howe Software will also place the program on a system disk for you at no charge, if you send in a system disk together with your original disk. The preceding applies equally to Model I and Model III owners who have only one drive in their system. Two-drive owners have no problem—they may either install the program on a system disk, or run it in Drive 1 with a system disk in Drive 0.

As noted briefly above, cassette also may be used, but it must be recognized that this is going to be a very slow method of filing and accessing data. No information for cassette users was contained in the manual that I received with the program. The cassette version is a completely different program from the

disk version. It does not contain the payroll section, and comes with a different manual.

No restrictions exist to the making of a backup disk of this program for your own use. This is encouraging to a program owner, and I sincerely hope that someday abuses of this capability will cease.

There are a number of considerations to note in assembling disks for data using SMALL BUSINESS ACCOUNTING. As these are fully explained in the manual, and are based upon whether or not you are using one, or more than one drive, they need not be detailed in a review. The files that are set up require significant amounts of data storage. Nevertheless, the one drive user can operate the program just as efficiently (if not as quickly), as the multidrive user, as the former will be instructed at all times as to when to insert or remove the various disks in use.

RECORDS

Three data records are maintained by SMALL BUSINESS ACCOUNTING. These are: Record of Receipts, Expenditure Codes and Payroll Record. With the first subject, you may display (or print), at any time, the totals day-by-day, or month, or year-to-date. The Expenditure Codes follow the Dome System, providing 32 Code Numbers for Deductible Expenditure categories, and six non-Deductible Expenditure categories. Large organizations could well have many more categories, but this quantity is quite sufficient for any small business.

The Payroll Record file has room for 99 employees. (Dome allows for a maximum of only 15.) The record file provides for records of each paycheck issued and personal information on each employee—their name, address, record number, employee number, marital status, and exemptions. Also, check number, date of check, and total wages. There is also room for FICA (Social Security) deduction, Federal and State Income Tax, and up to three other deductions that may be specified.

Part of the foregoing Payroll/Personnel information is inserted during the initialization of the file, which will be described in a moment. The other part develops as the Payroll records are issued for payment, and, of course not all of the data shown above will appear on the payroll check.

OPERATION—Initialization

A single command for the Model I with TRSDOS, or an Auto command with the Model III, will take you to the Main Menu. You then select from a choice of Initializing files for a new year, either Entering or Displaying Receipts or Expenses, Entering or Displaying Payroll, and last, Exiting the program (which insures that all files are closed). From the above it will be seen that you can go directly to the operation that you need, and, as you do so, sub-menus will appear. Because the installation of files for a new year must occur before anything else, this will be mentioned here first.

In addition to offering the "new file" option, the sub-menu allows you to display or modify expense categories and payroll deductions, and add to the employee payroll file. Answering a series of questions upon selecting the first choice permits quickly building a file under any name chosen—the default name is BOOKS.

The additional menu options need not be used (except Add to Payroll), if the defaults are adequate for your business. As stated previously the Dome system comprises the defaults, and for most businesses these are going to be adequate for normal use. No need to keep referring to the manual for these categories when using the program, either; a printout of these can be made from the program. In addition to changing any of the categories, if this is necessary, you may also expand the number up to 64, with subtotals computed on the summaries after one selected code number. While making any changes or additions to the codes, an interactive screen dialog allows you to correct any input errors you may make, and you can view or print the new or changed categories on request.

Displaying or Modifying Payroll Deductions operates similarly to the option just described, but there are only six payroll deduction descrip-

tions, which were listed above, and these may not be changed. Therefore, this could be a minor inconvenience to some companies. All deduction descriptions apply to all employees; for instance, you cannot separate Exempt employees from non-Exempt, at least as far as deductions are concerned. I cannot think of any reason that this would be a problem in this area, except that there is a remote possibility that there could be some difference that could occur between Exempts and non-Exempts in the three "optional" deduction categories. With this exception, the Payroll Deduction categories are changed just as the Expense categories were, using a screen dialog.

The Add Employee Payroll option should only be necessary when a new employee is added to the payroll after the files for a new year have been established. Because payroll records are in a separate file, they are created separately as we shall see, so the Add function is different from the procedure that initially builds the file, even though it appears here in the review with the Installation procedures.

OPERATION—Data Entry

The second option on the Main Menu places you in a position to Enter and Display Receipts or Expenses. This category as headed in the manual is called "Computing Receipts and Expenses," which is functionally correct, but could lead to confusion on the part of a novice user. The manual states that this option (quoted above), should be selected from the Main Menu, but, as you will note, that's not what the Main Menu says.

In any event, selecting this provides another menu—the Bookkeeping Menu. In this area you may: Enter and Display Receipts, Enter Expenditures, Display and Correct Expense Items, and Compute Monthly Totals.

The first choice allows you to enter the total receipts for one or more days. If you have already entered receipts (you are requested to identify the month), these previous totals are displayed on a day-to-day basis, together with Total Receipts This Month, Thru Last Month, and Year to Date. You now have an opportunity to enter receipts for any day—this would permit you to effectively change a

previous entry, inasmuch as any new entry will replace the one currently on the disk file. It also allows you to actually add receipts found later or previously omitted in error.

Entering Expenditure data is as easy to do as the previous functions, and expenses may be inserted at any time—when paid, or at month end, as convenient. SMALL BUSINESS ACCOUNTING has a limitation of 256 items for any month. The Dome System has room for 320 items; but Howe Software made the limitation of 256 to accommodate Model I users. Data are input by providing the Expense Code Number. This displays the description, at which time the amount may be entered. Entries are re-displayed and queried for accuracy. If a change is necessary the entire item must be respecified. However, you can avoid retyping anything except the values if Enter only is pressed. Requesting the next menu item permits displaying or printing all expenditures by month, item number, code and description, together with the total. The final menu item provides a complete record of the expenditures in each category, tax-deductible and non-deductible, with totals.

This display (or printout) is an impressive one, showing as it does the Code, item Description, (amount) This Month, Thru Last Month, and Year to Date, across five columns. At the bottom of the display, the Total Income, and (total income) Less Expenses are shown, together with the result, Net Profit. The length of this material precludes showing it on one screen; however, it will stop at the end of each screen, and pressing Enter will continue the display.

This major record is, as mentioned, informative and complete. Nevertheless, both on the screen and when printed, it would be easier to identify isolated amounts if they were not surrounded by zero amounts, when this occurs. That is, if there are no data for an item, it will be displayed and printed as: \$0.00—making it easy to overlook for instance, an entry such as \$1.00. It would be far better, in my opinion, for zero amounts to be blank on this display or printout.

The Main Menu item "Enter or Display Payroll" provides the sub-

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menu of Enter Employee Data, Enter Payroll Data, and Display or Modify Payroll Data, as well as Return to Main Menu.

As referenced earlier, the payroll data comprise two groups of information—personnel information and financial information. When the files are initialized for a new year, blank files are created for each employee. The personnel information, which was described earlier, merely provides identification of the employee and his/her status for tax purposes. Actually, when the file is initially created, the information area is reserved with blank spaces. This means that the first time data are entered, the information is "changed." Therefore, it is easy to make later changes in the same way.

The Payroll data may be entered by replying to the "Employee Number?" query. This results in the employee data being retrieved from the file and displayed as you type in the check information. Any quantity of checks may be issued to an employee, once again though, within the limits of your disk storage.

Total wages and deductions must be specified for each employee. Note that one of these entries was given previously as FICA, and two others were Federal Income Tax and State Tax, respectively. This means then, that before entering these items, you have been off somewhere computing these deductions. The program is just not that sophisticated to do this, but I feel this is reflected in its low cost, as a program capable of doing this would be an expensive one.

The display/modify function results in still another sub-menu. This allows you to display or modify a single employee check. The same speedy dialog occurs here as for the many other change functions. You may also display or print the entire list of employee checks, or the totals only for paychecks issued to one employee. You may do this for any number of employees as you will be given the option of looking for another employee after each completion of this action.

The Year-to-Date option provides a wealth of information—the total amounts paid to each employee, and all deductions. You may display all individual checks, or only the totals for each employee. The total for all employees is also provided.

This too, may be printed, if desired.

It is hardly necessary to mention that the program operates with lower case; this is the rule with most programs nowadays rather than the exception, as in the past.

ERROR TRAPPING

Error trapping could be improved in this program. Not that errors are not detected, but rather in the way that the result of an error is handled. For example, if a file has not previously been configured and you enter a (non-existent) choice from the menu, you are returned to "Ready." Which means you start over again. When you are into a sub-menu this can be annoying. A message telling what was incorrectly requested and a chance to try over again would be more appreciated. This type of response is effected satisfactorily in other places in the program, such as when the message, "Incorrect Expense Code Number" is presented—much better! Another standard error trap is used if commas are erroneously entered in dollar amounts. The report "Extra ignored" is presented, and all following the comma is lost, of course. Also, if a dollar symbol is typed at any time, you will receive "Re-do?." These last two error reports are the standard system error reports. Better trap-paths and better reports of errors would be beneficial to the program.

DOCUMENTATION

The "manual" that comes with SMALL BUSINESS ACCOUNTING is twenty-three 8 1/2 by 11 inch single-sided sheets, including the cover sheet. Printing appears to be by offset press from typed copy, and in places there were some minor "dropouts" caused by poor original reproduction copy, but not severe enough to make the information illegible.

The writing and spelling in the manual cannot be faulted—it is clear and simply written. No one who has even a very minor knowledge of bookkeeping or keeping financial records should have any problem understanding the program procedures or operating functions. The author has addressed the least knowledgeable user adequately without boring the well-informed. The only suggestion for improvement would be to have a "tree" of the various menus, sub-menus, and

sub-sub-menus included somewhere near the beginning of the documentation. This would aid in providing an overall understanding of the functioning of the program.

There is a fairly important omission from the documentation.

continued on page 32

BITS AND PIECES

continued from page 10

Coleman Ave., Suite C-18, Santa Clara, CA 95050; (408) 988-0164.

UNIVERSAL OPERATING SYSTEM

A version of the University of California's UCSD P-System is now available from PCD Systems Inc., for the TRS-80 Models III, II and 16, as well as several other popular microcomputers. This system allows the development of programs in Pascal that will run on other computers without alterations. The package includes a compiler, screen editor, file manager, run-time package and full documentation. All TRS-80 versions currently sell for \$650 (the Model 16 version uses that computer's Z80 processor; a 16-bit version for the 68000 processor is expected soon). For more information, contact PCD Systems Inc., P.O. Box 143, 163 Main Street, Penn Yan, NY 14527; (315) 536-7428.

NEW HARD DISKS FOR MODEL III

Apparat has introduced their new AT-Series line of Hard Disk Drives for the Model III. The new systems are available in 5, 10 and 20 Megabyte configurations, and the 5 and 10 Megabyte versions can be upgraded to 20 Mb. Another big plus: all drives come with a NEWDOS/80 2.0 Hard Disk Operating System. The 5 Megabyte drive sells for \$1,975 and the 10 and 20 Megabyte versions cost \$2,550 and \$3,075 respectively. For more information, contact Apparat Inc., 4401 S. Tamarac Parkway, Denver, CO 80237; (303) 741-1778.

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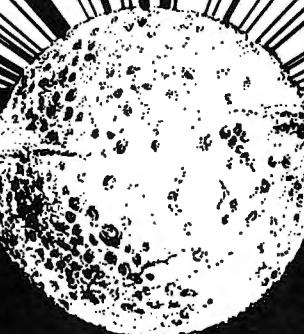
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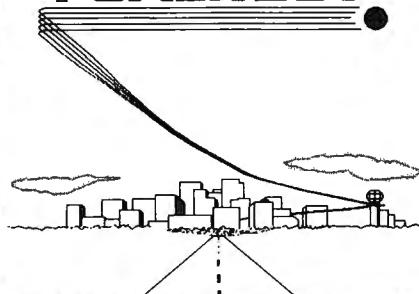
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BEGINNER'S CORNER

Spencer Koenig

This Month: Compilers, Shmilers! What Are They, Really?

Hi, and welcome. Recently I've been really curious about how people have been writing all these programs that allow the TRS-80 to "use" other languages. In some cases these interpreters and compilers were written in BASIC (I'm impressed).

Looking into it, I've come across a good introductory book on the subject (good for beginners, that is) called "Writing Interactive Compilers and Interpreters" by P.J. Brown (Wiley). It's written in "easy to understand" clear language and has examples in BASIC to display the various concepts. I recommend it, but it does assume a good knowledge of BASIC.

In looking around at the various languages available, it seems pretty impressive to me how this kind of task is accomplished. I've seen programs written, in BASIC, that interpret or compile PASCAL, BASIC, COBOL, LISP and FORTH. I'm sure there must be some programs around that emulate newly invented languages. We just haven't heard of them yet.

By now you must have noticed that I used the phrase "interpret or compile" a few times (a P.J. Brown influence). There is a difference between the two terms, but their actions (the way they work) are similar, although the results (output) can be very different. This article will deal mainly with the topic of what a compiler is. Perhaps later (as I learn more about them) I can go into more detail about what interpreters and compilers are and how they do what they do.

First, a little professorial footnoting and citing.

compile: to compose from materials gathered from several sources; to heap together (*The American Heritage Dictionary*).

A syntax-directed compiler is a general-purpose compiler (I love it when they use the word to describe itself!) that will service a family of languages by providing the rules for language analysis in the form of data (usually in the form of a table or list), rather than building the specific parsing method (separating the input stream into parts) for a particular language into the compiler.

Another type of compiler is the *incremental compiler*. The compiler generates code for (or checks the syntax for) a statement, or groups of statements received incrementally (line by line, word by word, character by character, etc.), regardless of the code to be generated. This is different from the usual case, where the compiler begins checking syntax after finding an "end of line" character (closely paraphrased from the second edition, *Encyclopedia of Computer Science and Engineering* by A. Ralston and E. D. Reilly, Jr.).

I really enjoy quoting new books I've just received. Makes me feel like I've gotten my money's worth.

Well, the *encyclopedia* certainly said a mouthful. What does all that gibberish mean? A compiler is a program that generates code that a particular microprocessor can use to perform a task. A compiler can be written in any language. It can get input either from data statements, from keyboard input (interactively), or by some other means, such as disk files, and, depending

on what that input is, generates the required code. The code generated is most often machine code.

I say "is most often" because I have found out that the code generated is not always machine code. For example, some PASCAL compilers do not generate machine code. Instead, they create a file that is in "P-code." This P-code is then "interpreted" by another program called a "RUN-TIME" module.

Now, things start getting pretty complex with all this stuff. You'd think people would start getting sick of all these additional programs and modules added to a system to get a simple program to work on your machine. AM I CRAZY OR AM I RIGHT (why not both)?

Well, they claim to have a good reason for this kind of design. The word you run across is *portability* or *transportability*. This means that a PASCAL program compiled to run on an IBM-PC could run on a TRS-80 as well, if they both have compatible P-code interpreters (and if you were able to get the program from one machine to the other). Sounds good in theory but.... That's enough about politics and the better mouse trap. I want to know what these things are, already. I'll leave the bickering to the experts.

FIRST A LITTLE DISTORTED HISTORY

Compilers, like most utilities and system optimizers, came to us from the GREAT HALL of MAINFRAMES. Way back then, people used to write programs in machine code. I've met some who say they input programs by flipping switches and such.

Later came the development of ASSEMBLERS, which allowed you to input a language that looked like someone forgot that vowels existed (JR means JUMP and JNZ means JUMP if the result is not zero). After that came the HIGH (and mighty) LEVEL languages, such as FORTRAN. The advantages of a high level language was that you could read it a great deal easier than a bunch of 1's and 0's.

The disadvantages were that the machine couldn't use it at all. What they needed was a go between that took the HIGH LEVEL language and "translated" it to a low level language that the computer could use. (I hate to say "understand." Everybody uses "understand." My computer doesn't understand me—do you? DOES ANYONE OUT THERE? Never mind.) That's what a compiler does: it takes your high level input and converts it to a low level output, usable by the CPU.

How does it do this? That is a heavy question, and the best I can do here is give you an overview of the situation. After all, if you want detail, that's what twenty and thirty dollar books are for.

Most compilers are made of several modules and therefore have several stages to go through before you get the finished product. They all analyze the "source code," your input high level language, and substitute the "object code" (machine language file) for it.

This isn't a one to one operation, where every word

continued on page 25

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*** SPECIAL NOTICE ***

Beginning with this month's issue, BUSINESS COMPUTING has "merged" with THE COMPUTRONICS MONTHLY NEWS MAGAZINE. Each month, BUSINESS COMPUTING will appear as a section within the COMPUTRONICS MAGAZINE. The content and direction of BUSINESS COMPUTING will not change, and all present subscribers to BUSINESS COMPUTING will now receive the COMPUTRONICS MAGAZINE.

*** MICROSOFT'S SYSTEMCARD ***

Microsoft has just introduced a multi-purpose expansion card for the IBM Personal Computer that will provide users with several new features for their computers.

To begin with, the SYSTEMCARD adds either 64K or 256K of RAM to the system, which can be used with disk emulator software provided along with the card. What this software does is allow you to use part or all of the extra RAM as if it were an additional disk drive attached to the system, so that you can store many program and data files in the card's memory. The difference is that, unlike a disk, access to the programs and data stored on the card is just about instantaneous (compared to the time needed to access files from a diskette). Many programs are too long and complex to fit into memory all at once and still leave room for the manipulation of data in memory. Generally, this type of program will be split into sections that are stored as separate programs (sometimes called "subprograms") on your diskette. When you are operating the system, and you select an action that requires a different subprogram on the diskette, your computer will load the appropriate program file from the diskette and then run the program. In very complex programs, you may have many pauses in your work as you wait for the system to load a subprogram from the disk. With the SYSTEMCARD and its disk emulator software, you can load ALL of the needed subprograms into the card's RAM, and then, when a subprogram is needed, it loads from the card into main memory with practically no pause in operation at all. Likewise, your data files from the diskette can be placed into the SYSTEMCARD's RAM, and when you need to load data from the file, you don't have to wait for the disk drive -- the file loads directly from the RAM on the card. When finished with the files on the card, you simply copy all of the files back to a diskette. This is a major timesaving innovation, and it is rapidly becoming a popular add-on feature for many microcomputers.

Another feature of the SYSTEMCARD is the addition of both parallel and serial interfaces to your computer. The serial interface is asynchronous, which means that you can communicate directly through a modem with timesharing services, databases and remote data terminals, and also hook up to most letter-quality serial printers.

The parallel interface allows direct connection to any standard Centronics-style parallel printer, and includes its own printing buffer, which is another very popular time-saving feature. The print buffer allows you to "dump" a great deal of text into the printer memory at very high speed, and while the printer is printing out your text, your computer is freed to go on to other tasks.

The presence of the two interfaces is also a spacesaver: normally, you need to add separate cards for each interface. Since both are included on the same card with your extra RAM, two expansion slots in your computer that would otherwise be filled are left empty for future expansion.

Another added feature of the SYSTEMCARD is a clock/calendar which allows you to set the time and date and then access both from your applications programs. You can automatically print the date on your reports or record both the time and date when entering new records into a data file.

The SYSTEMCARD is easily installed and requires no additional software. Complete installation and operating instructions are of course included, and a troubleshooting guide will come in handy as well.

Microsoft's SYSTEMCARD is available in a 64K version for \$475 and a 256K version for \$995. They both look like a very good value -- one of the better expansion cards to appear for the IBM yet. For more information, contact Microsoft Corp., 10800 N.E. Eighth, Suite 819, Bellevue, WA 98004; (206) 455-8080.

***** NEW TAX FORMS AVAILABLE *****

The law requires that, beginning July 1, 1983, payers of interest, dividends or patronage dividends must withhold 10% of each payment as Federal income tax withheld. However, individuals may claim exemption from withholding if various qualifications are met. In order to claim exemption from withholding, an individual must file, with the payer, a Form W-6 Withholding Certificate.

Form W-6 is now available as a 2-part continuous form with part 1 for the payer/institution and part 2 for the recipient's files. The form is designed for computer printout and fits in a window envelope.

Form W-7 is used to claim exemption from withholding, as above, but is used by "exempt recipients," such as trust funds, corporations, tax exempt organizations, individual retirement plans, government agencies, securities or commodities dealers, middlemen, and various others.

For more information and samples, contact OCR Data Systems, Inc., 200 Clearbrook Road, Elmsford, NY 10523; (914) 592-5510.

*** PFS PROGRAMS FOR APPLE, IBM AND TI ***

After a recent adaptation for the IBM PC of several popular PFS programs (originally written for the APPLE), Software Publishing Corp. has announced that they are also available for the new Texas Instruments Professional Computer.

PFS: FILE and PFS: REPORT are data-management programs. With PFS: FILE, users can create a database according to their requirements and then retrieve and manipulate the data with a great deal of flexibility. The PFS: REPORT program is then used to design and print "presentation quality" reports from the PFS: FILE database. The PFS: FILE program has a suggested price of \$140, and the PFS: REPORT costs \$125.

Another package, PFS: GRAPH is now available in a version for the IBM Personal Computer. This program operates on the same PFS: FILE data or on data files created by VISICALC to create bar and line graphs and pie charts. This package sells for \$140.

Yet another PFS system has just been introduced for the APPLE II and IIe. PFS: SCHOOL RECORDKEEPER is a add-on package that works with the PFS: FILE and PFS: REPORT programs to produce any of 30 specialized reports designed for recordkeeping and office management in schools. The reports include student records, scheduling, and even property management, and all of the reports can be customized to the individual school's needs. This package will be available for \$150.

*** NEW NEC PRINTER ***

Business functions requiring ledger size printed reports such as accounting and bookkeeping as well as engineering and scientific projects may now rely on a new wide carriage dot-matrix printer currently being introduced by NEC Home Electronics (U.S.A.), Inc.

The 120 character-per-second printer yields 136 columns and is compatible with a wide range of computers (previously standard wide-carriage printers could only print 132 columns, which is too short for some applications -- just four more characters can make a big difference). Called the PC-8025A, the new printer is the latest member in NEC's family of reliable printers, including the recently developed PC-8023A.

Like its predecessor, the larger carriage PC-8025A is bi-directional and has such features as a 2K buffer for printing and typing simultaneously, tractor and friction feed, standard parallel (Centronics-type) interface and a serial option.

The PC-8025A dot-matrix printer offers six different font (typestyle) capabilities; boldface, underline and subscripting, plus the Greek, mathematics and European characters so necessary for many business and professional applications.

NEC Home Electronics Inc., is a subsidiary of NEC, Inc., of Tokyo, Japan, which is a leading world supplier of advanced computer and communications equipment and systems. For more information on the new PC-8025A, contact NEC Home Electronics (U.S.A.) Inc., 1401 Estes Avenue, Elk Grove Village, IL 60007; (312) 228-5900.

*** DAVONG SYSTEMS RESPONDS TO THE IBM PC-XT ***

Davong Systems, the leading independent supplier of microcomputer hard disk and tape backup systems for the IBM Personal Computer, calls the IBM PC-XT a "mixed blessing."

Davong sales and marketing vice president Chuck DePew, says "IBM's entry into the hard disk-based personal computer market is the ultimate confirmation. It tells small computer users that Winchester technology delivers proven, practical data storage for the mass market, and that means that every computer user with a floppy-only system is going to consider hard disk for their IBM, APPLE or OSBORNE. And that's great for us, because Davong makes add-on hard disk systems for all of them."

But will hard disk-based products like the IBM PC-XT, in time, displace add-on peripherals? "Not if we stay ahead of them," says DePew. "Many of our people came out of the mainframe PCM (plug compatible manufacturers) peripheral business. We know what it takes to win. We must continue to give peripheral customers newer ideas, more features, and lower price. Davong is set up to do just that. We're lean, mean, and dedicated to better microcomputer data storage. Although we have invested heavily in research and development, it is a highly focused effort with little waste. Our overhead is low. We will continue to give data storage customers more for their money."

"We're more than a year ahead of IBM, even with the IBM PC-XT announcement," says David Jorgensen, Davong's international sales director. "We offer more capacity (up to 128 Megabytes), more selection (5 different capacities), more speed (3 to 5 times faster access); and more exclusive features -- multiple operating systems (IBM DOS, Pascal, CP/M and concurrent CP/M) on the same disk, tape cartridge backup, programmable disk cache, flexible volume mapping, local networking, and more. All this, and our drives cost \$1000 less."

Jorgensen also sees some promising new markets opened by the IBM PC-XT. "Winchester without backup is like driving cross-country without a spare tire," he says. "Sooner or later, you'll wish you had it. IBM PC-XT owners can get that backup from Davong, not IBM. Also, while everybody is talking about networking, Davong has practical networking solutions that can link hundreds of IBM PC and PC-XT computers. IBM doesn't."

Davong's primary product is the Universal Winchester Hard Disk System for IBM PC, PC-XT, APPLE II, IIe or III, and OSBORNE-1. The systems can be configured for any of these computers with the appropriate host adapter, interfacing cable and software. Single drive systems are available in 5, 10, 15, 21 and 32 Megabyte (formatted) capacities, but up to three "slave" drives can be added for up to 128 Megabytes of on-line data storage. These systems are available with 18 Megabyte streaming cartridge tape backup.

Exclusive MULTI-OS(tm) software enables use of DOS (or SOS), Pascal and CP/M and concurrent CP/M (a multi-user operating system) on the same IBM PC or APPLE. All four operating systems can reside on one Davong hard disk system. Software utilities simplify initialization, copying, backup, restore, diagnostics, file recovery, volume management, and configuration of boot options. Variable hard disk configuration enables the setup of multiple volumes in any size and number, limited only by the operating system selected. Davong offers several standard selections, as well as complete custom configuration.

For more information, write or call Davong Systems, 217 Humboldt Court Drive, Sunnyvale, CA 94086; (408) 734-4900.

*** CITIBANK OFFERS HOME BANKING PROGRAM ***

After their successful experiment in home banking last November (which used ATARI computers), New York's CITIBANK has begun promoting their new HOMEBASE program, which will allow APPLE users to hook up with the bank's computers to make their transactions over telephone lines.

Last November's experiment was a promotion made in cooperation with Macy's and Computer Center (a specialty computer store), and was intended to see if there really is a market for this type of service (or if a market could be created). According to the Computer Center, sales of systems increased dramatically, proving that there is a demand for home banking service.

The new program is concentrated on owners (or prospective purchasers) of APPLE computers, and is being carried out in cooperation with Macy's and The Computer Store (on Lexington Avenue in New York City), where demonstrations of the new system are taking place. Apparently CITIBANK has realized that the APPLE computer is likely to remain far more popular than the ATARI among serious users, and the demonstrator told a lunch-time audience that the IBM Personal Computer was among other systems that are expected to become HOMEBASE-compatible.

It's now practically a foregone conclusion that individuals and businesses will rely heavily on electronic banking in the future, and this kind of system will undoubtedly become very popular and widespread in just a few years. It is to be hoped that electronic banking will not create more problems than it solves, but it certainly will create some problems, especially relating to the privacy and security of the individual.

*** ATARI HAS PROBLEMS CONTROLLING ITS DISTRIBUTORS ***

ATARI recently introduced a new computer, the 1200XL, intended to have an image that is less that of a game-playing computer and more of a workhorse computer. Apparently they have realized that the continuing slump of interest in video games could hurt them badly -- their Models 400 and 800 are very well designed for sound effects and extremely sophisticated game graphics, but very difficult to program and use for serious applications such as personal budgeting, word processing, and business applications.

So they introduced the 1200XL, which at least LOOKS like a much more serious computer. But some who have seen it say that it's mostly looks (and looks don't count for much in this business). Consumers apparently find little added value in the new ATARI model. The problem is that the 1200XL is not cost-competitive with other similar computers on the market, and most of ATARI's own distributors agree -- the machine is overpriced.

ATARI's original suggested retail price for the 1200XL was \$899. This is far above competitive computers like the COMMODORE 64 or the TI ARMADILLO (which has 80K of RAM). When the 1200XL first arrived on the dealers' shelves, discounting began immediately, to ATARI's dismay. It may be that they want to keep the price jacked up so that the 1200XL will not compete with sales of remaining stocks of 400 and 800 computers.

ATARI has apparently requested that retailers not advertise the 1200XL for less than \$749, because they "feel that \$749 is a viable price for that computer." But at that price, dealers are not very enthusiastic about selling the new computer. One dealer who sold almost \$500,000 worth of ATARI computers last year ordered only 60 of the new 1200XL's, because of fears that it "wouldn't sell very well."

And now price wars have begun, with only a few dealers holding to prices above \$700, and most are selling the 1200XL for between \$600 and \$700. There is at least one retailer selling the new machine for only \$589.88.

The price of the 1200XL is not the only problem ATARI is having with its dealers. A new policy has been adopted regarding distribution of all ATARI computers, and distributors may no longer sell to dealers located outside of a specific geographic region -- the distributors can only sell within their own exclusive territory. This is causing big problems for retailers who operate large chains of computer stores.

In many cases, the chains are widespread across many regional areas, and some are nationwide chains. These chain operators can no longer purchase ATARI computers from a single distributor, and they are not happy about it. One retailer said that to abide by the new regulations, he would have to buy from 15 different distributors, often at different prices. The result of all this is that many large computer store chains are seriously considering dropping the ATARI line altogether. There are so many other computer companies fighting for shelf space that many dealers will be content to stock their shelves with computers from ATARI's competitors.

*** THE BEST NEW PORTABLE COMPUTER ***

Radio Shack has stolen the market for "notebook" size portable computers. Their new Model 100 is clearly the state of the art in this type of portable machine -- their only close competition (the NEC portable computer) is not being marketed outside of Japan. This type of computer will usher in a new chapter in portable, convenient computing, and many imitators will be appearing this year. But Radio Shack is the leader -- the Model 100 has some of the best design features of ANY computer. Its keyboard is better than most keyboards found on non-portable machines; its display is the largest liquid crystal (LCD) panel yet created (which is very legible and large enough to allow really serious word processing wherever you go). Keep an eye on Radio Shack, because there are two more new computers coming from them this year. (For more detailed information about the Model 100, and some predictions about their upcoming products, see the "Bits & Pieces" and "Crystal Ball" departments in this issue of COMPUTRONICS.)

*** NEW SYSTEM FOR DENTISTS ***

A new computer system designed to increase cash flow, maximize profits, and assist dentists in delivering even more effective dental care has been announced by DataTrac, a suburban Kansas City subsidiary of Inter-Continental Services Corporation (ICSC).

The system features general ledger, billing and receivables, automated patient background and history files, one year appointment scheduling, insurance form preparation, word processing, instant reports on any patient account or transaction, as well as facilities for automated payment plans and printed recall notices.

D.D.S. can produce in a few minutes what often takes several weeks to do by hand. Before a patient leaves the office, for example, the office assistant can hand the patient a combination insurance claim for ready for signatures and mailing, a statement of charges with each item explained in layman's terms, and a recall notice all printed on one form.

Moreover, D.D.S. is able to identify -- for a given time period -- the number and type of procedures performed by each producer in the practice, including Dentists and hygienists. This gives the dentist important information which can be used to adjust fees by the procedure, by the producer, or for the practice as a whole.

"We've found that patients appreciate the clearly worded explanations typed on their statements and have a tendency to pay their bills much faster as a result," says Lon Weekly, Vice President of DataTrac Product Development. "And fee adjustments tend to be more equitably distributed when a dentist uses the kind of information D.D.S. can produce. It's more fair to the patient and more profitable for the dentist."

D.D.S. is available through DataTrac offices located in Los Angeles, Dallas, and Kansas City with new offices projected for other major cities in the coming year.

The DataTrac package consists of the D.D.S. software, a Z-80 based computer with 64K of memory, two floppy disk drives, and a hard disk mass storage device for fast access to large data files. (Although it has 64K instead of 48K, the computer in the

Photo looks suspiciously like an adapted TRS-80 Model III . . . and the hard disk looks exactly like the hard disk used at H & E Computronics -- made by Quality Computer Services . . .) The system also includes a high speed color printer that can produce correspondence quality type. An optional printer for letter-quality word processing is also available.



All hardware and software is warranted for one year -- about four times longer than the industry-standard 90 days, Weekly says. In addition, all service is performed by DataTrac personnel on a local basis. For more information about the D.D.S. system, contact DataTrac at (800) 255-6450 or, in Kansas, (913) 541-9220.

*** IBM PC MOUSE ***

The main attention-getting feature of Apple's new LISA computer is the use of a computer "mouse" to move an on-screen cursor and activate various functions of the system. Apple's mouse is a small handheld box attached by a wire to the computer, with a couple of buttons on top. To operate the mouse, you just hold the box on a table and slide it back and forth. A ball protruding from the underside of the box rolls around as you move the mouse, and the ball's rotation is translated into cursor motion on the screen. This allows very rapid positioning of the cursor anywhere on the display, and the buttons on top of the mouse are used to issue commands to the system.

Mouse Systems Corporation has introduced a mouse for the IBM Personal Computer, called the PC MOUSE. This is well timed, since there are software companies (such as Visicorp, which owns VISICALC) that are working hard on LISA-style software for the IBM machine, an operating system called "VISI-ON." Presumably this new mouse will be compatible with the soon-to-be-announced software system.

The PC MOUSE operates differently from the LISA mouse. Instead of a rolling ball on its bottom, this mouse is used by placing it on an aluminum pad and then moving it around on the pad. The pad has an extremely fine grid of lines printed on it, and the mouse contains an optical sensing device that can "read" the lines as the mouse passes over them. By counting the lines, the computer can tell how far you have moved the mouse and in what direction. A microprocessor within the mouse transmits data about the mouse's position to the computer -- at 1200 bits per second.

Although the LISA-type software is not yet available (and is not even officially announced), the new mouse is available now. Programmers will appreciate the chance to get acquainted with this new device that many say will eventually replace the keyboard as the standard input-device for microcomputers. The PC MOUSE sells for

\$332, can be purchased directly from the manufacturer, and will be available soon from retail stores. For more information, contact Mouse Systems Corp., 2336 Walsh Avenue, Santa Clara, CA 95051; (408) 988-0211.

*** COMPUTER SENTRY STANDS GUARD ***

The use of telephone lines for data transmission is rapidly increasing, and keeping that data out of unauthorized hands is a growing concern. There are many strategies for safeguarding transmitted data, and here's a new one: a device that protects your computer from unauthorized access over the telephone. The COMPUTER SENTRY will control any phone line, whether connected to a computer or not. In a computer installation, the SENTRY is connected between the phone line and the computer's telephone modem. Whenever someone places a call to the SENTRY-equipped line, their call is intercepted by a lifelike synthesized female voice, which requests that the caller enter his "PriveCode number." The tele-tale carrier tone of the modem is hidden, so that callers won't know that they have reached a computer installation.



An authorized caller will simply enter a personal six-digit access code, either by Touchtone or voice (the SENTRY can be accessed from any telephone, touchtone or rotary dial, without special adaptation). Once the code is entered and verified, the line is opened to the caller's access. The SENTRY "diagnoses" any attempt to enter the system illegally and can issue an alarm when an unauthorized access is attempted -- it can even be set up to permit tracing the incoming call when a break-in attempt is detected. In high security applications, the SENTRY can be instructed to shut down the line completely. For less sensitive installations, the device can be set to allow one additional attempt before shutting down the line.

The COMPUTER SENTRY is a product of International Mobile Machines Corp., 100 North Street, Philadelphia, PA 19103; (215) 569-1300.

BEGINNER'S CORNER

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generates a machine instruction. Very often it takes from several to dozens of instructions to perform the same task as:

PRINT "HI THERE": A=B: REM A BAD EXAMPLE

A program of 200 lines can easily become several thousand machine code instructions. You can see how this can become quite complex.

There are also several other stages that the compiler must go through, such as error checking. We often take for granted when our BASIC INTERPRETER gives us an error code, but, if you tried to consider all the possibilities of what could go wrong in a program, you could end up with as many error messages as lines of code (so how about a little appreciation huh?).

The compiler checks for all kinds of situations (constructs) that require balanced characters. By this I mean it checks for FOR-NEXT loops, matching parentheses, semi-colons in the right place, etc. You get the idea.

The steps required to use a compiler are often simple enough. The first is to load the compiler. The second is to load the source and run the compiler. This often produces an intermediate program often called a load module. The next step requires that it be checked for errors. The third step (sometimes) is to add a library of routines that the program might require. This library can add quite an overhead (eat up memory) and slow the program down.

All these steps can become quite a problem, especially if you happen to have errors in your source code. Then the only thing to do is to load your editor and load your source code. Edit the source code and resubmit it to the compiler again.

Now you know why everyone likes interpreters. The hassle of loading all these editors, linking loaders, and syntax checkers can become a real grind.

An incremental compiler is close to what your interpreter does. It goes through you source compiling a command at a time. What you get is very fast compiled code with very little error checking.

Another kind is called an interpreter/compiler, which looks up a given instruction. It checks to see what it's supposed to do with it by breaking it into a series of steps. It saves these steps as a file, and there you have it. You then load the compiled program to see if it works.

This differs slightly from another type called a "LOAD AND GO" compiler which compiles the program and then starts it right away. All these kinds of compilers are similar to those you'd see on micros today.

The difference between the compilers on the MAINFRAMES and those on the micros is that the older generation compilers were more difficult with which to work. The mainframe systems were "time-sharing" programs, part of a larger time-sharing system.

This meant that you were one of a possible several hundred other users on the system. What you did to get a program compiled was to submit a "job." This job was put on a queue (a waiting list). If you knew how to finagle the system, you could find out about an hour later that your program didn't run.

Unless you knew how to find where the system stored output about to be listed, and got to see the

errors before the listings were printed, you'd then get a listing about a day later to see what your errors were. Then, of course, you'd have to go through the whole process (as on micros) to correct the mistake.

OK. Why go to all this trouble for a compiled program? What are the advantages?

Well, generally speaking, the BASIC interpreter you have in your computer is (not meaning to insult anyone) pretty slow. That is, it's slow when compared to a machine language program. If you've read any books on assembly language (*TRS-80 Assembly Language* by Hubert S. Howe, Jr. for example), you'd find the typical comparison is that machine language is 300 times faster than that of an interpreted BASIC program.

If you've played any of those great arcade programs around, you'd see what I mean. You can write your games in BASIC first to make sure all the logic is intact and that you have all the bells and whistles you want. Then, when you've got it just right, you can compile it. This gives you the speed, excitement, and professional look that sells. It also affords protection against anyone stealing your code (if that's a problem for you).

It also means that you can develop those programs much faster. The reason for high level languages is for the ease of programming and program maintenance. It's also easier to document and modify.

So, if you're shopping around for the perfect compiler - what should you look for? (1) The perfect BASIC compiler for the TRS-80 should be *interactive*. This means that you should be able to have the compiler in memory when you're entering and editing your source code. This allows you to debug as you go along without wasting much time on loading and reloading modules.

(2) The compiler should be *completely compatible* with the BASIC of your machine. The one thing you don't want to have to do is to relearn BASIC. The other thing you don't want to have to do is go back to all your old programs and have to comb through them to make minor changes.

(3) The compiler should have as few *modules* as possible. If you can find one that allows you to use a word processor to create your source, or allows you to use the built-in editor of our machine, then that's to your benefit. This means less hassle and one less program to have to learn to use.

(4) The last item I'd consider (there are others, but let's be reasonable) is if the company who produces the compiler demands residuals from those who use it for programs compiled and marketed.

My opinion of this kind of marketing technique is not very high. If you bought a utility, you shouldn't have to keep paying for it if you use it to make some money for yourself. That's like Radio Shack charging you for selling your basic program to Computronics, and Computronics being charged for printing the listing and selling the magazine. The whole idea can get pretty ridiculous.

That about raps up this session. I hope I gave you some insights and something to think about. I'm planning on more of this subject at a later date. Until next time, keep your eyes open and your record heads clean.

Spencer Koenig
153-27 73rd Avenue
Flushing, NY 11367 ■

PRACTICAL BUSINESS PROGRAMS

S. M. Zimmerman and L. M. Conrad

Month #6: Trial Balance Program

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This completes the review of the second group of programs in our general ledger set. The first program in this group, TRANS, was reviewed two months ago. TRANS is used to input the initial values of a data set. This month's program is TRIAL. The function of the TRIAL is to produce a trial balance to be used in the task of tracing down errors.

The publication schedule for the general ledger system is as follows:

No.	Month	Program
1.	GLMENU (Controls use of routines).
2.	NAME & START (Initializes chart of accounts and firms name).
3.	TRANSACTION (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 mileage and moves files between disks).

The operating procedure for TRIAL follows:

RUNNING THE PROGRAM

Operating TRIAL is similar to CPA. The output looks like a trial balance with the net values of each account shown.

We reduced the need for this program by adding the ability to sum debits and credits on the transaction program. This ability cut down on our use of TRIAL, but it did not eliminate the need for the program.

The questions you must answer to run this program follows:

TRIAL BALANCE PROGRAM
CURRENT TRANSACTION FILE?
LINE COUNTER (Y/N)?
OLD BALANCE SHEET FILE NAME?

In addition to the above you will have to input the date of the run and decide on either printer or CRT output. If you select the CRT output option you will have to hit the ENTER key so as to page through the results. When the program is complete you will have to hit the ENTER key to be returned to the main menu GLMENU.

The line counter question was put in to make the program easy to use with operating systems which have a counter, such as DOSPLUS. If you do not need it, leave out line 40.

EXAMINING THE PROGRAM

The program starts out with a CLEAR 1000 to make room for the string variables to be used. In line 20 the format of the output is defined. If your numbers are too big for the format defined, this is where you should make your adjustments.

Line 50 completes the input of the filespecs needed to produce a trial balance. The files are read in lines 60-100. In line 100 you are given a choice of printer or screen output and asked to input the date of the report.

The remaining program completes the output of the trial balance.

PROGRAM LISTING

```
10 CLS:CLEAR 1000:REM "TRIAL" TO PRODUCE TRIAL BALANCE
20 E$="### % % ##,##.## #,##,##.##"
30 PRINT "TRIAL BALANCE PROGRAM":NO$="NO":FF$="FILE":
INPUT" CURRENT TRANSACTION FILE":BZ$
40 INPUT "LINE COUNTER (Y/N)":LC$:IF LC$="Y" THEN CMD"FORMS(T)"
50 INPUT "OLD BALANCE SHEET FILE NAME":NX$:FQ$=(FF$+"N")
60 SU=0: OPEN "I",1,NO$: FOR I=1 TO 6: INPUT #1,P: N(I)=P:
SU=SU+P: NEXT I: CLOSE 1: DIM X#(SU,2)
70 OPEN "I",1,NX$: FOR I=1 TO SU: INPUT #1,P#,Q#: X#(I,1)=P#:
X#(I,2)=Q#: NEXT I: CLOSE 1
80 OPEN "I",1,BZ$: FOR I=1 TO 1000: INPUT #1,P1%,P2%,P3%,P4%,
A1#,A2#: K=P3%: KK=P4%: A3#=A1#: A4#=A2#: IF P1%=>0 THEN 100
90 X#(K,1)=X#(K,1)+A3#: X#(KK,2)=X#(KK,2)+A4#: NEXT I
100 INPUT "INPUT DATE XX/XX/XX":D$:INPUT "PRINTER OR CRT
(P OR C) SETUP PRINTER IF NEEDED":P$: IF P$="P" THEN 120
110 IF P$<>"C" THEN 100
120 CLOSE 1: PRINT D$: IF P$="P" THEN LPRINT " "; LPRINT " ";
LPRINT D$: LPRINT " "; LPRINT "
130 OPEN "I",1,FQ$
140 FOR I=1 TO 5: INPUT #1,PP$: PRINT PP$: IF P$="P" THEN
LPRINT PP$
150 NEXT I
160 CLOSE 1: IF P$="P" THEN LPRINT " "; LPRINT " "; S1#=0:S2#=0
170 OPEN "I",1,FF$: W$="NO" ACCOUNT DEBIT
CREDIT": PRINT W$: IF P$="P" THEN LPRINT W$
180 FOR I=1 TO SU:IF X#(I,1)>X#(I,2) THEN X#(I,1)=X#(I,1)-
X#(I,2):X#(I,2)=0
190 IF X#(I,2)>X#(I,1) THEN X#(I,2)=X#(I,2)-X#(I,1):X#(I,1)=0
200 NEXT I
210 ZQ=0: FOR I=1 TO SU: INPUT #1,A$: ZQ=ZQ+1: PRINT USING
E$;I,A$,X#(I,1),X#(I,2): IF P$="P" THEN LPRINT USING
E$;I,A$,X#(I,1),X#(I,2) ELSE IF ZQ=13 THEN ZQ=0: INPUT "ENTER
TO CONTINUE";D$
220 S1#=S1#+X#(I,1):S2#=S2#+X#(I,2):NEXT I
230 F$="#" #####.#####.#####
240 X$="-----"
PRINT X$: IF P$="P" THEN LPRINT X$
250 PRINT USING F$;S1#,S2$: IF P$="P" THEN LPRINT USING
F$;S1#,S2#
260 Y$="-----"
PRINT Y$: IF P$="P" THEN LPRINT Y$
270 INPUT "ENTER TO RETURN TO GLMENU":D$: LOAD "GLMENU",R
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THE ULTIMATE GREEN SCREEN

Robert Epstein, Ph.D.

Headaches? Tense, irritable? Weary, watery eyes? Then this article is for you . . .

About a year ago a secretary on my floor posted on the door to her office a newspaper article about the hazards of word processing. It said that secretaries and computer buffs the world over frequently suffer eyestrain, headaches, and other maladies from staring for long periods at text displayed on CRTs or TV picture tubes. It blamed the problem primarily on current hardware: resolution and contrast are often poor (for example, on the monitor supplied with the TRS-80 Model I), the monitors are often too small (for example, on the Osborne-1 or in many Apple systems), many screen surfaces are polished glass and hence highly reflective (this applies to virtually all the major manufacturers of micros), and the typical white-on-black display is irritating to many people.

The secretary had been complaining of eyestrain for some time, but no one listened to her. We kept telling her that she probably needed new glasses, that she should take more breaks, that she should fiddle with the contrast and brightness controls, and so on. Finally, she threatened to quit.

Since she had managed, by this time, to convince us that there might be something to what she was saying, and since she was an excellent secretary, we did some experimenting. Over a period of about three months, we tried many of the screen fixes now on the market—on her machine and on four other machines our research group uses for word processing and data analysis. Most of the fixes, we concluded, are worthless or only partial cures. The best one we found also turned out to be the cheapest—by a factor of about ten. It deserves, perhaps, to be called “the ultimate green screen.”

THE USUAL ALTERNATIVES

First, a few words about the usual alternatives. These include replacement monitors, no-glare filters, and “green screens.”

MONITORS—There are some good monitors available. I am now facing a Leedex 100G, which has a 12-inch screen, good resolution, and a built-in green filter. I have been able to face this for as many as six straight hours with little more eyestrain than I would get from reading typewritten text. The Leedex 100 is just about as good, but has the conventional white-on-black display.

The contrast on these monitors is superb. To see how good the contrast is on your monitor, try the following test: darken your room, and with your computer off, turn your monitor on and off. With most monitors, you'll notice a dramatic increase in screen illumination when the monitor is turned on. That's all wasted light, which competes with the image that your computer displays and lowers the contrast. When you do this test with the Leedex monitor, you'll be impressed: you can barely detect a change in illumination when you turn the monitor on. In other words, virtually no light is wasted. The letters sent out by your computer stand out dramatically against a truly dark background.

The Leedex 100G retails for about \$175 and commonly sells for about \$155. Some vendors will try to soak you for at least another \$10 for a cable. If you've got the skill and time, you should be able to wire up the cable yourself for less than \$5 with some Radio Shack parts. The Leedex 100 is about \$25 cheaper at this writing.

The Leedex machines aren't perfect. Since their screen surfaces are highly polished, they reflect your face and every other interesting thing in the room. Remember, a good screen should show you your text—and NOTHING ELSE. (That's what a piece of paper does, after all.) If your screen is showing you how handsome you are, it is screwing up in two ways: first, it's providing a distraction (depending on how handsome you are); second, and more important, it's providing irrelevant information, stimulation that interferes with what you're supposed to be seeing. There's a simple fix for the glare: the “ultimate green screen” (keep reading).

There are other replacement monitors around, priced about the same as or a bit more than the Leedexes. Both TECO and Amdek advertise similar units, but since I haven't actually seen either one, I can't vouch for them. (From the photos, the Amdek looks suspiciously like the Leedex.)

NO-GLARE FILTER—No doubt after a few of Tandy's own employees threatened to quit, about two years ago Radio Shack introduced a no-glare filter for its machines. The filter is a nylon mesh, stretched taught on a plastic frame. The filter attaches to the monitor via double-



Figure 1: Sanding the edges of a plexiglass screen on a belt sander.

sided foam adhesive on the back of the frame. It costs about \$16.

Our secretary was happy with the filter—for about a week. It does virtually eliminate glare, but not without cost.

There are two problems, one minor and one major. The minor problem is that a web of nylon plays tricks with light. Remember as a child how you stared with fascination at the pretty patterns you got when sunlight shone through your umbrella? When you move your head from side to side in front of the no-glare filter, you also see pretty patterns. And, as you know by now, your screen should NOT be showing you pretty patterns; it should only be showing you your letters.

Second, the web significantly reduces the clarity of the letters. Since it is not perfectly transparent, nor perfectly homogeneous, it makes everything a bit fuzzy. If your screen resolution is crummy to begin with, you're really going to suffer with the no-glare filter. The problem occurs, in part, because the filter does not lay flush with the screen surface.

Here's a general rule for no-glare filters: the farther the filter is from the screen, the greater the loss in information. This applies especially to filters that eliminate glare because they have a "matte" surface—a slightly rough, dull finish that does not reflect light very well. (Try holding a piece of plastic with a matte finish just an inch away from your screen. Can you make out any text at all?) The only reason why the Radio Shack filter lets any information through is because it is a web—most of the light you get from the screen is passing through the holes. A solid no-glare surface placed even a half-inch away from the screen would virtually wipe out your text.

GREEN SCREENS—Given the persistence, size, and number of ads one sees for "green screens," (which, by the way, also come in other colors), I suspect that micro consumers must have spent hundreds of thousands on them. What's a "green screen," what are the claims, and what is the truth?

A green screen is a piece of plastic, tinted green (or some other color), and cut or molded to fit your monitor screen. The plastic ranges from 1/8-inch Plexiglas, to flimsy, flexible acetate. The tint is usually dark green and is occasionally a very light green.

The claims tend to be overstated, considering what you often get. Various screens are said to "reduce glare," to "improve contrast," and to "reduce fatigue." One ad offers a "Green Screen WARNING." All the other guys are cheating you, it says.

I'd like to offer my own green screen warning. I've bought or used six of the green screens currently on the market and have also made a few of my own. They're not as good as the ads say. Here are the facts.

A few years ago some of the major computer manufacturers discovered that tinted screens reduced eyestrain. Many people find green particularly soothing. There is a point, therefore, to having a tinted screen. But virtually all of the screen fixes on the market—for those of us who don't have the built-in green of the Leedex 100G or an equivalent monitor—create more problems than they solve.

At one extreme there is the Alpha Green Screen, sold by Alpha Products for \$12.50. This is a thin piece of flexible plastic, tinted light green and molded to hug

your picture tube. It is held in place by static electricity (reinforced by some double-sided tape). Problems: the filters sometimes don't come all the way to the edges of your picture tube and hence can create a disturbing band of bright light at one or more edges. Second, the glossy plastic is a beautiful reflector. Since the surface is curved, you don't get a perfect mirror image, but the effect is still distracting on the one hand and, again, a source of competition for what you're supposed to be seeing. Finally, the plastic can be slightly wrinkled. Wrinkles play games with your room lights and make the reflection more disturbing.

The "original green screen" by Micro-Mega is flexible plastic mounted in a plastic frame, like the Radio Shack no-glare filter. It sells for about \$14. Like any of the devices that "square off" your screen, it does improve the looks of your machine. But, again, there are problems. Because the surface is glossy (remember the no-glare filter rule: a filter that isn't actually flush with the screen cannot have a matte finish), it reflects your room light. And because the plastic is flexible, the reflections will be distorted and will dance when you move.

If I haven't convinced you not to spend your money on such a screen, I should at least point out that you can buy enough colored acetate from your local artist's supplies store to make about six such screens for about \$5. A good artist's supplies store will also give you the choice of at least a dozen colors. (We tried four on that unhappy secretary. She preferred yellow, as I recall.)

Slightly more expensive screens (usually \$15 to \$20), such as the Fatigue Fighter sold by Southern Innovative Design, are made of 1/8-inch acrylic plastic or some equivalent. They assure you of no wrinkles, but consequently make the best mirrors. If you see an ad claim that such a screen reduces glare, don't believe it.

These screens truly do make your monitor look handsome. So even though I don't think they're perfect, I'll let you in on the secret of making them. First you need some Plexiglas with a suitable tint. Rohm and Haas 1/8-inch #2092 is ideal and costs less than \$2 per square foot. (That's right, if you can buy a small enough piece of the stuff—say, a scrap from your local plastics supplier—you can have a green screen for less than two dollars.) The plastic comes with paper on both sides to protect it. Leave the paper on while you're cutting and sanding. Cut out a piece of the proper size on a table or a band saw—with a SHARP blade. For a TRS-80 Model I, the perfect dimensions are 8 11/16 inches by 11 1/8 inches (this allows 1/16 of an inch along each dimension for sanding). For the TRS-80 Models II and III, the proper dimensions are 9 1/16 inches by 11 9/16 inches.

Sand each of the four sides smooth on a belt sander. You can use the sander to get nicely rounded corners, if you wish (Figure 1). Then peel off the paper and apply two strips of double-coated neoprene form to two edges (Figure 2). The best foam to use is Scotch Mount Automotive Attachment Tape No. 06377, available for about \$10 per 20-yard roll. (This is the black tape you see on the Radio Shack no-glare filter and some of the other screen-fixes I've mentioned.) The foam tape is available from most auto body shops (it's used to attach car moldings).

Those of you who are light pen users surely feel neglected. Some of the filters I've mentioned have to be

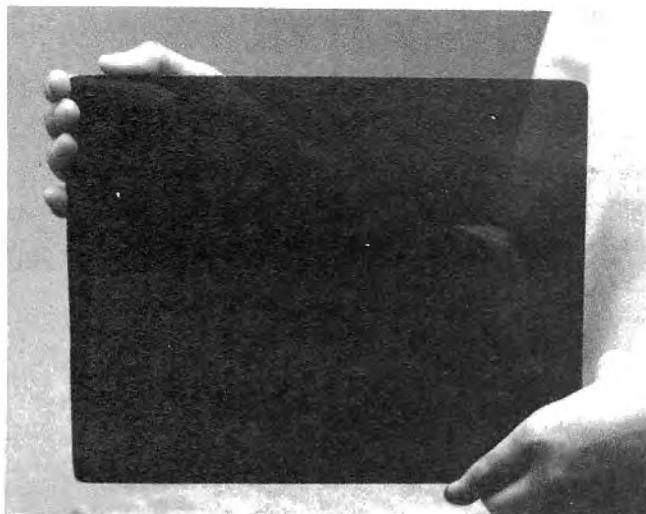


Figure 2: Apply two strips of double-coated neoprene foam to two edges.

removed in order for you to use your light pens—yet another drawback.

THE ULTIMATE GREEN SCREEN—She hadn't quit, but she was still unhappy. And we had learned a lot about green screens. The ultimate green screen—which, as far as we could see, is not available as an inexpensive fix for a monitor you already own—would have the following characteristics:

- 1) It would have a no-glare surface
- 2) It would not introduce distortions
- 3) It would tint the screen

- 4) It would minimize information loss
- 5) It would be easily removable, or, better yet, allow you to use a light pen while it's in place

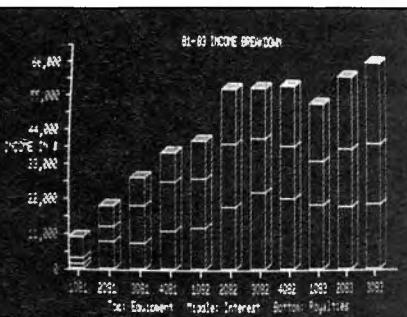
I had worked a few years ago with a remarkable spray color dye called Spray Mark, manufactured by the Magic Marker Company (Figure 3). I was using it to tint



Figure 3: Spray Mark color dye, manufactured by the Magic Marker company.

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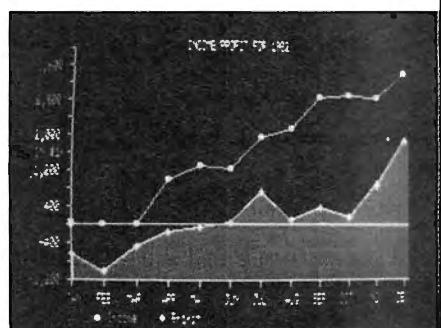
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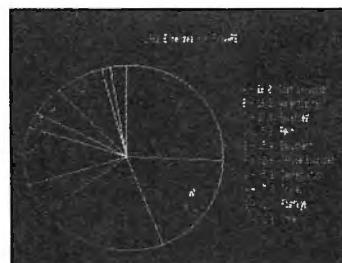


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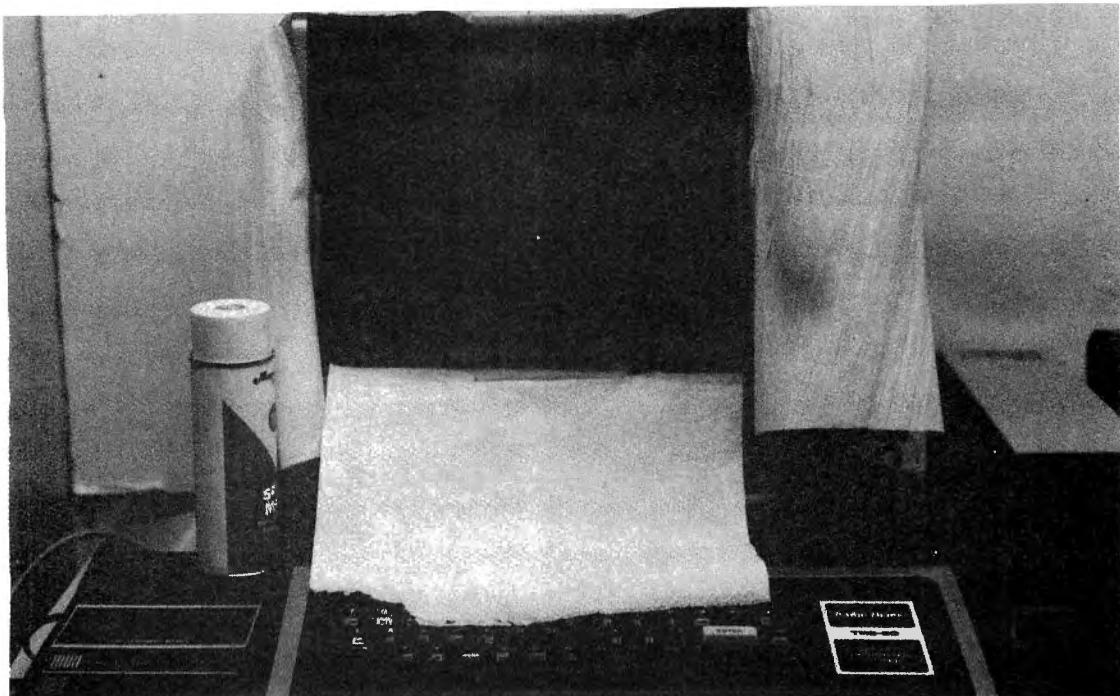


Figure 4: Paper towels should be taped around the edges of the screen before spraying.

light bulbs. It's one of the only sprays that's appropriate for bulbs because it's both transparent and unaffected by heat. What's more, it washes off with water. Since it's used by artists, it comes in many exotic colors.

One afternoon, a few minutes after one of my many attempts to calm the secretary, I caught sight of a half-empty can I had used on the bulbs. I rashly walked into her office, taped four paper towels around the edges of her screen, and sprayed (Figure 4). Before my eyes, my reflection grew dimmer and dimmer and finally disappeared. We had achieved a perfect matte surface, completely distortion-free. When we turned the monitor on, we found that we had a pleasant tint (the color happened to be yellow) and clear letters. The secretary was understandably hesitant about making a snap judgment. Within a few days, however, she was reborn. She liked the screen!

I tracked down a supplier and tried out some other colors. You can spray one color over another to make virtually any tint and then wash off the screen with a damp rag to start over. We settled on one right out of the can—"yellow green." "Lemon yellow" and "Nile green" work well, but don't limit yourself to these few. Find a tint that you're comfortable with. They're your eyes.

The degree of tint is determined by how heavy a coat you apply. We settled on a very light tint. Since the dye is highly translucent, you can't get it very dark.

We were concerned at first about the fact that the dye is water soluble. One sneeze, it seemed, and your filter would be history. All I can say to that is that it hasn't happened. The secretary (she's still working on the same system) and my friends and I have used "the ultimate" for more than a year without mishap. (How often do you sneeze on your computer?) If you did accidentally wet part of your screen, you could simply wash the entire screen and then reapply the dye. If you want a more permanent fix, you can also buy a fixative to spray over the dye.

PRICE AND AVAILABILITY—Here's the best part. A

can of Spray Mark retails for \$5.50 at this writing and will cover between five and ten screens (depending on how heavily you coat them). That means it costs you less than 50 cents per screen. Let me emphasize here that although this is clearly a bargain, "the ultimate" would be worth the price even if it cost more than a plastic green screen; it does a much better job.

Spray Mark is hard to come by. The Magic Marker Company went out of business recently, and Spray Mark was, for a short time, completely unavailable. Now it is in the hands of the Berol Company of Danbury, Connecticut, which, unfortunately, does not sell direct to the public. Your local artist's supplies store may carry it. In the Boston area, you can get it from Johnson Artist Materials, 355 Newbury Street, Boston, MA 02115, telephone (617) 536-4065. This store will also sell it to you by mail, and, I was told, if interest seems great enough, the store will waive its usual \$10 minimum on mail orders.

An alternative is to spray a fine mist of liquid dye (for example, Dr. Martin's Synchromatic Transparent Water Color) with an airbrush. If you already own an airbrush, this option makes more sense than Spray Mark. An airbrush gives you a more uniform mist and better control.

The secretary is happy, and so am I. My Leedex 100G is glare free, thanks to some Spray Mark Lemon Yellow. Spray-on water-soluble dye should cure a lot of headaches. It provides a soothing tint without introducing distortions. It doesn't hurt your screen in any way and it comes off easily. It provides a homogeneous, no-glare, matte surface that has little effect on the clarity of your letters. And, best of all, it costs less than 50 cents per monitor.

Robert Epstein, Ph.D.
Executive Director
Cambridge Center for Behavioral Sciences, Inc.
11 Ware Street
Cambridge, MA 02138 ■

GORDON SPEER'S CORNER

Gordon Speer

PASCAL'S TRIANGLE — REVISITED For TRS-80 Model 1 or 3 and EPSON Printer

On page 919 of the December 1980 issue we presented two versions of Pascal's Triangle, and some background information on Pascal. A local math teacher challenged us to print a graphic of Pascal's triangle showing only the locations of the odd numbers. If you are an architect, it will resemble the windows on the gable of a Swiss Chalet. Some have said it reminds them of a Navajo rug pattern. To a graphic artist it is simply alternately nested equilateral triangles of six different sizes.

```
10 'PASCAL'S TRIANGLE - GRAPHIC ODD/EVEN - EPSON PRINTER -
SPEER
20 DEFINT A-Z           'INTEGERS ONLY
30 DIM N(65),P(65)      'NUMBERS, PREVIOUS NUMBERS
40 LPRINT CHR$(27)"A"CHR$(7); '7/72" PER LINE
50 LPRINT CHR$(27)"F";    'DISABLE EMPHASIZED TYPE
60 LPRINT CHR$(15);      'COMPRESSED TYPE
70 P(1)=1                'STARTING VALUE FOR EACH LINE
80 N(1)=1
90 FOR L=0 TO 63          '64 LINES
100 LPRINT STRING$(64-L,32); 'STARTING POINT FOR PRINTING
110 FOR I=1 TO L+1         'INDEX ACROSS THE LINE
```

```
120 IF P(I)/2=INT(P(I)/2) THEN LPRINT" "; ELSE LPRINT"0 ";
130 N(I+1)=P(I)+P(I+1)      'NUMBER=SUM OF TWO ABOVE IT
140 NEXT I
150 LPRINT                  'LINE RETURN AND FEED
160 REM THE FOLLOWING LINE COPIES LINE "N" TO LINE "M" AND
170 REM REDUCES THE NUMBERS THAT ARE OVER 1000, SINCE WE
180 REM ARE ONLY INTERESTED IN WHETHER THEY ARE ODD OR EVEN
190 FOR I=1 TO L+2:P(I)=N(I):IF P(I)>1000 THEN P(I)=P(I)-1000
200 NEXT I
210 NEXT L
```

HORSES

One of the problems I give my students is the HORSE LINEUP. The computer must select twelve horses at random for twelve starting gates. It is just as bad to have two horses in the same gate as it is to have a horse in two different gates. This requires the use of a counter for each horse number to record whether he has already been chosen. All counters (C(1), C(2), etc.) have values of zero to begin with, so we arbitrarily use a value of 1 to indicate that a horse has now been assigned a gate. It's post time.

```
10 'HORSES
20 CLS                      'CLEAR THE SCREEN
30 DIM C(12)                 'DIMENSION THE COUNTER ARRAY
40 PRINT,"GATE","HORSE"       'COLUMN HEADINGS
```

MULTIDOS Version 1.6 for either the Model I or the
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Z'DOS Version 1.0 for either the Model I or the
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```

50 PRINT
60 FOR G=1 TO 12
70 H=RND(12)
80 IF C(H)=1 THEN 70
90 C(H)=1
100 PRINT,G,H
110 NEXT G

```

TINY PRINTING—EPSON

The compressed subscripts on the EPSON printer are really quite readable, and since the line spacing is easily changed, I decided to try printing whole lines in the tiny type. If you have a word processor, or just want to list some programs to see how they look, try the following:

```

10 LPRINT CHR$(15);           'compressed mode
20 LPRINT CHR$(27)"S"CHR$(1); 'subscript mode
30 LPRINT CHR$(27)"A"CHR$(6); '12 lines/inch

```

Then LPRINT or LLIST whatever you like (but don't turn off your printer, it will reset to normal type and spacing).

EPSON PRINTERS AND THE MODEL I

I don't in any way want to criticize David A. Lien's excellent instruction book that came with your EPSON printer, but if you are using it with a Model 1 you must know that LPRINT CHR\$(0); DOES NOT WORK WITH A MODEL I. He mentions this in the book, but not every place it appears. One such use of it is to designate the superscript/subscript mode (CHR\$(27)"S";) as a superscript. In order to send the CHR\$(0) to the printer you must change LPRINT CHR\$(0) to a POKE 14312,0.

For example, suppose you want to print an abbreviation for cubic feet. Here is how it might go:

```

10 LPRINT "ft";             'this is the easy part
20 LPRINT CHR$(27)"S";      'script mode
30 POKE 14312,0            '0=super, 1=sub
40 LPRINT "3";              'cubed
50 LPRINT CHR$(27)"T";      'cancel script mode

```

If you think the compressed "3" makes a better looking exponent, then add the following two lines:

```

35 LPRINT CHR$(15);         'compressed
45 LPRINT CHR$(18);         'normal width (pica)

```

Beginners will think that this is a lot of programming for just one exponent, but this could easily be done in the form of a subroutine and handle all the exponents printed by an entire program.

BRAIN SURGERY—ONE MORE TIME

In two previous issues I described how the Model 1 memory chips are changed when faulty (like Christmas tree lights) and the lower-case letters added. Recently, I updated a Level I keyboard to Level II, and I see no reason why you should not know how to do this yourself too.

Ordinarily the Level II upgrade would be done at a repair center, and it costs about \$170 including labor. You can purchase the Level II ROM's for about \$100 if you shop around, and install them yourself. One problem I ran into was not recognizing that the memory

chips in my Level I keyboard were only 4K, and not the necessary 16K. When ?MEM was asked, the new ROMs answered 16K. Level II ROMs are unable to distinguish between 4K RAM chips and 16K RAM chips, they simply use the same 4K four times. In either case there will be 8 RAM chips in the keyboard, one for each bit of the 8-bit bytes they store. Here again I must thank my Birmingham, Alabama expert Steve Gilbert for finishing the conversion.

On an entirely different problem, Steve found it necessary to use 300ns memory chips in my old-style expansion interface to correct a timing problem. If you are having interface problems, you might try this, or contact Steve directly.

Gordon Speer
3304 Woodlawn Road
Sterling, IL 61081 ■

PROGRAM PREVIEWS

continued from page 14

Although the SMALL BUSINESS ACCOUNTING program is available for Model II owners, no mention is made of this computer. This information is probably provided in a different manual. This publication rates a 7, losing points only because of reproduction limitations.

GENERAL EVALUATION

Overall, this program may be considered as exactly what its title declares: a "Small Business Accounting System." Basing it on a well-known accounting system was an apt decision. The program runs as predicted, with no problems encountered, and it is smoothly progressive. The ability to go directly to the various functions for information or additional entry, without stepping through a number of unneeded functions is pleasant and speedy.

I would like to have seen some embellishments to the program, but I must continually remind myself that I am reviewing a program not designed for a large commercial operation. Nevertheless, a couple of minor functions might be considered for future updates. One, the ability to break down a check expenditure into different expense categories. Two, as noted before, the computation of Income Tax Deductions. The last one mentioned is probably asking too much.

For the purpose for which it is intended then, this program is excellent. The small business with a minimum computer installation could use it well, without any problems.

BACKGROUND

SMALL BUSINESS ACCOUNTING was written and produced by Hubert S. Howe, Editor-in-Chief of this magazine. Dr. Howe is also the author of two books on machine-language theory and programming, as well as a number of other programs. Howe Software operates independently of H & E Computronics, Inc. However, the latter firm carries Howe's products.

SMALL BUSINESS ACCOUNTING—Howe Software, 14 Lexington Road, New City, NY 1056, (914) 634-1821. Model I & III cassette version, \$29.95. Model I & III disk version, \$59.95. Model II version and IBM Personal Computer version, \$69.95. ■

COLOR COMPUTER CORNER

A NEW COLOR COMPUTER?

Among the speculation about new Radio Shack products is a story circulating that a Korean-made Color Computer will soon join the Radio Shack line. This new computer will reportedly come equipped with 64K of memory, which would make it a lot more interesting to those who would like to use their investment to make money in a business application.

The story has popped up in enough places to make us believe that there will indeed be a new Color Computer, but we don't have any details about it yet—Radio Shack is determined not to leak information about new products before their official announcement date.

We know that this will cause some concern among present Color Computer owners, and we'll be investigating as many sources as possible for more information. We will try to answer some important questions about the new machine as quickly as possible. Will the new C.C. be compatible with present software? Will it be compatible with present peripherals, or will we see new disk drives and other hardware to go with the new computer? What new features will the new machine have? Will it have a genuine typewriter-style keyboard or will they stick to a keyboard with pushbutton-type keys? Will the present Color Computer continue to be sold or is the new computer a replacement for it? And if the new computer is to be a replacement, what kind of continuing support can present C.C. owners expect to get from Radio Shack?

We'll be working hard to answer all of these questions and more, and hope to provide the complete story on the new computer within the next month or two.

SPEECH SYNTHESIS

Now you can get your Color Computer to talk to you, with a software package that lets you program speech using commands in your BASIC programs.

SPEAK-UP, from Classical Computing, requires no hardware modifications—software alone does the trick.

Using text entered from the keyboard or keyed into your program, SPEAK-UP's text-to-speech converter (which occupies only a little more than 7K of memory), will have your Color Computer talking in no time.

SPEAK-UP works with BASIC or Extended Color BASIC, and is provided on cassette tape—with a 16K version on one side and a 32K version on the other.

Clear documentation includes complete instructions, text-to-speech rules, and a sample BASIC program that demonstrates the use of the system.

The price is definitely right: only \$29.95 plus \$2 for postage and handling. To order or for further information, contact Classical Computing Inc., P.O. Box 12247; Lexington, KY 40582.

NEW UTILITIES

Two disk-based utilities for the Color Computer will be welcome additions to any user's library, and these two could even avert total disaster. If you've ever "crashed" a disk that contains the only copy of an important program or data file, you'll appreciate these products.

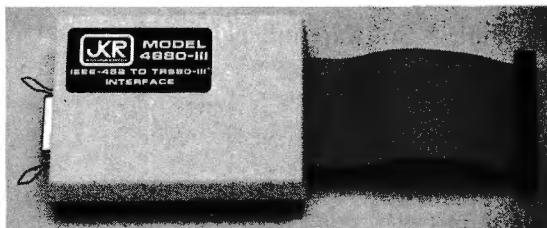
DISK SAVER is a neat little utility that allows you to make a quick cassette tape backup of any disk, and to restore the tape's contents back to a disk again.

DISK ZONKER is kind of like a "SUPERZAP" utility for the Color Computer. It allows you to examine any diskette in great detail, displaying data in each sector in ASCII form or byte-by-byte in HEX or Decimal, and lets you change any data shown. DISK ZONKER also lets you locate the start, end, and transfer addresses of any machine language program stored on the disk. But the most useful feature of this program is its ability to read and alter the disk directory—you can repair the damaged directory of a crashed disk, thereby making the disk's files readable again.

DISK SAVER costs \$16.95 and DISK ZONKER goes for \$24.95. For more information on these programs, contact Color Software Services, P.O. Box 1708, Greenville, TX 75401. ■

IEEE-488 to TRS-80 Interface

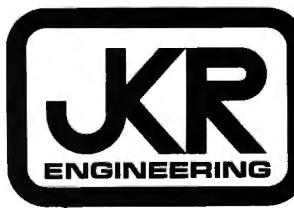
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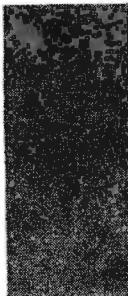
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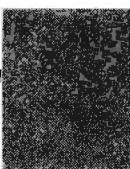
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MULTIPLEX VS NETWORK

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POCKET COMPUTER CORNER

Steven M. Zimmerman and Leo M. Conrad A Program for Keeping a Home, Credit Card, and Other Inventory Lists

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A home inventory is something most people put off doing until after a fire or break-in, when it's too late. This program is designed to help in the development and maintenance of a home inventory list. A maximum of 39 items, their values, and their date of purchase may be kept in the computer at one time. When the computer has reached its maximum you can save the information on both tape and paper for future reference. As things change, individual tapes may be reloaded into the computer, the list updated, a new record printed and saved on a new tape.

With the exception of a few headings, the program as designed will handle a list of credit cards, a name, phone, and zip code list. If some small additional changes are made, an address list could also be maintained. The program maintains a list of string variables (name, words etc.) matched with two numerical variables. A list of items, value, date (as a numerical value) or item, value, serial number, and credit card company, number, expiration date are examples of the type of information the program can maintain. In the program review section changes needed to customize the program will be reviewed.

The program includes the ability to add items, to delete items, to list the current inventory on printer or display, to sort items by date of purchase, and to sort items by value. It does not have the ability to sort by name of item, because of the limited string (characters-letters) handling abilities of your pocket computer.

RUNNING THE PROGRAM

To maximize the capacity of the program, a start up routine was left out. All variables must be set equal to zero or blank in the case of string variables. The CLEAR statement is used for this purpose. To CLEAR all variables from memory for a new run, you must type CLEAR <CR>. Take care not to use this instruction if you happen to have something in memory you wish to save.

After typing CLEAR <CR> type R. <CR> to start the program. R. is shorthand for RUN. The main menu will appear on the display:

ADD DEL PRT TIME VAL?

To select any one of the alternate actions, you must type the first letter of the selection followed by a <CR>. For example A <CR> selects the ADD option. ADD <CR> results in a short delay, and then the main menu is again displayed. If you wish to stop execution of the program, press the ON key for BREAK or press the OFF key and turn the computer off.

After typing A <CR> the following will appear on the display:

ITEM?

The name of the item owned should now be entered.

Your pocket computer will only accept seven characters. If you type a name with more than seven characters, only the first seven are stored in memory. You will have to be careful in naming your inventory items. The items in our inventory consisted of the following:

No	Item	Value	Date
1.	Brief case	\$50.00	1980.0111
2.	Computer	2000.00	1978.0501
3.	Silver tray	250.00	1935.0000
4.	Telescope	366.00	1983.0105

The dating method of placing the year first followed by a decimal point, the month, and then the day was selected to make the task of sorting by date from low to high work. The names all contain more than seven digits, and must be reduced to work. The seven character limit does not pertain to numerical variables, which is one reason they are used for the date. Some of you may find it easier to answer using the entire word and let the computer reduce the results to seven digits, as we have.

The data questions and answers follow:

```
ITEM? BRIEF C <CR>
VALUE? 50 <CR>
DATE? 1980.0111 <CR>
ITEM? COMPUTER <CR>
VALUE? 2000 <CR>
DATE? 1978.0501 <CR>
ITEM? SILVER TRAY <CR>
VALUE? 250 <CR>
DATE? 1935.0000 <CR>
ITEM? TELESCOPE <CR>
VALUE? 366 <CR>
DATE? 1983.0105 <CR>
ITEM? <CR>
ADD DEL PRT TIME VAL?
```

The termination procedure selected for the input of data was simply to press <CR> without entering any characters. Your pocket computer continues to the next line of code when this instruction is given. In the program the next line of code instructs the computer to return to the menu.

Type P <CR> to produce the following results on your printer:

```
NO ITEM    VALUE
DATE
1. BRIEF C 50.
1980.0111
2. COMPUTE 2000.
1978.0501
3. SILVER 250.
1935.
4. TELESCO 366.
1983.0105
```

The reason for the short lines is that your printer has only 16 columns of output available. If you do not have the printer, it is possible to obtain similar output on the display, but this program is best used with a printer.

On your display should be the main menu:

ADD DEL PRT TIME VAL?

This time select the TIME sorting option by typing T <CR>. After a short delay, you will be returned to the main menu. As the number of items on your list increases, the amount of time to complete the sort will increase greatly.

Selecting the PRT option results in the following being produced on your printer:

NO	ITEM	VALUE
	DATE	
1.	SILVER	250. 1935.
2.	COMPUTE	2000. 1978.0501
3.	BRIEF C	50. 1980.0111
4.	TELESCO	366. 1983.0105

The program will now return to the main menu:

ADD DEL PRT TIME VAL?

This time, type V <CR> to order the items by value, and when complete, print the results again. They should be as follows:

NO	ITEM	VALUE
	DATE	
1.	BRIEF C	50. 1980.0111
2.	SILVER	250. 1935.
3.	TELESCO	366. 1983.0105
4.	COMPUTE	2000. 1978.0501

Assume you have just sold the telescope and you want to remove it from your inventory list. Before continuing, notice that this item is number 3 on the list. Select DEL by typing D <CR> and you will see:

DELETE #/0?

If you happen to select delete in error, there is a built-in default procedure. Typing 0 <CR> will return you to the main menu. In this case type 3 <CR>. When you have returned to the main menu, select PRT and you will obtain the following:

NO	ITEM	VALUE
	DATE	
1.	BRIEF C	50. 1980.0111
2.	SILVER	250. 1935.
3.	COMPUTE	2000. 1978.0501

The telescope has been removed from your list.

USING THE TAPE RECORDER

To use the tape recorder to save programs, the

CSAVE "filespec" instruction is used. The recommended procedure is first to clean the tape with a bulk eraser of some type. The tape is then rewound, and the tape counter is set to zero. Place the recorder on fast forward until a count of 10 is reached. Now connect the recorder to the computer and cassette interface. Place the recorder in play-record mode and type CSAVE "filespec" <CR>. You will see the tape recorder operate and hear the file being saved.

It is good practice to save at least two copies and then to use the CLOAD? "filespec" instruction to check to see if the copies saved were good. CLOAD? is used in the same manner as the CLOAD instruction. The tape is rewound, the computer and interface are connected, and the cassette recorder is set to play. The instruction CLOAD? "filespec" <CR> is typed and you can see and hear the program file being checked.

The primary difference between CLOAD? and CLOAD is that the first instruction checks the program in memory with the one on tape, while the second instruction loads a program from tape to your computer. It is suggested that you practice with short programs the task of saving, checking, and reloading until you are confident you know how to handle this ability.

To save data, the instruction PRINT # "filespec" is used. The tape is prepared in the same manner as when programs are being saved. This instruction is executed in either the DEFine or RUN modes. It saves all data stored in the computer. It is again suggested you save at least two copies of the data. In this case there is no way to check and make sure the data was saved correctly, so it is suggested that you make sure you also keep a printed copy of the data.

To read the data back into the computer, the instruction: INPUT # "filespec" <CR> is typed after the tape has been rewound and the recorder set to play.

It is a good rule with your pocket computer always to use the same recorder to record and play. If you have loading troubles try different recorders and different sound settings. These are two critical variables in the recording process.

EXAMINING THE PROGRAM

The program was designed with the idea that the first nine variables- A, B, C, D, E, F, G, H, and I would be used as working variables, and the data would be recorded in position A(10) and on. Variable A is first used as a string variable to direct the main menu. It then is used in the delete routine to identify the line to be deleted.

Variable B is used as the data counter. At all times the value of B is the number of items in inventory. The limit is 39, and due to the need to minimize code there is no error trapping routine, so be careful when you begin to reach the limit of the program.

Variables C, D, E, F, and H are used as counters. G and G\$ are used to save values and strings during the sorting operation. Variable I was not needed.

Line numbers were used to structure the program. Lines 1 through 7 are associated with the main menu. Line 1 prints the menu and lines 2-7 direct the flow of the program depending on the answer given to the menu question.

continued on page 48

ADD YOUR OWN LIBRARY COMMANDS TO LDOS

Bob Bowker

It's a familiar situation: you've just bought a great new utility, one that you would use twenty times a day. One catch: your LDOS system diskette already shows "Free = 0 Grans." But don't give up just yet—you can turn the utility into a library command and add the code to one of your library modules.

FIRST, THE BACKGROUND

The concept of "library commands" has been standard on the TRS-80's since the first edition of TRSDOS. The library is made up of several short command words such as DIR, FREE, KILL, and APPEND, whose routines are available at DOS Ready (and from BASIC via CMD"XXX") for system operation and maintenance.

The code for all these library commands was combined into several /SYS modules, or files, each of which is loaded into RAM when one of its routines is called. This method is certainly much better than having a /CMD file for each of the 30-odd library commands (want to see a diskette fill up fast?), but there are two distinct disadvantages to it: first, an entire /SYS file must be loaded into RAM to access one routine, which is usually only a small part of the file; and secondly, there are of necessity many files on the system disk to handle these library commands (9 /SYS files contain library command code in the case of NEWDOS/80 2.0, for instance).

Not so with LDOS, which uses "Partitioned Data Sets" (PDS) to store the library routines. A PDS is a single file which can contain many independent routines, arranged one after the other; the routines are indexed in a PDS directory at the beginning of the file. Each directory entry in a PDS file consists of an Entry Number (essentially a 1-byte ID Number), the transfer address of the routine itself (the address in RAM at which execution of the routine will begin), and the location in the PDS file itself of the start of the routine. LDOS, using PDS, is able to store all thirty-three of its library command routines in only 2 separate files (there are actually 35 commands, but that's getting ahead of ourselves).

HOW THE LIBRARY WORKS

When a library command, such as "DIR" or "KILL", is invoked, the LDOS resident system first reads in SYS1/SYS, which contains the table of valid words, and looks up the command. Each word in the table is followed by two bytes: a pointer to the PDS file in which its routine is contained, and its Entry Number.

Next, the resident system reads in relative sector 0 or the PDS file, and checks the directory there for the Entry Number; once it's found, the transfer address is stored, and the location of the routine in the PDS file is established. The PDS file is then positioned to the start of the routine, and that code (and only that code—not the whole file) is read into RAM. Control is then passed to the transfer address to execute the command.

Each of the two LDOS library command files, SYS6 and SYS7, contains the code for several command routines; by typing "LIB" from LDOS Ready, you'll see a list of which commands are in which PDS file (the "A"

list is in SYS6, the "B" list in SYS7). There are two commands, however, which are not included in the list. Type "A! (((", or "B! (((", from LDOS Ready, and you'll get a friendly greeting from the authors of LDOS, noting that this particular command is reserved for the future. Until that future arrives, however, perhaps in the form of the next version of LDOS, the two slots represented by "A! (((", and "B! (((", can be used for your own routines.

To illustrate the process, we'll add the command "UNKILL" to the library, and add the code to do the unkilling to SYS6/SYS (the same process can be followed to add some other command and its code to SYS7/SYS). Once it's all in place, UNKILL will be treated just like any other library command—it will be in the list when you call for LIB, and it can be executed from BASIC using CMD"UNKILL FILENAME/EXT" (see below, "HOW TO USE UNKILL"). Best of all, we'll be able to "sneak" it onto a full diskette: SYS6 has over 3 sectors at the end which are not being used—wasted space, normally—and we'll tuck our code in there.

All library commands are 6 characters in length; shorter names are padded on the right with blanks (20's). In the table of commands in SYS1, each name is followed by one byte which defines the PDS file number, and another which is the PDS entry number. In the case of "A! (((", the 2 bytes are 80 (defining SYS6 as the PDS file) and E1; for "B! (((", they're C0 (for SYS7) and E2.

THE NEW COMMAND

The first step is to make a backup of your system diskette, and do this work on that backup. Once all the changes are made, and you've tested UNKILL to your satisfaction, you can copy SYS1 and either SYS6 or SYS7 back onto your master. This warning is boring and, I would like to think, unnecessary, but better safe than sorry.

These changes and additions can be accomplished most easily with a program such as ULTIZAP/PRO, or even SUPER UTILITY, but no less completely with LDOS's "DEBUG (E)".

Start by reading relative sector 1 of SYS1 into memory, and replacing the 6 bytes of "A! (((with "UNKILL" at the end of the table (make sure that you install all caps—the system will take care of lower case input comparisons on its own). "UNKILL" is now a valid library command, although at this point all it will do is display the message from the authors.

The authors' message is displayed by 119 bytes of code which form the library routine "A! (((or "B! (((":

```
00100      ORG    5200H
00110      ;
00120      START   LD     HL,MSG1      ;POINT TO THE MESSAGE
00130      CALL    4467H      ;USE LDOS'S DISPLAY ROUTINE
00140      JP     402DH      ;AND RETURN TO DOS
00150      ;
00160      MSG1    DEFM   'HI THERE, THIS COMMAND IS RESERVED FOR '
00170      DEFM   'THE FUTURE BY YOUR LDOS SUPPORT GROUP! '
00180      DEFM   'ROY, BILL, TIM, CHUCK, DICK. '
00190      DEFB   0DH       ;MESSAGE TERMINATOR
```

This code is at the end of both SYS6/SYS and SYS7/SYS; it's the final element in each PDS file. To replace it with our code, we must shorten SYS6 by the length of the "A! (((code, and let the system APPEND our routine. Some directory repair is needed, but it's still the simplest of the methods available.

The shortening is really easier than it might sound; all that's required is to change 3 bytes in the directory entry for SYS6/SYS. First, you'll have to find the start of the code for "A! (((", since that will be the new end of the whole file. Take a look at the first sector of SYS6—you'll find 19 groups of eight bytes, each of which starts with the two bytes 08 and 06; these are the PDS directory entries. The final such entry, near the end of the sector, should read as follows:

08 06 E1 00 52 xx yy zz

The 08 identifies a PDS directory entry block, and the 06 is the length of the block. E1 is the Entry Number of this command, and 5200H is the transfer address. the next two bytes (xx and yy) are the sector number of the PDS file in which this code starts, and the third (zz) is the relative byte number in that sector of its first byte of code. Write down these three numbers—they're the new ones we need to shorten SYS6. (In the case of LDOS 5.1.3 for the Model I, these three bytes are 32 00 A0; for the Model III, version 5.1.0, they're 30 00 EF.)

Read in relative sector 2 of the diskette directory; the entry for SYS6/SYS starts on the third line. The fourth byte (relative byte 23H or 35 decimal) contains SYS6's end-of-file offset byte (the first byte in the final sector which is unused); replace it with the number "zz" from the PDS directory entry. Next, replace the fourth and fifth bytes in line 4 of the sector (relative bytes 33H and 34H or 51 and 52 decimal) with "xx + 1" and "yy" from the PDS directory ("xx" must be incremented to account for file relative sector 0).

PUTTING THE TWO TOGETHER

The system will now do the next job for us—put our code in place in SYS6. Assuming that the code for UNKILL has already been assembled into a file called UNKILL/OBJ of drive 1, issue the following command:

APPEND UNKILL/OBJ:1 TO SYS6/SYS.password:0

Note that since SYS6/SYS is protected by a password, it must be specified in order for APPEND to function—see your LDOS owner's manual for the proper word. Similarly, if you ATTRIB a password to UNKILL/OBJ before this step, it too must be specified.

Finally, we must change the new bytes at the end of SYS6/SYS back into PDS form. At the end of UNKILL/OBJ, the final 4 bytes made up an end-of-file marker, and the transfer address of the program UNKILL/OBJ; these bytes have been APPENDED to SYS6. Read the final sector of SYS6 into memory, and look for the 4 bytes:

02 02 00 52

The first 02 identifies this as an End-of-file/Transfer address block; the second 02 is the block length; and the third and fourth bytes set 5200H as the transfer ad-

dress. This would really foul up the system—/CMD codes in a PDS file! To keep the lid on things, zap in the following bytes to replace them:

04 02 00 00

In a PDS file, the 04 identifies this as the end of a routine's code; the 02 is the block length; and the two 00's fill the block—they're meaningless, and could be any HEX bytes. And you're done!

Exit to DOS and try the LIB command; UNKILL should be the final entry in the first set of commands listed—second set if you replaced "B! (((". Next, kill UNKILL/OBJ, then unkill it using your new command; if you have any problems, go back and check the source code for typing errors, and reassemble UNKILL/OBJ.

HOW TO USE UNKILL

UNKILL works just like KILL—you must follow the command word with a filename/ext:d as follows:

UNKILL FILESPEC/EXT:d

The routine proceeds in two distinct steps: 1) find a directory entry if it exists, and 2) check that ALL of the original sectors assigned to it are still free. Any errors which occur during the course of the routine will result in the display of standard LDOS error messages, except one: if the grans used by the program you're attempting to UNKILL have been assigned to another file, you'll get the following error message:

File has been overwritten, and is lost.

(In this case, you're almost out of luck; the only other course of action open to you is to try to manually locate as many of the file sectors as you can, and copy them one-by-one onto another diskette. Good luck!)

UNKILL does not pay an attention whatsoever to passwords; none have to be specified in the command line, and the file will be reactivated (if at all possible) regardless of its previous protection attributes. Once "alive", however, any passwords which were previously required will once again be in effect.

One caution: it is possible that one or more grans which were used by your file have been assigned to another file, which itself in turn has been killed. UNKILL will look at the grans originally used by your file, see that they're free, and reassign them in the process of unkilling it, even though the data in those grans is from another file. You must thoroughly check out all UNKILLED files before assuming that all is well, especially if some time has passed since they were killed.

Similarly, it is possible for UNKILL to reactivate a file all of whose sectors are 00's, if you've zeroed the file. In other words, UNKILL makes no content judgments about sectors—they are either assigned or not, and acted upon accordingly.

As part of the process of re-establishing the file, UNKILL automatically updates the directory's HIT and GAT sectors. There is no need to copy the UNKILLED file to another diskette then KILL the original to make certain that the directory is correct.

A word to the wise: if you want a killed file to stay that way, you'd best "zero" out at least its directory

entry, if not every sector assigned to it (the only other alternative is to use UNKILL as a /CMD utility with your own password, but even that isn't totally foolproof).

SOME FINAL NOTES

A caution to non-LDOS users who may wish to adapt UNKILL for their own use: four of the routines which are called will probably give you problems under any other DOS. They are @CKDRV, which checks that a drive exists, that there's a diskette in place, and updates the Drive Code Table; DCTBYT, which returns various drive and diskette values or attributes from the Drive Code Table; and RDSYS and WRSYS, which read and write System sectors. You might be able to find replacement calls in your DOS, or you could add a short table which hard-configures the program to your system.

Model III users should beware of the RAM address which is EQUated to @CKDRV in line 270 in the program; this is one of the "unmovable" addresses in LDOS 5.1 for the III which has moved. Double check the address of this routine in your owner's manual, page 6-41, and make a change if necessary.

While UNKILL was the command we chose, you can install any library routine you wish, in the same manner—just make certain that the command word you use is either 6 characters long, or padded on the right with blanks:

TEST = 54 45 53 54 20 20

One other caution: don't make the code too long, or you'll start stepping on other programs. If you're adding this to a full diskette, the limit will be determined by the number of available sectors at the end of the SYSx file: multiply the number of grams assigned to the file by the number of sectors per gran on the disk, subtract the number of the last sector in the file, and add one. If you're counting bytes, don't forget to add all the spare bytes in the last sector of the shortened file. In any case, full diskette or not, some existing routines are over 2200 bytes long so the absolute restriction isn't too serious.

UNKILL can also be used directly as a /CMD utility occupying its own directory and diskette space, but that defeats the fun of what we've just accomplished—adding a 750-byte utility to our system diskette which was already full!

```

00100 : UNKILL/LIB
00110 :
00120 : Copyright (c) 1982 by The Utility Co.
00130 : All rights other than personal use are
00140 : hereby reserved.
00150 :
00160 :=====
00170 :
00180 : Library command code to UNKILL a filename/ext:d
00190 : with GAT and HIT sector corrections - for use
00200 : with LDOS 5.x.x only
00210 :
00220 :=====
00230 :
00240 MODEL EQU 0125H ;ROM Model number test
00250 SBUF$ EQU 4200H ;SYS Buffer - 256 bytes
00260 LDRV$ EQU 4300H ;current drive # (0-7)
00270 :
00280 QEXIT EQU 402DH ;return to DOS Ready

```

```

00290 @ERROR EQU 4409H ;DOS error exit
00300 @DSPLY EQU 4467H ;display a message
00310 @CKDRV1 EQU 4488H ;check in Mod 1 drive
00320 @CKDRV3 EQU 4290H ;check in Mod 3 drive
00330 @CKDRVZ EQU 4209H ;addr in up to ver 5.1.2
00340 :
00350 WRSYS EQU 4768H ;write a system sector
00360 DCTBYT EQU 479CH ;search DCT for byte
00370 RDSYS EQU 4B45H ;read a system sector
00380 :
00390 :=====
00400 :
00410 ORG 5200H ;start address
00420 :
00430 START PUSH HL ;save inbuf$ pointer
00440 LD A,(MODEL) ;check out Model #
00450 CP 49H ;"I" on Model III
00460 JR NZ,STARTX ; go if it's a I
00470 LD HL,@CKDRV3 ;else load up III's addr
00480 LD A,(@CKDRV3+1) ; and check on version
00490 CP 0C4H ;it's C4 if 5.1.3
00500 JR Z,PUMODL ; go if it's 5.1.2
00510 LD L,@CKDRVZ&0FFH ;else load new LSB
00520 PUMODL LD (CKDRV+1),HL ;insert III's vector
00530 STARTX POP HL
00540 LD A,(HL) ;get char from CMDBUF
00550 CP 41H ;anything there?
00560 JR NC,BEGIN ; go if yes
00570 CP 7BH ;mask out invalid chars
00580 JR C,BEGIN ; and go to work
00590 LD A,13H ;"Illegal Filename" error
00600 JR PU2 ; and exit to @ERROR
00610 :
00620 BEGIN LD (INPUT),HL ;store address for later
00630 CALL GETDRV ;get drive number spec'd
00640 LD C,A ;put Drv # in C register
00650 CKDRV CALL @CKDRV1 ;check that drive in
00660 JR NZ,PU2 ;error exit - go if pblm
00670 JR NC,PU1
00680 LD A,1AH ;"Write Protected" error
00690 PU2 JP ERR
00700 PU1 LD HL,MSG2 ;"searching..." message
00710 CALL @DSPLY ; and show it
00720 LD A,09H ;want the DIR cyl number
00730 CALL DCTBYT ; and ask for it
00740 LD (DIRTRK),A ; and store it
00750 LD D,A
00760 LD A,02H ;Rel sector 1 of DIR
00770 LD E,A ;put it in E register
00780 LOOP1 LD HL,SBUF$ ;point to buffer
00790 CALL RDSYS ; and read sector in
00800 JR NZ,PU2 ;go if error
00810 LD HL,SBUF$+5 ;point to 1st entry
00820 PUSH BC ;save registers
00830 PUSH DE
00840 LD B,08H ;# entries per sector
00850 LOOP4 PUSH BC ;save entry count
00860 PUSH HL ;save entry pointer
00870 EX DE,HL ;exchange pointers
00880 LD HL,(INPUT) ;requested filename
00890 LD B,08H ;max length of filename
00900 LOOP2 LD A,(DE) ;get DIR entry character
00910 CP 20H ;is it a space?
00920 JR Z,PU3 ;skip over if yes
00930 CP (HL) ;compare to input char
00940 JR NZ,NOTTHIS ; go if no match

```

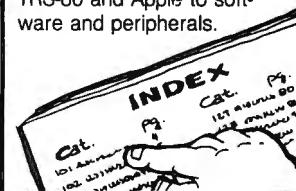
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ADD YOUR OWN LIBRARY COMMANDS TO LDOS

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00950	INC	HL	;bump input char pointer	01610	LD	D,A	; into D register
00960 PU3	INC	DE	;bump DIR char pointer	01620	CALL	CHECK	;check if that cyl's free
00970	DJNZ	LOOP2	;do this B times	01630	INC	HL	;bump extent pointer
00980	LD	A,(HL)	;check for /EXT	01640	JR	LOOP5	; and check that one
00990	CP	2FH	;is it a slash?	01650 ALLDON	LD	A,(LDRV\$)	;set up to rewrite sector
01000	JR	NZ,FOUNDT	;done if not	01660	LD	C,A	;drive number in C
01010	LD	B,03H	;max length of extent	01670	LD	A,(DIRTRK)	
01020	INC	HL	;point to extent char #1	01680	LD	D,A	;cylinder # in D
01030 LOOP3	LD	A,(DE)	;get DIR extent character	01690	LD	E,00	;GAT sector
01040	CP	20H	;is it a space?	01700	LD	HL,SBUF\$;buffer location
01050	JR	Z,PU4	;skip over if yes	01710	CALL	WRSYS	;write it back
01060	CP	(HL)	;compare to input char	01720	JP	NZ,ERR	;go if error
01070	JR	NZ,NOTTHIS	; go if no match	01730	LD	A,(ENTSEC)	;get entry sector loc'n
01080	INC	HL	;bump input char pointer	01740	LD	E,A	; into E register
01090 PU4	INC	DE	;bump DIR cahr pointer	01750	CALL	RDSYS	;read that sector in
01100	DJNZ	LOOP3	;do this B times	01760	JP	NZ,ERR	;go if error
01110	JR	FOUNDT	;found it!	01770	PUSH	HL	;save for now
01120 NOTTHIS	POP	HL	;HL==> DIR entry	01780	LD	HL,(ENTRB)	;point to entry name
01130 PU5	LD	BC,20H	;offset to next entry	01790	LD	B,05	;back up 5 bytes
01140	ADD	HL,BC	;HL==>next entry	01800 LOOPQ0	DEC	HL	;decrement pointer
01150	POP	BC	;check entry counter	01810	DJNZ	LOOPQ0	; back to start
01160	DJNZ	LOOP4	; go if not all checked	01820	SET	4,(HL)	;set "In Use" flag
01170 :				01830	POP	HL	;restore HL
01180	POP	DE	;restore registers	01840	CALL	WRSYS	;write DIR sector back
01190	POP	BC		01850	JP	NZ,ERR	;go if error
01200	LD	A,07H	;number sectors/cylinder	01860	LD	E,01	;point to HIT sector
01210	CALL	DCTBYT	;get that number	01870	CALL	RDSYS	; and read it in
01220	AND	1FH	;bits 0 - 4 only	01880	JP	NZ,ERR	;go if error
01230	CP	E	;final sector yet?	01890	CALL	HASHIT	;hash filename & load it
01240	JR	NZ,PU6 .	; go if not	01900	CALL	WRSYS	;write HIT back
01250	LD	A,18H	;File not in DIR" error	01910	JP	NZ,ERR	;go if error
01260	JR	PU2		01920	LD	HL,MSG3 ;"Unkilled...",message	
01270 PU6	INC	E	;bump sector counter	01930	CALL	@DSPLY	; and show it
01280	JR	LOOP1	; and go check that one	01940	JP	@EXIT	;all done!
01290 FOUNDT	POP	HL	;restore registers	01950			
01300	LD	(ENTRB),HL	;store for later	01960	*****		
01310	PUSH	HL	;save for now	01970			
01320	LD	B,05	;back up 5 bytes so that	01980	:	GETDRV - sub to parse out requested drive number	
01330 LOOPF1	DEC	HL	; HL==>Entry start, not	01990	:	from the command line - default drive 0	
01340	DJNZ	LOOPF1	; Name start	02000	:		
01350	BIT	7,(HL)	;FXDE or FPDE?	02010 GETDRV	PUSH	HL	;save pointer
01360	JR	NZ,PU5	;go if FXDE	02020 LOOPG1	LD	A,(HL)	;check character
01370	LD	DE,ENTRY	;else move whole entry	02030	CP	0DH	;carriage return?
01380	LD	BC,20H	;length of entry	02040	JR	Z,BACK00	; go if yes
01390	POP	HL	;HL==>Name start in entry	02050	CP	3AH	;colon?
01400	LDIR	'	; and move it	02060	JR	Z,GOTONE	; go if yes
01410	LD	HL,ENTRY+25	;point to end-of-entry	02070	CP	60H	;check for lowercase
01420	LD	(ENTEND),HL	; and save that addr	02080	JR	C,LOOPG2	; go if not
01430	LD	A,(ENTRY+19H)	;does an FXDE exist?	02090	RES	5,A	;else convert to UC
01440	CALL	GETXDE	; get it if yes	02100	LD	(HL),A	; and replace it
01450	POP	BC	;clean off the stack	02110 LOOPG2	INC	HL	;bump the pointer
01460	POP	DE	;restore registers	02120	JR	LOOPG1	; and check next one
01470	POP	BC		02130	:		
01480	LD	A,E	;get sector number	02140 BACK00	XOR	A	;default Drive 0
01490	LD	(ENTSEC),A	; and store for later	02150	POP	HL	;restore pointer
01500	LD	E,00H	;point to GAT sector	02160	RET		
01510	LD	HL,SBUF\$;point to destination	02170			
01520	CALL	RDSYS	; and read it in	02180 GOTONE	INC	HL	;point to drive number
01530	JP	NZ,ERR	;go if error	02190	LD	A,(HL)	; and get it
01540	LD	HL,ENTRY+17	;point to extent field	02200	CP	30H	;valid drive number?
01550 LOOP5	LD	A,(HL)	;get start cyl number	02210	JR	C,BACK00	; default to 0 if not
01560	LD	E,A	; into E register	02220	CP	38H	;valid drive number?
01570	INC	A		02230	JR	NC,BACK00	; default to 0 if not
01580	JR	Z,ALLDON	;go if no extent	02240	SUB	30H	;mask the ASCII
01590	INC	HL	;point to gran info	02250	POP	HL	;restore pointer
01600	LD	A,(HL)	;start gran # & # grans	02260	RET		
				02270			
				02280	*****		
				02290			

02300 ;	GETXDE - sub to find any FXDE's and transfer the extent fields into ENTRY space.	02990	OR	A	;check for start gran = 0
02310 ;		03000	JR	Z,LOOPX1	; go if it is
02320 ;		03010	HERE	DEC	;update bit counter
02330 GETXDE	INC A ;check for FXDE	03020	RRC	H	;rotate start gran's FREE
02340	RET Z ; go back if none	03030	DJNZ	HERE	; bit to pos'n 0
02350	PUSH BC ;save all registers	03040	LOOPX1	RRc	;rotate into CARRY
02360	PUSH DE	03050	JR	C,TAKEN	; go if it's not free
02370	PUSH HL	03060	SET	7,H	;elkse set it "IN USE"
02380	INC HL ;bump pointer	03070	DEC	C	;count this gran
02390 XDLOOP	LD A,(HL) ;get the FXDE's DEC	03080	JR	Z,ITSOK	; and go if done
02400	PUSH AF ; and save for now	03090	JR	LOOPX1	;else loop for another
02410	AND 1FH ;bits 0 - 4 only	03100	POP	BC	;restore BC
02420	ADD A,2 ;convert to relative sect	03110	CALL	ENDCHK	;reload updated FREE
02430	LD E,A ; and load into E	03120	INC	IX	;point to .next cyl's FREE
02440	LD A,(DIRTRK) ;get DIR track number	03130	PUSH	IX	; byte in GAT
02450	LD D,A ; into D register	03140	POP	HL	;restore GAT pointer
02460	LD A,(LDRV\$) ;get drive number	03150	CALL	MOVRN1	;get that byte into H reg
02470	LD C,A ; into C register	03160	LD	A,D	;get # grans left in ext
02480	LD HL,SBUF\$;point to buffer	03170	CP	03H	;more than 3?
02490	CALL RDSYS ;read sector in	03180	JR	C,DOLESS	; go if not
02500	JP NZ,ERR ;go if error	03190	LD	B,3	;else do 3 more
02510	POP AF ;restore FXDE's DEC	03200	JR	LOOPX1	;go to work again
02520	AND 0E0H ;bits 5 - 7 only	03210	DOLESS	LD	;else load up number left
02530	LD C,A ; into C register	03220	JR	LOOPX1	
02540	LD B,00H ;zero the B register	03230	;		
02550	ADD HL,BC ;HL==>start of entry	03240	TAKEN	LD	HL,MSG1 ;"Overwritten" message
02560	LD C,22 ;offset to 1st ext field	03250	CALL	@DSPLY	; and show it
02570	ADD HL,BC ;HL==>1st extent field	03260	JP	@EXIT	;take it on home.....
02580	LD DE,(ENTEND) ;destination in mem	03270	;		
02590	LD BC,08H ;8 bytes to move	03280	ITSOK	POP	BC ;C==# grans/cyl
02600	LDIR ;so move them	03290	CALL	ENDCHK	;store new FREE byte
02610	LD (ENTEND),DE ;store end-of-entry	03300	POP	HL	;clean off the stack
02620	INC (HL) ;any more extents?	03310	RET		
02630	JR Z,GOTIT ; done if not	03320	;		
02640	INC HL ;else point to FXDE's DEC	03330	ENDCHK	LD	B,C ;B==# grans/cyl
02650	JR XDLOOP ; and do this one	03340	ENDCK1	RLC	;rotate byte back normal
02660 ;		03350	DJNZ	ENDCK1	
02670 GOTIT	POP HL ;clean up the stack	03360	LD	A,H	;now load it back into
02680	POP DE	03370	LD	(IX),A	; its SBUF\$ location
02690	POP BC	03380	RET		
02700	RET ;and we're done	03390	;		
02710 ;		03400	MOVARN	PUSH	HL ;move byte location into
02720 ;*****		03410	POP	IX	; IX register
02730 ;		03420	MOVRN1	LD	A,(HL) ;get actual byte
02740 ;	CHECK - sub to check if cyl <= DE is free; if	03430	LD	H,A	; into H register
02750 ;	it is, set it "in use"	03440	RET		
02760 ;		03450	;		
02770 CHECK	PUSH HL ;save pointer	03460	*****		
02780	LD HL,SBUF\$;buffer address	03470	;		
02790	LD L,E ;HL==>cyl's "FREE" byte	03480	;	HASHIT	- sub to HASH filename/ext and put the
02800	CALL MOVARN ;initialize IX register	03490	;		resulting code in place in SBUF\$
02810	LD A,(LDRV\$) ;get drive number	03500	;		
02820	LD C,A ; into C register	03510	HASHIT	PUSH	BC ;save all registers
02830	LD A,08H ;byte # for grans/cyl	03520	PUSH	DE	
02840	CALL GETGPC ;get that number	03530	PUSH	HL	
02850	AND 0E0H ;bits 5 - 7 only	03540	LD	HL,(INPUT)	;point to filename
02860	RLCA ;move top 3 bits into	03550	LD	B,09H	;max # characters + 1
02870	RLCA ; bottom 3 bit loc'n's	03560	LD	DE,FILENM	;destination
02880	RLCA	03570	AGAIN1	LD	A,(HL) ;get character
02890	INC A ;make it absolute	03580	CP	2FH	;is it a slash?
02900	LD B,A ;B==>grans/cyl	03590	JP	Z,MOVEM	; go if yes
02910	LD A,D ;get start gran number	03600	CP	0DH	;carriage return?
02920	AND 0E0H ;bits 5 - 7 only	03610	JR	Z,CR	; go if yes
02930	RLCA ;move top 3 bits into	03620	CP	3AH	;colon?
02940	RLCA ; bottom 3 bit loc'n's	03630	JR	Z,CR	; go if yes
02950	RLCA	03640	LD	(DE),A	;else move this byte
02960	LD C,B ;C==> grans/cylinder	03650	INC	HL	;bump input pointer
02970	LD B,A ;B==>start gran number	03660	INC	DE	;bump destination pointer
02980	PUSH BC ;save for now	03670	DJNZ	AGAIN1	; and do it again

03680	EXT	LD	B,03H	;max length of extent	04370	DONEXT	LD	A,(ENTSEC)	;get DIR sector #
03690	DOJOB1	LD	A,(HL)	;get character	04380	SUB	02H		;convert from rel sct #
03700		CP	0DH	;carriage return?	04390	LD	(DEC),A		;store for now
03710		JR	Z,CR1	; go if yes	04400	LD	HL,(ENTRB)		;get start byte
03720		LD	(DE),A	;else move this byte	04410	LD	BC,SBUF\$;calculate the offset
03730		INC	HL	;bump input pointer	04420	SBC	HL,BC		;L=offset
03740		INC	DE	;bump destination pointer	04430	LD	BC,05		;offset to entry start
03750		DJNZ	DOJOB1	; and do this again	04440	SBC	HL,BC		;HL=>start of entry
03760	;				04450	LD	A,L		;combine offset...
03770	DOJOB2	PUSH	HL	;save pointer	04460	LD	HL,DEC		; ...with DEC
03780		LD	HL,FILENM	;point to storage	04470	OR	(HL)		
03790		LD	BC,0B00H	;B=max length whole thing	04480	LD	C,A		;put it into C
03800	JOB3	LD	A,(HL)	;get character	04490	LD	B,00H		; and zero B
03810		CP	41H	;valid alpha?	04500	LD	HL,SBUF\$;start of HIT
03820		JR	C,NUMER1	; go if not	04510	ADD	HL,BC		;HL=>entry's location
03830		RES	5,A	;force uppercase alpha	04520	LD	A,(HASHCD)		;get code
03840	NUMER1	INC	HL	;bump pointer	04530	LD	(HL),A		; and stuff it in
03850		XOR	C	;start machinations	04540	POP	HL		;restore registers
03860		RLCA			04550	POP	DE		
03870		LD	C,A		04560	POP	BC		
03880		DJNZ	JOB3		04570	RET			
03890		LD	HL,HASHCD		04580	:			
03900		CALL	HASHB		04590	*****			
03910		DEC	HL		04600	:			
03920		DEC	HL		04610	:	CHANGE - sub to change 2 digits into 1 hex		
03930		CALL	CHANGE	;convert to hex digit	04620	:			
03940		OR	A	;did a 0 result?	04630	CHANGE	PUSH DE		;protect contents of DE
03950		JR	NZ,PUH1	; go if not	04640	CALL	SUB1		;get, mask, and convert
03960		INC	A	;if yes, make it a 1	04650	RLA			;move these 4 bits into
03970	PUHI	LD	(HASHCD),A	;store the code	04660	RLA			; the top 4 bit loc'n
03980		POP	HL	;restore HL register	04670	RLA			
03990		JR	DONEXT	; and loop	04680	RLA			
04000	;				04690	AND	0F0H		;throw away bottom 4 bits
04010	HASHB	LD	A,0F0H	;more machinations	04700	LD	E,A		; and store for now
04020		AND	C		04710	INC	HL		;bump the pointer
04030		RRC			04720	CALL	SUB1		;get, mask, and convert
04040		RRC			04730	AND	0FH		;throw away top 4 bits
04050		RRC			04740	OR	E		;combine with 1st digit
04060		RRC			04750	INC	HL		;bump pointer
04070		CALL	INVERT		04760	POP	DE		;restore DE
04080		LD	A,0FH		04770	RET			
04090		AND	C		04780	:			
04100	INVERT	ADD	A,30H		04790	SUB1	LD A,(HL)		;get digit
04110		CP	3AH		04800	SUB	30H		;mask the ASCII
04120		JP	M,JPOVER		04810	CP	0AH		;check for A - F
04130		ADD	A,07H		04820	RET	C		; done if not
04140	JPOVER	LD	(HL),A		04830	SUB	07H		;else convert
04150		INC	HL		04840	RET			
04160		RET			04850	:			
04170	;				04860	*****			
04180	MOVEM	DEC	B	;count this one	04870	:			
04190		LD	A,B	;check count	04880	ERR	SET 6,A		;force short error msg
04200		OR	A	;done yet?	04890	JP	@ERROR		
04210		JR	Z,QUIT	; go if yes	04900	:			
04220		LD	A,20H	;else load up a space	04910	*****			
04230	AGAIN2	LD	(DE),A	; and store that	04920	:			
04240		INC	DE	;bump destination pointer	04930	GETGPC	- sub to check # grans per cylinder,		
04250		DJNZ	AGAIN2	; pad right with spaces	04940		taking into account Double sided drives		
04260	QUIT	INC	HL	;bump input pointer	04950	:			
04270		JP	EXT	; and check for extent	04960	GETGPC	CALL DCTBYT		;get nominal figure
04280	;				04970	PUSH	AF		; and save for now
04290	CR	INC	B	;bump counter	04980	LD	A,04		;double-sided byte
04300		INC	B	; twice	04990	CALL	DCTBYT		; and get it
04310	CR1	LD	A,20H	;load up a space	05000	BIT	5,A		;check dbl-sided bit
04320	AGAIN3	LD	(DE),A	; and store it	05010	JR	Z,CHKDON		;done if off
04330		INC	DE	;bump destination pointer	05020	POP	AF		;restore count
04340		DJNZ	AGAIN3	; pad right with spaces					
04350		JP	DOJOB2	;now go to work, hashing					
04360	;								

continued on page 45

HARDWARE REVIEW

MICROFAZER from QUADRAM CORPORATION

Bernie Herpin

Do you find yourself waiting at your keyboard while your printer is printing? I did. I use a lot of programs, such as a check writer, a ledger, and a word processor, in which I do a lot of printing. I would like to be able to go on and do something else while the printer prints.

I saw an advertisement for the Microfazer printer buffer offered by B. T. Enterprises of Bohemia, New York. As I use my TRS-80 for business applications, I decided to invest in a Microfazer. It is offered with several amounts of buffer memory, from 8K (\$159) to 64K (\$299). The standard configuration is parallel-to-parallel but serial-to-parallel and serial-to-serial options are also offered.

When my Microfazer arrived, I couldn't wait to try it out. The one thing the ad didn't tell me was that you need a separate power supply. The operation manual did tell me how to modify my Epson MX-100 printer so that it could supply the power. The other option is to run out to your local Radio Shack and buy an external power supply (\$6.95). This is the option that I chose.

The Microfazer mounts directly to the input of the Epson, using provided screws. The color is the same so it looks great. The printer cable connects to the side of the Microfazer, so there is no interference with paper feed. There is also a short extender cable available if you can't mate the Microfazer directly to your printer.

Now for the big test! I loaded up my Lazy Writer Word Processor and a six page document. With Lazy Writer, an assembly language program, you can see the print roll by on the screen as it goes to the printer. I told Lazy Writer to print the entire document. The print started rolling so fast that I couldn't see anything but a blur! The printer started printing and before you could say, "Holy quick print, Batman!" the entire document was in the printer buffer and the word processor was waiting for my next command! I mean this was the

ADD YOUR OWN LIBRARY COMMANDS TO LDOS

continued from page 44

```
05030 RLCA ;double it
05040 RET
05050 CHKDON POP AF ;restore count
05060 RET
05070 :
05080 ;*****
05090 :
05100 ; - Buffers and Messages
05110 :
05120 DDIRTRK DEFB 00H ;DIR cylinder number
05130 ENTSEC DEFB 00H ;DIR entry sector number
05140 DEC DEFB 00H ;temp storage for DEC
05150 HASHCD DEFW 0000H ;filename's hashcode
05160 INPUT DEFW 0000H ;address of filename
05170 ENTRB DEFW 0000H ;entry address in SBUF$
05180 ENTEND DEFW 0000H ;end-of-entry
05190 :
```

greatest thing since microchips! The document still took as long to print as before, of course, but I was able to go on with other things on the computer.

I tried it with a BASIC program. It appears that the buffer can take data faster than BASIC can write it. I was able to dump a five page ledger to the buffer in the time that it normally takes to print one page. So before the printer was finished with the first page, the program had finished writing to the buffer and again was asking "What next?" I was thrilled! It turns out I can even dump print to the buffer, turn off the computer and let the printer do its thing.

I wanted to see what the capacity of the 64K buffer really meant. I loaded a 29305-character BASIC data file into the word processor. I turned the printer's ON LINE switch to off, so the buffer would fill up without printing. I set up the word processor to print 72 characters per line and 62 lines per page. These are full lines of print. The buffer took 57.16 seconds to take all of the print, which was 8 pages. After all print was dumped, I again dumped the print. I was able to get another 8 pages of print plus a part of another page into the buffer before it filled up. This is more than most people would ever need to print at one time. "Not enough for me," you say? Well, you can "chain" Microfazers together for buffers of any size!

The Microfazer comes with a complete operation manual, although the operation is transparent to the user. This is a worth-while investment to anyone who does a lot of printing and finds that they are doing a lot of waiting while the printing is going on.

Bernie Herpin
Herco Computer Services
532 Potter Court
Colorado Springs, CO 80909 ■

```
05200 MSG1    DEFM    'File has been
overwritten, and is lost.',0AH,0DH
05210 ;
05220 MSG2    DEFM    0AH,0AH,'Searching for file.....',0DH
05230 ;
05240 MSG3    DEFM    0AH,'File has been unkillled -',0AH
05250         DEFM    'the GAT and HIT sectors have been
updated.',0DH
05260 ;
05270 FILENM  DEFM    '                      ;packed filename for HASH
05280 ENTRY    EQU     $                      ;start of available RAM
05290 ;
05300 END      START
```

Copies of this program are available on disk from the author for \$10.00

Bob Bowker
The Utility Company
11360 Sunset Blvd.
Los Angeles, CA 90049 ■

SOFTWARE REVIEW

DOSPLUS II by MICRO POWER, INC.

Alan Simpson and Jim Smithheisler

The announced package arrived—a bit later than was announced, but not bad for a large project. I had the week earlier run into something that I couldn't fix with my SUPERZAP. Needed was a program copy from an old (supplier's) disk for program modifications. Of course, the original operating system would not read the disk, else SUPERZAP would not have been tried. In all fairness to SUPERZAP, it was also on an old disk that had some read errors—maybe it too was not in original condition. At any rate, I needed to recover the only existing copy of the production program!

Flipping open the now familiar, rich looking brown manual I saw the system disk and five index tabs: DOS Operations, Library Commands, Utilities, DOSPLUS BASIC and a yellow TECH. Information. The next pages are the Table of Contents—alphabetized within each section, showing page number locations, but sadly missing an index.

At least the printed page format looks like a technical manual and not (like the owner's manual) a first grade primer format—when having to refer to THE BOOK I don't want candy, but meat! And there are nearly 400 pages of meat here for use. One more tab could have been used for the Editor/Assembler's 32 pages, but since it is located in the very back of the book, it is easy to find.

To comment on the entire manual would be redundant, but here are some features I do like. From DOS, lower case is supported—no more fumbling in disgust for the "CAPS" key at the lower left hand of the keyboard when a DOS command isn't accepted. BACKUP automatically does a FORMAT of a blank disk and doesn't copy unused areas from the source disk—saving my time! DATE and TIME questions can be disabled. Both have flexible formats: 11/12.82 is November 12, 1982 and 17-32 26 is 05:32:26 P.M. Sixteen devices are supported in a CP/M-like fashion for device independence. FROM and TO are supported in applicable command lines such as COPY, BACKUP, CONV(ert), etc., as are three wild-card characters. The screen may be printed on paper by pressing the CTRL (control) key and the - (minus) key simultaneously. A slash (/) followed by ENTER will execute the last used DOS command again—very handy when formatting a new box of disks, or looking at the directories of several disks in succession. Multiple commands on a line, separated by a semi-colon, are valid—meaning you may construct a kind of "keyboard DO file"; without having to wait for one operation to complete before typing the next command.

APPEND will concatenate data files, programs and even devices. A software write-protect (WP=Y) parameter is available to keep a customer from writing onto a specific disk. Decimal number values are assumed, but Hex, Binary and Octal are supported (by suffixing the value with the appropriate H/B/O letter). The FORMS command has a buffer set-size parameter for allocating part of memory as a printer buffer—good for slower printers. Setting BF=2000H can allow you to print a

short program listing while keyboarding continues.

Being well acquainted with DOSPLUS for the Model III on our 7.5 Meg VR DATA hard pack, with ease we began DOSPLUS II. Perusing the manual, we found two nice features: 1) Disk BASIC has the "labels" option (paragraph names to COBOL users); and 2) an Assembler (Z80) is in the package! Not bad for the advertised retail of \$249.95, especially when you also get full support of the Hard Disk hardware that is currently available for the Model II/16.

Pleasantly, we also discovered that although the manual does not state the ability to DELETE and INSERT (DI) (source-line-number, destination-line-number), or the DUPLICATE (DU) BASIC statements by keyboard command—these features are there—just as in the Model III version, and we were assured (next day via Ma Bell), that a letter to registered owners would be coming out to that effect. The call was made to find out about DISKZAP and how to get to the back side of a disk—the book says to use the format of drive number 0B for the back side, but that didn't work! Doubling the number of the desired track did work. Larry said they would fix the book.

First step was to insert the new system disk and wait for the "64K SYSTEM" and "INITIALIZING" messages to go away. They did—in about half the time of the supplier's system. Nice! I don't like to sit and wait while a computer gets ready to do something. Next step was to format an 8-inch (double sided) disk in our Model 16—we were getting right to the good stuff. All went without a hitch (as expected from our long-time satisfaction with Mod III DOSPLUS). After BACKUP, the FREE command showed way over 1 Meg of data space remaining on drive 1. We chuckled at that figure, and proceeded to CONV(ert) two subsequent disks of data onto our first working copy of the new system disk.

Very clearly stated in the manual is the capability to—get this one—CONV(ert) to AND from TRSDOS disks. Surely, we thought, they omitted the version restriction, but NOPE, it'll READ/WRITE, etc., to and from either of the two TRSDOS versions that we possess in-house! This gives an unprecedented flexibility between old and new systems. We can restructure BASIC programs with DU, DI and other goodies, CONV(ert) back to the 1.2 or 2.0 disk and GO!

With the lost program now recovered, Jim remarked with tongue in cheek that he "didn't like DOSPLUS III!" Whereas the DOSPLUS for the Model III had made that hardware more usable and reliable than the Model II, now he must admit that the Model II/16 can be the productive machine it should have been all along. All that it lacked, evidently, was an operating system that will make better use of the inherent capabilities of the hardware. Disk I/O now seems to be at least twice as fast as under the "other" system. No special patches are required for the thin-line drive operation (the 8-inch drives in the Mod 16 turn off whereas the Mod II drives

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THE HOME COMPUTER AND THE HANDICAPPED (UPDATE)

or

THE TECHNOLOGY E-X-P-L-O-S-I-O-N

Michael Herbert Shadick

The second half of the present century has seen an expansion—nay, an *explosion*—of technology eminently well-suited to the many able/disabled lifestyles. To cite only a few examples: recent developments in computer communications have, for the first time in all of human history, made it possible for individuals to be mentally, emotionally, and even spiritually mobile, without necessarily being *physically* mobile. Which is to say that today, people who are physically handicapped are rendered completely capable of *unhandicapping* themselves in many areas of their lives.

For example, take the area of vocational mobility. Thanks to the computer terminal and related technologies, career opportunities for many able/disabled individuals have become anything but terminal.

"I never thought a piece of electronics gear could give me a new lease on life," a paraplegic programmer recently shared with me, "but my home computer has done that—and more." Thanks to my friend's modem, he has managed to open up whole new communications and career vistas which he never dreamed existed. He's been playing electronic chess lately—with a gal way out in Wyoming. She links her TRS-80 with his Apple II by phone, and they help each other program their respective computers to make some mighty sophisticated moves. And, in the process, they are learning a lot about the game of chess, among others!

Home computery, of course, is a lot more than just fun and games to growing thousands of Americans, many able/disabled folks among them. "I'll never be able to get to work," a Baton Rouge, Louisiana quadriplegic recently told me, "so I bring my work into my home. It comes in by phone every day, I process it with the help of my Commodore PET, and it goes out the same day, in the same way."

So what precisely is this woman's work? No, she's not a computer programmer. What she is, is a proofreader. Seated at her specially adapted terminal, she punches up readouts of copy (text to be proofread for errors in spelling, grammar, and syntax before being set into type) on her PET's CRT screen. Any errors which she spots, she instantly corrects via a few slight movements of her left hand, which rests on a sophisticated hand control modeled after the special "stick" designed for the Space Shuttle astronauts. "My mobility and dexterity have both been severely limited for years," she explains, "but I've always been good with words. So, I let a few professional typesetters know about my wordy wisdom, and now I'm in command of thousands of words each day, quite literally. The pay isn't bad, either! But what if you don't happen to own a home computer, and you don't even know the first thing about one? Good news—if you're even a bit ambitious. For today, many computer-oriented firms are both willing and eager to train you—and then help you get set up on

your new down-home business! "Actually, the business part often comes before the actual on-the-job, in-the-home training," an instructor for the Minneapolis-based Control Data Institute (CDI) informed me. "You see," she explained, "our students receive a lot of hands-on training, keyboarding on the actual computer hardware they'll be using. And that means, of course, that they must have free access to the hardware and the software to run it. In the case of physically disabled and/or immobilized students, their home becomes their classroom, and eventually, their office."

The burgeoning variety of computer-based careers offering so-called cottage industry (read "at-home") potential, would boggle even a computer brain, and any technical training required is, not at all surprisingly, being offered by a growing number of institutions such as CDI. "No matter what a person's interest," a vocational/technical teacher told me recently, "we have a computer program to match it and complement it. From monitoring institutional food portion-control programs, to plotting and predicting the physical stresses on a projected bridge span, there is in fact very little work of an analytical or computational nature which cannot be conducted at a cottage computer terminal. The possibilities are literally as infinite as the imagination of the person at the console."

Yet what, you might well be wondering, about an able/disabled person with a certain artistic bent? What can the dawning age of home computery do for him or her? Plenty, seems to be the answer for tomorrow, and yet, more amazingly, even for today. The widening world of computer-generated graphic display arts, though still in its infancy, already promises to offer an unprecedented number of electronic avenues for one's creative drives. Take, for instance, the case of the sight-impaired young Philadelphian who also happens to be a computer graphic display artist. This would have been an impossible dream, were it not for a very exotic \$200 piece of computer hardware called a voice synthesizer.

My Philadelphia friend creates computer-generated graphics displays "for business and industry" (just like the sign says), all from the comfort of his high-rise (and now high-tech) apartment. "I got into the graphics end," he recently told me, "through an old shop class instructor from back in high school. She somehow sensed that I had an innate talent for drafting and layout, even though I had been unable, of course, to do either. Well, one day she asked me if I'd like to do drawings that move. I didn't know what she was talking about, until she punched up a modular shipping container graphic drawing on her CRT terminal, and then instructed the terminal's voice synthesizer to explain to me, in detail, what the graphic consisted of. By pushing a few keys, she could make the graphic rotate and be visible in all its dimensions, right there on

the screen. I couldn't see it, of course—at least, not with my eyes. But the synthesizer explained it in, well, graphic detail. And that, in turn, enabled me to make changes and improvements in the design, and to eventually come up with totally new designs of my own. Believe me, all this makes Star Wars seem like kid stuff!"

My friend quickly discovered that his long-frustrated artistic bent had finally found a dynamic means of expression. Today, he is heavily (and happily!) involved in working on a structural design project for a major west coast architectural firm. The fact that my friend has never met his employers face to face seems to bother neither him nor them. "We communicate every day," he explained. "Or, to put it more graphically, our computers do."

Which brings us, interestingly enough, to a subject which is particularly near and dear to my own heart. I'm referring to the allegedly *impersonal* nature of computers. It is claimed by some (although I strongly suspect that they are speaking from a point of unfamiliarity on the matter) that to work at and to thus interact with a computer, is somehow cold, impersonal, and even (shudder!) dehumanizing.

Quite the opposite of any of the above, the act of creatively interfacing with a computer is in fact one of the most distinctly *human* experiences available to us mere mortals. For, inherent in the very act of programming and/or operating a computer, is the absolute necessity of calling upon every mentally creative resource at the programmer/operator's disposal. He or she, you see, is thus quite far from a passive pawn in the process. Rather, he/she is the computer's very *senses*, if you will. For computers can do no more than apply whatever specific logic is programmed into them. As a programmer acquaintance of mine put it, "if you feed crap in, you get crap out." In other, perhaps more genteel terminology, computers in general call upon the very *highest* levels of human cognitive potential. It's not, as they say, a part-time game.

Now, what if you yourself haven't even the slightest inkling of how a computer works, much less the know-how to make it work for you? "Some people seem to have a natural predilection or predisposition towards them," was the recent observation of a psychiatric aide associate of mine, who just happens to be into computer analysis. "For the folks who are for some reason fearful of them, I'd say they should stay away," he advises. "But for someone who is even the least bit curious about computers, and who would like to find out what they can and cannot do, my advice is to get involved. There's much, indeed, to be said for going in on the ground level of such a growing cottage-industry."

His words are not to be taken lightly—unless, of course, you should choose to take the entire computer age lightly. Admittedly, those "digital demons" are not for everyone. But maybe, just maybe, one of them has your name on it. Why, it might even help you become very much at home in, and *in control of*, a whole new career. And that, my friend, computes!

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POCKET COMPUTER CORNER

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If you are making changes to the program and need to change the menu's sort instructions, be sure to change line 4 and line 6 so they have the correct first letter.

Lines 10 and 11 are used to add items to the list. The prompts in line 10 may have to be changed if you are working with a credit card list instead of a home inventory list. Keep the size of your prompts as small as possible so you do not use an excessive amount of memory.

Lines 20-23 are the lines which delete data from the list. Line 20 has a default procedure built-in just in case you select this option by error. If you need just a little more memory, the default question /0 and the IF statements could be removed from this line without affecting anything other than this error trapping activity.

Lines 30-38 are the sorting routine. This code sorts both the value and date information. Removal of lines 30-38 would increase the capacity of the system if sorting could be eliminated.

Lines 40-42 print the output of both display and printer. Line 40 contains the headings to be used. If you are using serial numbers rather than dates, this is one place you will have to make a change.

PROGRAM LISTING

```

1:INPUT "ADD DEL PRT TIME VAL?";A$
2:IF A$="A" THEN 10
3:IF A$="D" THEN 20
4:IF A$="V" THEN 30
5:IF A$="P" THEN 40
6:IF A$ ="T" THEN 30
7:GOTO 1

10:B=B+1:C=3B+7:INPUT "ITEM?";A$(C):C=C+1:INPUT "VALUE?";
    A(C):C=C+1:INPUT "DATE?";A(C):GOTO 10
11:B=B-1:GOTO 1

20:INPUT "DELETE #/0?";A:IF A=0 THEN 1
22:FOR C=A TO B-1:D=3C+7:E=D+3:A$(D)=A$(E):D=D+1:E=D+3:
    A(D)=A(E):D=D+1:E=D+3:A(D)=A(E)
23:NEXT C:B=B-1:GOTO 1

30:FOR H=1 TO B:FOR E=1 TO B-1:D=3E+8:F=D+3
31:IF A$="T" LET D=D+1:F=F+1
32:IF A(D)<=A(F) THEN 37
33:IF A$="T" LET D=D-1:F=F-1
34:D=D-1:F=F-1:G$=A(F):A$(F)=A$(D):A$(D)=G$:D=D+1:F=D+3
35:G=A(F):A(F)=A(D):A(D)=G:D=D+1:F=D+3
36:G=A(F):A(F)=A(D):A(D)=G
37:NEXT E:NEXT H
38:GOTO 1

40:PRINT "NO ITEM VALUE DATE"
41:FOR F=1 TO B:D=3F+7:G=D+1:PRINT F;" ";A$(D);";";A(G):PRINT
    A(D+2):NEXT F
42:GOTO 1

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HELP! MY PROGRAM'S TOO BIG FOR MY COMPUTER!

Michael Barlow

What do you do when your program is too large for the memory in your computer? Many of us have gone through the agony of getting trapped by a long "garbage collection" as the string allocations are re-organized. Probably everyone has then spent a fruitless hour or so trying to balance off the size of the CLEAR statement against the garbage collection time, or even the program execution time, and not succeeded in doing much else than get an OUT OF MEMORY message. If your computer does not have its full capacity of memory, a few bucks will cure the problem—until you write longer programs and repeat the process. What do you do when all the hardware is installed, and still you haven't enough room to run your program? There are, of course, several programming techniques you can use to reduce the length of your program, such as string-packing, line numbering by ones, opening the minimum number of buffers, and so on. We will assume you have tried all these, and still the program is too long. Assuming you wish to remain in BASIC, there are several possibilities:

- 1) Compress the code
- 2) Use a smaller DOS
- 3) Break up the program into shorter, individual programs
- 4) Break up the program into sections which can be merged and deleted

COMPRESSING THE CODE

All full-sized DOS systems have something equivalent to CMD"C" in NEWDOS. This feature deletes all spaces and comments from the program, thus compacting it, but also making it difficult to understand unless it is separately documented. I usually save the main (commented) program under development as NAME/DOC (for "documented"), and then issue CMD"C". Nothing happens on the screen, and the disk drives will stop, but don't touch anything yet. A longish program will take ten or fifteen seconds to compress, at the end of which a READY prompt is displayed. Now save this as NAME without the /DOC, and make sure this is the one that is actually RUN. It is quite surprising how many bytes can be saved by this method, even if you think you have written unspaced code and used a minimum of comments to make a pretty listing. One of my programs of 18K length compresses to 16K, and I'll swear there's not an ounce of fat in it!

What are the problems, if any? None that will affect the user, but several that may give you trouble during program development or debugging. First, the deletion of comments is ruthless, so you will lose your first line giving the program name, date and version number, and all the little start-up instructions you put in after the REM symbol. This makes it tricky to keep track of which version you are using. You will also have to watch out for commented parameter changes; if you use two different lines of data for different printer types, say, and the unused line is "REMarked out," then the unused statement will disappear from the RUN version.

Second, you must pay special attention when you want to edit the program. You must edit both versions equally, and the safest way of doing this is to reload the /DOC version every time, and then go the CMD"C"

route again. However, sooner or later you will goof and overwrite the commented version with the compressed version. Be warned, and always have a back-up copy of the /DOC program—I name mine NAMES/DOC. Get into the habit of always checking the first line of the program before you SAVE. If you can't see the version number or date, DON'T DO IT!

USING A SMALLER OPERATING SYSTEM

Another way of getting more room for your program is to reduce the space occupied by the operating system. Boot your favorite DOS, enter BASIC, and then PRINT MEM. On my 48K double-density Model I, NEWDOS reads 36692 bytes available. DOSPLUS 3.3 gives 37448, and TBASIC (which is a stripped-down DOSPLUS BASIC) gives 40051. Naturally, these numbers reflect the abilities of the various systems—you won't be able to do exotic programming steps with TBASIC, for instance. However, some of the more advanced features of the BASICs may only be required to assist you in developing or debugging the program, and can perhaps be omitted from the RUN version. The NEWDOS manual indicates 7 system files that can be eliminated if you can afford to do without certain features. This would give an extra 8960 bytes if all systems were resident at the same time, but in fact they are not. One of the reasons for the heavy diskette usage with NEWDOS/80 is the fact that the various System "modules" are called in and deleted as necessary, so that utilizing a reduced system will not necessarily reduce the memory requirement at all, although it will of course give you more space on your system diskette.

Another snag with using a reduced system is that it is not possible (at least with NEWDOS) to copy a missing System module should you need to use it—you have to copy the entire System at once. There is no possibility of killing a system module in memory, but leaving it on the disk for further use. Add to that the fact that you will surely forget that this disk has a reduced system, and you are laying yourself open to a lot of bad language and frustration!

On the whole, using a reduced DOS is not going to help much with our problem.

USING INDIVIDUAL SHORTER PROGRAMS

Your program can probably be broken out into several sections which can run independently. For instance, if you are entering or updating data, you may not need the printing routine until later. There are at least two ways of handling this—by chaining programs, or by simply calling each program from a "control" or menu program.

Chaining is a neat way of getting from program to program, but is really a "menu" system in disguise. It is fine for programs that are required in sequence, but is not so flexible if you need to jump about amongst the programs. There is also a different syntax and different operating codes to be remembered, and if you need to carry variables between programs you will have to load a "transfer" file or POKE memory positions that will not be over-written.

Using a menu program is more flexible. As each selection is made, the relevant program RUNs, and when finished, each has the statement RUN"MENU". Apart from the need to load and run the MENU between each change, there are no restrictions on the order of use. In practice we use the RUN,V options of NEWDOS and DOSPLUS. These commands do not set the variables to zero, nor is the CLEAR statement affected. There is therefore no problem to retaining variables between the various programs—a real godsend for such things as dates, filenames, array sizes and so on.

The disadvantage of utilizing separate individual programs is that each must contain all the housekeeping routines. These include the data entry procedures, file handling procedures, printer control routines if required, error traps, and so on. Using RUN,V the MENU program can contain the initialization routines such as definitions, dimension, date and time inputs, and so on, so that these need not be repeated for each individual program. Nevertheless, the "overhead" required for each program may be quite substantial; my own programs never seem to be less than 12 bytes (about 15K) in length.

The great advantage of the separate programs is that they can indeed be run separately. They can therefore be modified independently, and can have totally different organizations and line numbers. NEWDOS has the very useful ERASE and KEEP commands which enable you to redimension arrays or delete them entirely, to delete or keep any variable, and also to resize the CLEAR statement with CMD"F=SASZ" at any time.

MERGING AND DELETING

Although all BASICs have the ability to merge other programs, only NEWDOS can do this dynamically from program statements, and without losing variables. NEWDOS can also delete dynamically, and so we have a way of breaking down a large program into smaller segments, without requiring the overhead of housekeeping routines being repeated. The arrangement still uses a menu, but instead of a RUN,V statement, we now have a MERGE"SEGNAME" command. the segment "SEGNAME" now loads—and not having the housekeeping overhead, it will load more quickly—and is now activated as if it were part of the original menu program. When the use of "SEGNAME" is finished, it is deleted from memory, and the program returns to the menu. This is such a powerful technique that a few details of the syntax may be useful.

First, it is advisable to keep each segment with line numbers that are not duplicated in the main program or in any other segment. Otherwise you will have trouble identifying spurious lines left over after a merge. Next, each MERGE should be preceded by a DELETE of the relevant line numbers. Deleting an already deleted block does not cause an error, but trying to merge on top of existing lines does. The merge and delete commands must also be the last statements on a line, and must be followed by the next line where execution

is to continue. (There are some additional minor constraints mentioned in the manual.) The coding to merge and delete the segment "LPRINT/BAS" is thus:

```
100 REM PART OF MENU
110 PRINT"SELECT PRINTOUT":
120 CMD"F",DELETE 3000-3500
130 MERGE"LPRINT/BAS"
140 GOTO 3010
.....
3000 REM LPRINT/BAS SEGMENT VERSION 2 DATED XX/YY/ZZ
3010 CLS:PRINT"DO YOU WISH TO PRINT? (Y/N):";LINEINPUT Q$
3020 IF Q$="N" THEN 3510
.....
3510 CMD"F",DELETE 3000-3500
3520 GOTO 100
```

If it is really that simple (it usually is with NEWDOS, if you can get past the manual!) are there any problems? Only that you need to have your wits about you when editing the programs. Since you need the MENU program to run the merged section, you are likely to be in the merged condition when you edit a line. Sooner or later you will SAVE to the segment name—and fetch up with the whole program filed there. This is no real problem, as you can delete and save again, but the best method is always to load the segment before editing, and to check the first line before saving.

More of a problem is renumbering, or making lists of variables, etc. You must have all the segments merged (even if the system won't run) or you may miss some vital cross-reference. Again this isn't disastrous, but it does mean you may have to recheck the operation of the whole program. One final point—the error trap is cancelled each time you MERGE, so it must be re-established as required.

CONCLUSION

Of the four methods listed above, the code compression method will probably not give you enough room. I have used the multiple-program method with a timesheet program which updated Job files and Leave files; we found that the operation, even with a speed-up kit, was too slow as each program loaded itself in turn. We also ran out of space on the disks. The merge-delete method was used for a program that prepares transmission schedules for a television station. All the programs together totalled 54K bytes, of which the menu program was 21K. Out of this, 2.3K consisted of comments, eliminated from the RUN version. Individual segments ranged from 2K to 6K, thus leaving plenty of working space in memory.

Utilizing this last method does require you to use NEWDOS, but anyone who tries to develop programs with any other DOS is making life unnecessarily hard for himself anyway.

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COBOL PRIMER #1

Hubbard C. Goodrich

Have you had dreams of learning COBOL but been frightened by the cost of classes, the incompatability between the large and small computers, or the complexity of the manuals accompanying the compilers? If so, and you would like to give it a try at home with your TRS-80, this is for you.

COBOL is one of the major computer languages. Historically, it has been used primarily in business or non-math/science applications. Unlike BASIC, it is a compiled language and, therefore, quite fast. Until recently, COBOL was not available for microcomputers, but since 1980, at least three have come on the market. All have manuals which are not appropriate for the beginner. (And Ryan McFarland does not respond to written quires, apparently.)

The purpose of this article and the ones to follow is to provide the beginner with a COBOL tutorial for RSCOBOL (RMCOBOL-Ryan McFarland Corp.) 1.3B which is licensed to Tandy Corporation. These lessons will be designed for those of you who wish to start at home the process of learning COBOL for its own sake or for later transfer to other machines.

The method to be used will be based on the idea of "learning by doing" with very limited theoretical or descriptive exposition. I feel that there is little need to duplicate the explanations already abundantly available in your local library or bookstore. What seems to be lacking is how these texts apply to your TRS-80. (It took me two weeks, for example, of daily trial-and-error effort to discover how to load my first COBOL data file.) My wish is to help you overcome some of the growing pains and introductory frustrations with the language and the RSCOBOL manuals. It is strongly recommended, however, that you have at least one general text on COBOL to which you can refer for the theory and fuller explanations of the material to be covered here. (At least the text will have an index which is sorely lacking in the manuals.) I will provide you with the programs that will get you started. Once you have become familiar with RSCOBOL, you can revise the programs listed in the texts. (Three suggested texts are given at the end.)

In order to follow these tutorials, you must have the following:

- (1) Three RSCOBOL Manuals:
 - (a) Cobol User's Guide (RUNCOBOL & DEBUG)—CUG
 - (b) Credit Source Program Editor—page references will not be given for CREDIT, as this manual is quite clear
 - (c) RSCOBOL Language Reference Manual—CRM
- (2) Programs on disk (see CUG p32)
- (and strongly recommended)
 - (3) a General COBOL text
 - (4) a printer
 - (5) and a major slug of patience

EDIT is used to enter and edit all source code. It has many similarities to the Edit commands found in EDTASM and BASIC and some very powerful commands, as we shall discover.

RSCOBOL is used to compile your "source" code into

the "object" code (ie. to rewrite the program you have developed into code the computer will actually "run"). After compilation, you will have two programs on your disk: the orginally written unchanged source code and the machine operational object code. The source code can be modified or edited and then recompiled at any time.

RUNCOBOL is used to actually call and run the compiled object code that has been created by RSCOBOL.

DEBUG is part of your systems package but will not be covered these tutorials.

Each tutorial of this series will introduce one or more of the operational activities in each of the initial programs.

First, COBOL is column oriented (see LRM p20). The first six columns are used for line numbers. Column 7 has special functions but for now we will leave it blank. Columns 8-11 are called area "A" and columns 12-72 are called area "B." Do not be too concerned with these distinctions for the time being. They should become clear as we progress.

Second, all COBOL programs must have 4 Divisions which start in area "A" (usually column #8)(CRM p24). Each Division has a particular function to play. After each Division, other material may be added.

For this first tutorial, we will concentrate on getting you started and present only the minimal amount of COBOL required to accomplish something. As I go along, I shall refer you to page numbers in one or the other of the three manuals listed above.

It is assumed that you have successfully read the appropriate directions for your TRS-80 Model and made backups of the systems disk. I tape the notch on mine so that all COBOL source and object code is written to a formatted disk in drive #1. You may write your programs to any drive you wish, or course.

Let's get started:

Step 1 : Load your COBOL + TRSDOS disk.

Step 2 : At <READY>, Type CEDIT and press <ENTER>

(The screen will display "TRS-80 Cobol Editor ver 1.0" etc.)

Step 3 : Type "I" for I(nsert) and <ENTER>

(The screen will display 000100 which fills the first 6 columns. Thereafter, everytime you press <ENTER>, the number will increment by 10—an AUTOMATIC numbering system.)

Step 4 : Press the right arrow key to tab to column #8 (or you may press the space bar to move right one space but it is strongly suggested that the tap key be used to maintain proper alignment. The left arrow key may be used to erase/backspace.)

Step 5 : Enter the following program. Be sure to enter the spaces and the end punctuation. The tab key (right arrow) will be a great help to line things up.

000100 IDENTIFICATION DIVISION.

000110 PROGRAM-ID.

000120 PROGRAM1.

000130 ENVIRONMENT DIVISION.

000140 CONFIGURATION SECTION.
000150 SOURCE-COMPUTER.
000160 RSC.
000170 OBJECT-COMPUTER.
000180 TRS-80.
000190 DATA DIVISION.
000200 PROCEDURE DIVISION.
000210 START-IT.
000220 DISPLAY "THIS IS A TEST OF THE COBOL".
000230 DISPLAY "SCREEN PRINT. THIS MESSAGE".
000240 DISPLAY "WILL BE DISPLAYED ON THE CRT.". .
000250 STOP RUN.

Step 6 : Press <BREAK> to leave the Insert mode.

COMMENTARY:

Line 100: (CRM p24,28,270,250) Required.
Line 110-120: (CRM p24,28,279) Required. The program name must contain at least one letter and be no more than 8 characters long.

Line 130: (CRM p24,31,271) Required.

Line 140: (CRM p24,31,32,271) Required.

Line 150-180: (CRM p32-33,271) Required. Identifies the computers to be used. The names may be freely chosen, are commentary and have no effect on the operation of the program.

Line 190: (CRM p46,275) Required.

Line 200: (CRM p102,278) Required.

Line 210: (CRM p21,24) Paragraph name Required. Under the Procedure Division, each sub-division is divided into "Paragraphs" which are similar to subroutines. The name chosen must be unique and must not be a reserved word (CRM 238-41). START is a reserved word. Hyphenation changes it sufficiently to make it unique. It may be up to 30 characters long (CRM p11-13). (One of the advantages of COBOL is that names can be very descriptive, so that the programs may become self-documenting. MOVE 15 to TAX-RATE is easier to follow than LET TR=15.)

Line 220-230: (CRM p158, CUG p28) DISPLAY is the first of the COBOL key words. These are statements or COBOL "verbs" and must start in column B (columns 12-72).

****The COBOL verb "DISPLAY" is similar to the BASIC command instruction "PRINT." The words between quotation marks or the values of a variable are displayed on the screen. A period must follow the last quote.

Line 240: (CRM p217,286) The second key expression.

****Logically enough, STOP RUN is similar to END in BASIC.

After entering the program from CEDIT, you may review your work by using the Up and Down arrow keys. Especially check for errors of spelling, spacing and the terminal period. If you find an error, you may Edit it with the subcommands which are almost identical to those found in Level II & III BASIC. If you forgot a line or two, press "I" and the line number just before the one left out. The next line number will appear and you may enter the desired material. Press <BREAK> to leave Insert. The program will renumber itself as you insert lines anywhere in the program.

If at any time you press the wrong key and don't know what to do, press <BREAK> to start over.

Step 7 : When you are sure everything looks correct, press "W" for W(rite) and the name of the program (eg. W PROGRAM1/CBL:1) <ENTER>

The /CBL is the extension for your source program.

The :1 is the disk drive number. Both of these may be ignored if you so wish but it is helpful to keep track of what you have when you list your directory at a later time.

Step 8 : When the program has been W(ritten) to your disk, press "Q" for Q(uit) and you will leave CEDIT and return to TRSDOS READY mode.

Step 9 : Now, from TRSDOS READY mode, type the following:

RSCOBOL PROGRAM1/CBL:1 (T) (CUG p.2,4)

The "T" stands for T(ube) or CRT so that as the compiler is working, your source code and the accompanying errors will be displayed (CUG p.4). You may leave the (T) out and nothing will be displayed while the program is compiled; or if you have a printer, you may use Print) (CUG p.4) to send the source program and the errors to the printer. This last is especially helpful for longer programs. I have yet to write a program completely free of errors. Even one forgotten period can create all sorts of error messages throughout the program and trying to keep track of errors as they flit past on the screen can be adventuresome. Hard copies will help, but they are not necessary every time you compile your program.

If you have error messages, compare your program with the copy above. Type CEDIT again. Then L(oad) PROGRAM1/CBL:1; and then press <ENTER>. Edit the program and re-compile.

Step 10: When everything is correct and the source code is saved to disk, enter the following from TRSDOS Ready mode:

RUNCOBOL PROGRAM1/COB:1
and the following message should be displayed on the screen: (CUG p16) TRS-80 MODEL I/III COBOL COMPILER (RMCOBOL) version 1.3B; COPYRIGHT 1981 by Ryan-McFarland Corp.
The /COB is the extension added by the compiler to your object code to distinguish it from your /CBL source code.

This has been our first lesson. We have partially covered the four required Divisions, the Program-ID, the Configuration Section and the Procedure Division (where all the action takes place). We have used two COBOL expressions DISPLAY and STOP RUN. We also used the CEDIT one letter commands I,L,Q & W. Finally, we have compiled and run our first program using T or P switches. That is quite a bit for our first lesson.

Next month, I will continue with a few more expressions and words. Until then, I recommend first, that you reread the manuals (and a COBOL text if you have one) especially in the areas we have covered here, and second that you go back and re-enter the same program but with a different message for practice.

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CHINESE ZODIAC

Carl T. Petersen

On January 25, 1982 the Chinese year of the Dog (4680) started, and it will be followed in 1983 by the year of the Boar. The Chinese Zodiac repeats every 12 years, and, according to their belief, a person's characteristics are by the sign under which he or she was born. As the Chinese new year begins on different dates each year, in January or February, lines 90 and 110 would require changing to reflect the new yearly date.

Lines 150-260 break down the year of birth entered, since only one of the lines will be true. The data lines 520-630 give the matrix used to determine how well a mate selection will be. Line 130 is used to convert to the Chinese new year.

When grading your spouse, don't take the program too seriously, as it is primarily for fun—but the Chinese have used the zodiac for thousands of years!

```
10' PROGRAM NAME : CHINESE/ZOD
20'
30' THE CHINESE NEW YEAR FOR 1982 STARTS ON 25 JANUARY
40'     LINES 90 AND 120 TO BE CHANGED EACH YEAR
50'
60 CLS:CLEAR 100
70 DIM S(12,12),N$(12)
80 INPUT "WHAT MONTH WERE YOU BORN IN (1-12) ";M
90 IF M>1 GOTO 110
100 INPUT "WHAT DAY OF THE MONTH (1-31)      ";D
110 INPUT "WHAT YEAR (1928, 1945 ETC.)      ";Y
120 IF D>0 AND D<25 THEN Y=Y-1
130 CY=Y+2698
140 CLS
150 IF (Y-4)/12=INT((Y-4)/12) GOSUB 700:V=1:PRINT "RAT";
160 IF (Y-5)/12=INT((Y-5)/12) GOSUB 700:V=2:PRINT "OX";
170 IF (Y-6)/12=INT((Y-6)/12) GOSUB 700:V=3:PRINT "TIGER";
180 IF (Y-7)/12=INT((Y-7)/12) GOSUB 700:V=4:PRINT "RABBIT";
190 IF (Y-8)/12=INT((Y-8)/12) GOSUB 700:V=5:PRINT "DRAGON";
200 IF (Y-9)/12=INT((Y-9)/12) GOSUB 700:V=6:PRINT "SNAKE";
210 IF (Y-10)/12=INT((Y-10)/12) GOSUB 700:V=7:PRINT "HORSE";
220 IF (Y-11)/12=INT((Y-11)/12) GOSUB 700:V=8:PRINT "SHEEP";
230 IF (Y-12)/12=INT((Y-12)/12) GOSUB 700:V=9:PRINT "MONKEY";
240 IF (Y-13)/12=INT((Y-13)/12) GOSUB 700:V=10:PRINT "ROOSTER";
250 IF (Y-14)/12=INT((Y-14)/12) GOSUB 700:V=11:PRINT "DOG";
260 IF (Y-15)/12=INT((Y-15)/12) GOSUB 700:V=12:PRINT "BOAR";
270 PRINT ". THE YEAR OF";CY
280 IF V=1 PRINT "YOU ARE CHARMING, SOCIABLE AND GENEROUS."
290 IF V=2 PRINT "YOU ARE HARDWORKING, BORN LEADER,
PRACTICAL AND DOWN TO EARTH."
300 IF V=3 PRINT "YOU ARE COURAGEOUS, SPONTANEOUS AND
PASSIONATE."
310 IF V=4 PRINT "YOU ARE GRACIOUS, SOFT-SPOKEN AND HAVE GOOD
TASTE."
320 IF V=5 PRINT "YOU ARE ENERGETIC, ENTHUSIASTIC, AND
SENTIMENTAL."
330 IF V=6 PRINT "YOU ARE WISE, GRACEFUL, EXCELLENT INTUITION
AND MAYBE PSYCHIC."
340 IF V=7 PRINT "YOU ARE CHEERFUL, ENTERTAINING, AND QUICK-
WITTED."
350 IF V=8 PRINT "YOU ARE GENTLE, SWEET-NATURED, AND CREATIVE."
360 IF V=9 PRINT "YOU ARE INTELLEGENT, WITTY, AND FUN-LOVING."
370 IF V=10 PRINT "YOU ARE BRIGHT, VIVACIOUS, AND HAVE
BOUNDLESS ENERGY."
380 IF V=11 PRINT "YOU ARE FORTHRIGHT, IDEALISTIC, AND
```

```
TRUSTWORTHY."
390 IF V=12 PRINT "YOU ARE GIVING, SINCERE, AND HAVE A TRUSTING
GOOD NATURE."
400 PRINT STRING$(63,"=")
410 FOR R=1 TO 12:FOR C=1 TO 12:READ S(R,C):NEXT C,R
420 FOR N=1 TO 12:READ N$(N):NEXT
430 J=1
440 FOR C=1 TO 12
450 PRINT "A MATE THAT IS A ";N$(J);TAB(34)"WOULD BE ";
460 IF S(V,C)=1 PRINT "AN EXCELLENT CHOICE."
470 IF S(V,C)=2 PRINT "A GOOD CHOICE."
480 IF S(V,C)=3 PRINT "A FAIR CHOICE."
490 IF S(V,C)=4 PRINT "A POOR CHOICE."
500 FOR T=1 TO 200:NEXT:J=J+1
510 NEXT C
520 DATA 2,1,3,4,1,3,4,4,1,3,2,2
530 DATA 1,1,4,2,3,1,4,4,2,1,3,3
540 DATA 2,4,2,3,1,3,1,2,4,2,1,1
550 DATA 3,2,4,1,3,2,2,1,2,4,1,1
560 DATA 1,3,1,3,1,2,2,3,1,1,4,3
570 DATA 2,1,4,2,1,2,3,2,3,1,2,4
580 DATA 3,4,1,3,2,3,2,1,3,2,1,4
590 DATA 4,4,2,1,3,2,1,2,2,3,4,1
600 DATA 1,4,4,3,1,3,3,2,2,1,2,2
610 DATA 2,1,2,4,1,1,2,3,2,4,3,3
620 DATA 2,3,1,1,4,2,1,4,2,3,2,2
630 DATA 2,3,1,1,2,4,1,1,2,3,2,3
640 DATA RAT,OX,TIGER,RABBIT,DRAGON,SNAKE
650 DATA HORSE,SHEEP,MONKEY,ROOSTER,DOG,BOAR
660 FOR T=1 TO 1000:NEXT
670 PRINT TAB(15)"RE-RUN PROGRAM <YES OR NO> ";:INPUT Q$
680 IF LEFT$(Q$,1)="Y" CLS:GOTO 60
690 CLS:END
700 PRINT "YOU WERE BORN UNDER THE SIGN OF THE ";:RETURN
```

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PRACTICAL BUSINESS PROGRAMS

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SUMMARY

The TRIAL program reviewed is the last program in group 2. The program is designed to aid in the search for errors. Errors will be made by even the best of us. A trial balance program is needed whenever an error occurs.

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PUTTING THE "POKES" ON THE LINE PRINTER VII

William O'Connell

The TRS-80 Model III has a number of special characters which may be made to appear on the video display by POKEing values to the Video RAM (addresses 15360 to 16383). A table included in Appendix C of the Model III Operation Manual supplies the necessary values (0 - 31 and 192 - 255), and diagrams each graphic in an 8 by 8 matrix.

Thus, the command: POKE 16000, 193 will cause a Heart to appear in the left-hand margin of the screen.

The Line Printer VII (Radio Shack catalog # 26-1167) is a dot-matrix printer with addressable dots. After entering the graphics mode, via a software command, each individual dot or dot-combination in a 7-dot-high column may be printed.

The key to graphics operation on the Line Printer VII is to command it: LPRINT CHR\$(18);CHR\$(n). The CHR\$(18) causes the printer to enter the graphics mode, and "n" has a value from 128 to 255 to define a vertical dot pattern.

By concatenating string characters, a graphic character comparable to the Model III POKE-character may be printed.

For example, this short program:

```
10 A$=CHR$(140)+CHR$(158)+CHR$(190)+CHR$(252)+CHR$(190)+  
    CHR$(158)+CHR$(140)  
15 LPRINT CHR$(18);A$
```

will make the Line Printer VII print a Heart character similar to the one created on-screen by POKE 16000, 193.

The accompanying table presents seven values for each special graphic character, followed by an example of the printed character defined by those values. These values may be used in a program step to define a string, as in the example above, or may be stored as data to be read into string-defining program steps to print graphics.

CHR\$(128) is a single blank column, and it may be necessary to insert two or three of these characters to separate the printed graphics. Wherever possible, a value of 128 is used in the table to begin or end a single character, and provide a bit of spacing.

To meet the 7-dot-high limitation of the printer, the Appendix's POKE characters must be modified to fit a 7 by 7 matrix. In most cases this limitation is not a problem, but in a few cases, the POKE graphic character must be modified substantially.

The most notable modification is to character # 252 which appears on the screen as a question mark on a reverse-field. For the sake of printed clarity, this character has been changed to a question mark on a normal field.

Another minor modification appears in characters # 253 and 254. On the screen, the "man" and "woman" have their "arms" lowered, but printer-clarity demands that they raise their "arms" to a horizontal position.

Characters # 244, 245 and 246, when printed together, draw a hand pointing to the right. By reversing the values listed for each of these characters, and printing them in the order: 246, 245, 244, one may reverse the hand to point towards the left (see Fig. 1).



Fig. 1. (a) shows the hand in its normal position, and (b) shows it reversed as described in the text.

Use of this table will double the number of characters available to you on the Line Printer VII, and save you the hours of computation necessary to define these special graphics characters.

You may also wish to try changing some values to create your own special graphic characters.

In either case, you now have a way to "POKE" each special character onto "hard copy" for whatever reason you wish.

CHARACTER # 1							
200	200	254	201	201	162	128	£
CHARACTER # 2							
128	128	128	255	128	128	128	1
CHARACTER # 3							
184	212	212	214	213	152	128	€
CHARACTER # 4							
188	193	192	192	193	188	128	Ü
CHARACTER # 5							
240	170	165	170	240	128	128	À
CHARACTER # 6							
136	136	136	136	136	184	128	¬
CHARACTER # 7							
128	184	197	196	197	184	128	§
CHARACTER # 8							
192	190	209	201	197	190	129	Ø
CHARACTER # 9							
188	192	193	194	160	252	128	Ü
CHARACTER # 10							
130	249	145	138	138	241	128	¾
CHARACTER # 11							
128	128	128	129	130	132	128	¬
CHARACTER # 12							
160	213	213	213	184	192	128	§
CHARACTER # 13							
254	147	147	179	205	129	128	®
CHARACTER # 14							
240	169	164	169	240	128	128	À
CHARACTER # 15							
242	169	165	170	242	129	128	¾
CHARACTER # 16							
130	253	137	146	162	253	128	¬
CHARACTER # 17							
128	184	198	196	198	184	128	§
CHARACTER # 18							
192	188	176	201	166	158	129	Ø
CHARACTER # 19							
178	201	201	202	202	177	128	¾

CHARACTER # 20 192 255 201	201 201 182 128 B	CHARACTER # 209 255 136 148	162 192 160 128 K
CHARACTER # 21 186 193 192	192 161 252 128 U	CHARACTER # 210 192 161 158	144 160 192 128 X
CHARACTER # 22 130 177 201	202 178 129 128 Z	CHARACTER # 211 128 255 144	144 143 144 128 M
CHARACTER # 23 128 178 201	255 201 166 128 E	CHARACTER # 212 128 132 252	160 144 140 128 V
CHARACTER # 24 160 213 212	213 184 192 128 A	CHARACTER # 213 128 138 149	213 209 160 128 S
CHARACTER # 25 160 213 214	212 184 192 128 A	CHARACTER # 214 152 164 194	194 164 152 128 O
CHARACTER # 26 160 212 213	212 184 192 128 A	CHARACTER # 215 132 130 190	130 190 130 128 T
CHARACTER # 27 142 213 213	213 213 184 128 S	CHARACTER # 216 128 252 146	146 140 128 128 P
CHARACTER # 28 128 252 212	214 213 212 128 M	CHARACTER # 217 152 164 164	156 132 132 128 C
CHARACTER # 29 252 146 147	254 202 128 128 R	CHARACTER # 218 136 132 132	252 132 132 128 T
CHARACTER # 30 128 142 209	177 145 128 128 F	CHARACTER # 219 132 188 192	192 186 130 128 U
CHARACTER # 31 136 132 132	136 136 132 128 ~	CHARACTER # 220 128 156 162	255 162 156 128 D
CHARACTER # 192 136 156 142	255 142 156 136 ♦	CHARACTER # 221 132 196 168	144 168 196 192 X
CHARACTER # 193 140 158 190	252 190 158 140 ♥	CHARACTER # 222 129 134 136	255 136 134 128 Y
CHARACTER # 194 136 156 190	255 190 156 136 ♦	CHARACTER # 223 184 196 192	176 192 196 184 W
CHARACTER # 195 156 156 139	255 139 156 156 ♦	CHARACTER # 224 220 242 129	129 129 242 220 N
CHARACTER # 196 156 162 213	225 213 162 156 ♠	CHARACTER # 225 144 160 255	129 129 129 128 J
CHARACTER # 197 156 162 229	209 229 162 156 ♣	CHARACTER # 226 128 136 136	170 136 136 128 +
CHARACTER # 198 128 200 212	226 193 128 128 £	CHARACTER # 227 193 227 213	201 201 193 128 E
CHARACTER # 199 128 128 193	226 212 200 128 Z	CHARACTER # 228 164 146 146	164 164 146 128 ≈
CHARACTER # 200 152 164 164	164 152 152 164 ☀	CHARACTER # 229 160 176 168	164 168 176 160 ▲
CHARACTER # 201 192 191 165	165 165 154 128 B	CHARACTER # 230 128 192 172	154 129 128 128 S
CHARACTER # 202 129 225 255	136 132 130 129 ♡	CHARACTER # 231 212 180 148	156 148 150 149 ≠
CHARACTER # 203 128 128 166	217 201 178 128 \$	CHARACTER # 232 128 136 153	170 204 136 128 €
CHARACTER # 204 128 136 156	170 201 201 128 €	CHARACTER # 233 194 165 147	137 165 211 161 %
CHARACTER # 205 128 128 153	212 211 163 128 \$	CHARACTER # 234 220 242 145	145 145 242 220 A
CHARACTER # 206 130 129 142	129 129 255 128 ¶	CHARACTER # 235 152 164 164	152 164 164 152 ∞
CHARACTER # 207 128 156 170	201 170 156 128 €	CHARACTER # 236 188 144 136	132 130 129 128 ✓
CHARACTER # 208 128 190 192	192 192 176 128 £		

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USING NEWDOS/80 DISK FILES, PART I

John L. Gross

This is the first of several articles that will cover the usage of the file types made available through NEWDOS/80 (Trade Mark of Apparat, Inc.). The type we will cover in this article is the "FF" type. The "FF" type is the fixed-item type of file. It is very similar to the random access type of file found in Radio Shack's TRSDOS. The advantages that the "FF" file have over random files are as follows:

1. Variable file length.
2. No need to convert numerical variables to strings. (You will not need to use MKS\$, MKD\$, or MKI\$.)
3. No need to use CVD, CVI, CVS.
4. Easier accessing of the file.

Let's first examine the open statement that is used with the "FF" files. It looks like this:

OPEN"Mode",Buffer#,File Name/Extension:Drive #,File type,File length

With the "FF" file type the following modes are available:

"I" = Open file for INPUT only; file must already exist.

"O" = Open file for OUTPUT only; if file doesn't exist it is created.

"E" = Same as "O" except the output is added to the end of the file.

"R" = The file is opened for input and/or output. If the file doesn't exist it is created.

"D" = The Same as "R" except the file must already exist and it cannot be extended.

The buffer # can be any number from 1 to 15. The buffer # cannot exceed the number of files that you requested when you entered BASIC. The file name can be any valid file name, and it can include a file extension with or without a password and drive #. The file type in the above example is the "FF" type. The file length can be any length from 1 to 4095. An example of an open statement is:

OPEN"R",1,"MAIL/DAT","FF",75.

This statement opens a file, or creates it if it does not already exist, using the file name "MAIL" with an extension of "DAT". The file length is 75 bytes long. Instead of using a field statement to field an "FF" file you must use an IGEL statement. IGEL is an abbreviation for Item Group Expression List. It functions very similar to a field statement. In our example of the open statement we specified a file length of 75. This was computed as follows:

Name	=	25 Characters
Street	=	25 Characters
City	=	15 Characters
State	=	2 Characters
Zip Code	=	8 Characters (Using double precision)
Total Length = 75 Characters		

The variables in an IGEL statement must always have a type specifier i.e. \$, %, !, or #. An IGEL statement must always end with a semi-colon. The basic program must never access the IGEL statement directly or an error will

occur. In our example the IGEL would look like this:

(25)NA\$, (25)ST\$, (15)CI\$, (2)SA\$, ZC#;

The next statement to examine is the put statement. With NEWDOS/80 there are two formats for the put statement. They are:

PUT Buffer#,File position,Igel line#

or

PUT Buffer#,File position,,IGEL statement

In both PUT statements the buffer # can be any number from 1 to 15. The file position is the record number within the file that you wish to put data into. The difference between the first and second PUT statement is the IGEL. In the first PUT statement a program line number is specified. This line number refers to the line number that contains the IGEL statement. In the second PUT statement the IGEL itself is made part of the PUT statement. Here is a sample listing of both statements taken from a program:

```
10 OPEN "R",1,"MAIL/DAT","FF",75
20 PUT 1,5,100
30 END
100 (25)NA$, (25)ST$, (15)CI$, (2)SA$, ZX#;
```

or

```
10 OPEN "R",1,"MAIL/DAT","FF",75
20 PUT 1,5,,(25)NA$, (25)ST$, (15)CI$, (2)SA$, ZC#;
30 END
```

Both examples would record data in record number 5. Using the first example will allow several PUT and GET statements to access the same IGEL statement without having to type the IGEL statement several times. Several symbols can be used for file positioning instead of the actual record number. They are as follows:

* = The file position is not changed. It remains at the point that it was last located. It cannot be used to advance from one record to the next. It is generally used to continue reading a partially read record.

= The file is positioned to the beginning of the record number that was last processed. After finding a record you can use this file position symbol to access the same record again or to update the record.

\$ = This allows the file to be positioned back to the beginning byte number that was last accessed.

% = This is used instead of a field statement. This doesn't actually transfer the data, it assigns the string variables in the IGEL statement to a fixed length. LSET or RSET can then be used to transfer the data to the IGEL variables.

!n = (An example is !123) n represents any number from 1 to 16,777,215. This positions the file to the number of bytes specified from the beginning of the file. i.e. !10 would position the file to 10 bytes from the beginning of the file.

!% = This is used to set the file position to the end of the file. This is used when you wish to add to the end of a file. With this symbol you don't need to get the

record number of the last record in the file before adding to the end of the file.

!\$n = This sets the file position equal to the number of bytes specified from the beginning of the file, but no data is written to or read from the disk. This is used to set the file position only. An example is **!\$100**. This sets the current file position equal to 100 bytes from the beginning of the file without reading or writing to the disk. The number specified can be any number from 1 to 16,777,215.

!\$% = This is the same as **!%** except no data is read from or written to the disk. This only sets the file position equal to the end of the file.

!#n = Where n equals any number from 1 to 16,777,215. This allows you to set the end of file to the number of bytes specified from the beginning of the file.

A sample program for storing a mail list on disk using an "FF" file type looks like this:

```
10 CLEAR 5000: OPEN "R",1,"MAIL/DAT","FF",75
20 CLS : LINE INPUT "NAME -----> ";A$
25 IF A$="END" THEN CLOSE : END
30 LINE INPUT "STREET" -----> ;B$
40 LINE INPUT "CITY" -----> ;C$
50 LINE INPUT "STATE" -----> ;D$
60 LINE INPUT "ZIP CODE" -----> ;E$:E#=VAL(E$)
70 PUT 1,%,80: GOTO 90
80 (25)NA$, (25)ST$, (15)CI$, (2)SA$, ZC#;
90 LSET NA$=A$: LSET ST$=B$: LSET CI$=C$: LSET SA$=D$: ZC#=E#
100 PUT 1,!%,80: PUT 1,&: GOTO 20
```

This program functions as follows:

Line 10 clears memory, reserves string space, and opens file name MAIL/DAT using "FF" type file with a record length of 75 bytes. Line 20 inputs the data from the keyboard. LINE INPUT is used in order to accept commas. Line 25 tests A\$ for being equal to "END". If A\$ equals "END" the program ends. Lines 30-60 inputs data from the keyboard. In line 70 the PUT statement fields the data using the IGEL in line 80. The GOTO 90 statement then causes the program to go to line 90 thus skipping line 80. Line 80 is the IGEL statement and assigns a length of 25 characters for variable NA\$, 25 characters for ST\$, 15 characters for CI\$, 2 characters for SA\$, and since ZC# is double precision it is automatically assigned a length of 8. Line 90 places the data from the variables A through E into the variables NA\$, ST\$, CI\$, SA\$, and ZC#. In line 100 the first PUT statement transfers the data into the buffer. Since the file position symbol is **!%**, the transfer is done starting at the end of the file. This PUT statement will not actually write the data to the disk file until the buffer is full or a close statement is executed. Since the data is important we want the data written to disk rather than wait until the buffer is full. The second PUT statement accomplishes this for us. The statement PUT1,& forces that data to be written to the disk file even if the buffer is not full. This statement should be used when ever you are working with data that is of an important nature.

Future articles will cover how to read the data back from the disk and how to update or edit the file.

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SOFTWARE REVIEW

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don't). Single or double sided modes work with ease (disk density and format are automatically recognized and accomodated).

This new operating system has already become the in-house standard for our Model II/16 systems. Patches are supplied on the system disk for the required applications that are commonly used—such as Profile Plus. A very cute message appears after the patch has been applied to the BASIC interpreter that says you may now store the TRISSDOS disk away forever. Such has been the case here for sure!

My next projects are to bring up the COBOL compiler, and to implement the VISICALC usage of the 256K of Motorola 68000 memory for internal storage. The data base I'm writing will use this available memory for direct-access keys.

The DOSPLUS II operating system is such a vast improvement over the other one that I remarked, "Jim, I really believe my Santa Claus wore a UPS uniform today." He chuckled as we walked out the door headed for home.

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ASK RICHARD

Richard Kaplan

What's the difference between a "multi-user" computer and a "time-sharing" system?

Both terms refer to a single central computer which can be used simultaneously by more than one person. They differ primarily in the location of this central computer in relation to the computer user. Also, time-sharing computers are usually large mainframe systems, whereas multi-user systems may be quite small.

A computer with multi-user capability has two or more terminals located in the same room, or close enough to be connected by a wire. The operators of all terminals share the same printers, disk drives, etc.

A time-sharing system often has hundreds of users located miles away, connected via a telephone line. Sometimes the user may use disk drives or printers located at the central computer, but usually the terminal connected to the network has a built-in printer, so printing can be done directly in the user's home.

How can so many people use the same computer at one time? Are there really many computers inside a multi-user or time-sharing computer?

Usually there exists only one central computer for all users. The net result is that only one person can ever use the computer in any one instant. The computer works with each user in turn for a small fraction of a second, saves that user's program or data, goes on to work with other users, and returns to the first user, usually in less time than it would take to enter a second keystroke. The net result is that to the user it appears that he has a complete computer to himself, but in reality he is sharing it with many other users.

You mentioned a computer terminal. Isn't that the same as a computer?

No. A computer terminal is simply a keyboard and a video screen (or printer). It is a device used to communicate with a computer. Often, however, personal computers may be used as terminals.

For example, some banks now permit customers to enter transactions at home into the bank's computer. Although a personal computer could be used for this purpose, no actual computation need be done at home. All that is needed is a device to communicate with the bank's computer. A terminal, which is far less expensive than a computer, can be used for this purpose.

In the context described above, terminals can be very cost-effective when used in a multi-user or timesharing network. Instead of purchasing five computers, a businessman can purchase one multi-user computer connected to five terminals.

What is the difference between a terminal and a "smart terminal?"

A terminal is simply a device which relays information to and from a computer. The exact information is transmitted (and displayed or printed).

A smart terminal can manipulate the transmitted information in various ways. For example, a user might instruct a smart terminal to change every "a" to an "e". A smart terminal can usually save information to disk, edit information on screen, and perform other functions similar to those of a word processor.

A smart terminal is a hardware device which can be purchased. It is also possible to purchase a software program to transform a computer into a smart terminal.

What is "bank switching?"

As was explained in a previous installment of "Ask Richard," every computer has some maximum amount of memory it can address. The Models I, II, and III, for example, are 8-bit machines, which mean that no matter how many memory boards you might like to add in, they can only control 64K. (The Models I and III have 16K devoted to specific tasks, so they only have 48K left for the user.)

A technique often used to increase memory capacity is *bank switching*. With this process, the computer maintains several independent blocks with 64K of memory. As needed, it is possible to switch between these memory blocks (or "banks"). It is rumored that the Model II, for example, can support 8 of these 64K memory banks, for a total of 512K. The result is that only 64K of memory is used at any one time, but to the user it appears as if 512K is available.

What is "structured programming?"

Structured programming is a particular style of programming designed to make a program easier to understand. Since certain fundamental commands are necessary to write a structured program, it is not possible to practice structured programming in all computer languages. Specifically, one of the major arguments against the BASIC language (which is used in every microcomputer, including the TRS-80's) is that it is not possible to write a structured program in BASIC.

Structured programming rests on the principle that every program can be written with three fundamental instructions: 1) IF / THEN / ELSE; 2) DO WHILE; 3) SEQUENCE.

For those not familiar with these terms, suffice it to say that any problem which needs to be solved by a computer can be defined by using combinations of three different types of commands. If these commands are used, the completed program will be easily understood.

It is essential to note that the GOTO command is conspicuously missing from this list. This is intentionally so. It is widely agreed that "the readability of a program is inversely proportional to the number of GOTO's it contains," and anyone who has ever attempted to decipher another person's BASIC program will attest to this. GOTO's cannot be avoided in BASIC, since it is not a structured language, but in a pure structured language it is possible to write any program without a single GOTO. (For non-believers, this can be proven by using higher-level mathematics.)

I've noticed that many otherwise excellent computers have very small screens, such as the Color Computer's 32-column screen and the APPLE's 40-column screen. Is there some technical explanation for this?

Yes, there is. The details of TV reproduction can be quite complex, but put very simply there is simply not enough resolution ("detail") on a television screen to produce more than 40 characters on one horizontal line.

But can't I buy a special device to add more characters to my screen?

Some manufacturers do offer boards to increase the width of a computer's screen (the most famous of these is the Vydex 80-column card for the APPLE), but in order to use these products it is necessary to purchase a monitor, as opposed to a television screen. A monitor can produce more detail than can a television, since its picture is made up of more "dots," so it can be used with a wider screen than can a television.

(Note: Not all computers which use a television screen can be used with a video monitor. These devices need a different type of input, and the computer must be specifically designed for a monitor, or a converter must be installed.)

Often I've been told to save a BASIC program in "ASCII FORMAT." What does this mean?

When a BASIC program is stored on disk, it is usually stored in an abbreviated form. That is, instead of storing the word "PRINT," for example, a one-character symbol which stands for PRINT may be used, thereby saving disk space.

Sometimes it is necessary for another program to read a BASIC program stored on disk. For example, you might want to use a word processor to edit your BASIC program. However, most word processors do not understand the special codes used to store BASIC programs on disk. Hence, it is necessary to save the program in an "unabbreviated" form. When a program is stored on disk in ASCII format, every character in the program is stored as a standard code—the ASCII code—which can be read by many other programs.

The standard command to save a BASIC program called TEST, for example, is SAVE "TEST". To save the program in ASCII format, you would type SAVE "TEST",A.

Obviously, there are different reasons to purchase each kind of printer, but I would usually recommend a parallel printer only to a novice computer user. If you are somewhat familiar with your computer, there are some instances in which a serial printer is preferable.

What is the difference between a parallel printer and a serial printer?

The difference between parallel and serial printers lies in the technique used to send information from the computer to the printer.

Remember that a byte, which is one character, is composed of 8 bits, which are 1's or 0's. The bit is the smallest unit a computer can work with, while 8 bits are usually stored together in one byte.

A computer connected to a parallel printer sends all 8 bits of one byte to the printer at one time. A serial printer, on the other hand, receives one bit at a time, instead of a byte at a time.

Which should I purchase, a parallel or a serial printer?

Obviously, there are different reasons to purchase each kind of printer, but I would recommend a parallel printer only to the novice computer user. If you are familiar with your computer, a serial printer is preferable.

The most overriding factor in my recommending a parallel printer is its standardization. Almost any parallel printer will work with a computer designed for parallel

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continued on page 61

ON-SCREEN ARTIST

David Lewis

Creating TRS-80 graphics on paper is tedious enough, but converting the picture into ASCII codes is also time-consuming and mistake-filled. EASEL alleviates both these problems and makes designing graphics a pleasure.

The cursor is moved around the screen with the arrow keys. The pixels in each graphics block correspond to the digits 895623 on the numeric keypad, and pressing one of these keys lights up the appropriate pixel. Mistakes can be corrected by positioning the cursor on the block and pressing the "C" key. When your picture is all done, press "P" to print the ASCII graphics character codes for each PRINT@ location.

THE PROGRAM

The cursor is non-destructive, and so lines 50 and 60 erase it if it has moved and juggle values to print it if it should be printed. The V in those lines is the number of blocks the cursor moves. It's set in lines 150 to 190, where I used G=PEEK(14400) to find the move; that part of the keyboard-mapped area contains the arrow keys coded in powers of 2. The statement G AND 8 is true only if the up-arrow is being pressed.

I also used the keyboard memory to check for the P and C keys in lines 100-110. The addresses PEEKed contain P or C in the position checked for in the lines; again, the IF/THEN will be true only if the key is being pressed.

Lines 200-210 check for the keypad entries. Line 220 adds the pixel (with a value of C) in one of two ways. If the space has no other pixels, the block is created by POKEing 128+C into video RAM. If the space is not blank, the C is "added" by ORing it with the present contents. This creates a harmless overlay and insures that the pixel will be set.

MODIFICATIONS

Changes are noted in the program for programmers without printers. The most important change is DIMensioning an array to save the screen, which is destroyed when the code values are printed. If the array is integer and the program is compressed, the program might fit into 4K.

If you have no numeric keypad, you'll want to change the 895623 to something like YUHJNM. In that case, change 200 to read P=INKEY\$:C=0, and then amend 210 to read IF P=="Y" THEN C=1 ELSE IF P=="U" THEN C=2, etc.

Well, I hope that EASEL removes the burden of creating graphics. Have fun!

5 'EASEL, by David Lewis, Shady, NY 12479

10 GOSUB 5000

50 IF V<0 AND PEEK(L)=CH THEN POKE,L,128 'ERASE CURSOR IF IT MOVED

60 L=L+V: IF PEEK(L)<129 THEN POKE,L,CH 'PRINT CURSOR

100 IF PEEK(14340)=1 THEN 4000 'CHECK FOR P FOR PRINTER

110 IF PEEK(14337)=8 THEN POKE,L,128:GOT050 'C FOR CLEAR BLOCK

150 G=PEEK(14400):V=0 'CHECK FOR ARROW KEYS

160 IF (GAND8) AND (L>15423) THEN V=-64 :GOT050 'UP

170 IF (GAND16) AND (L<16320) THEN V=64 :GOT050 'DOWN

```
180 IF (GAND32) AND (L>15360) THEN V=-1 :GOT050 'LEFT
190 IF (GAND64) AND (L<16383) THEN V=1 :GOT050 'RIGHT
200 P=VAL(INKEY$):C=0 'CHECK FOR KEYPAD PIXEL ENTRIES
210 IF P=8 THEN C=1
    ELSE IF P=9 THEN C=2
    ELSE IF P=5 THEN C=4
    ELSE IF P=6 THEN C=8
    ELSE IF P=2 THEN C=16
    ELSE IF P=3 THEN C=32
215 IF C=0 THEN 50
220 G=PEEK(L): IF G=CH THEN POKE,L,128+C ELSE POKE,L,G OR C
    'ADD PIXEL' TO GRAPHICS CHARACTER AT CURSOR LOCATION
230 GOTO 50
3995 '==OUTPUT TO PRINTER==
4000 C=1:P=0
4005 'ADD 4005 FOR G=0TO1023:L(G)=PEEK(G+15360):NEXT
IF NO PRINTER
4010 FORG=1TO4: LPRINT"LOCATION-VALUE",:NEXT:LPRINT
    'IF NO PRINTER, THEN CHANGE ALL LPRINTs TO PRINTs
4030 FORG=0TO1023
4040 V=PEEK(G+15360) 'CHANGE THIS LINE TO V=L(G) IF NO
PRINTER
4050 IF V<129 THEN 4090
4060 LPRINTTAB(P+2)G; TAB(P+9)V;
4070 P=P+16:C=C+1:IFC=5 THEN LPRINT:C=1:P=0
4090 NEXT:END
4995 'INITIALIZATION
5000 CLS:PRINT@26,"E A S E L"
5005 PRINT:PRINT:PRINT"Light up graphics pixels using":
    PRINTTAB(5)"89":PRINTTAB(5)"56":PRINTTAB(5)"23":
    PRINT" on the keypad."
5010 PRINT:PRINT"Use C to clear the block and the arrows to
move the cursor.":PRINT"Use P to print the character codes to
the printer."
5020 PRINT:INPUT<Press ENTER to continue.>;G
5030 L=15840:CH=120 'CURSOR POSITION, CURSOR CHARACTER
5040 'ADD 5040 DIML(1023) IF NO PRINTER
5050 CLS:RETURN
```

David Lewis
Shady, NY 12479
(914) 679-2217 ■

COBOL PRIMER #1

continued from page 52

Suggested Texts:

Ashley: *Structured COBOL: A Self-Teaching Guide*, Wiley & Sons.

Saxon: *COBOL: A Self-Instructional Manual*, Prentice-Hall.

Worth: *COBOL for Beginners*, Prentice-Hall.

(A number of patches for RSCOBOL are available from your local Radio Shack representative, or write/call TANDY (817-870-2044))

Hubbard C. Goodrich
South Harpswell, ME 04079 ■

PUTTING THE "POKES" ON THE LINE PRINTER VII
continued from page 55

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CHARACTER # 239	156	162	201	213	213	162	156	o
CHARACTER # 240	193	170	148	148	170	193	128	x
CHARACTER # 241	134	137	137	255	129	255	128	q
CHARACTER # 242	128	156	162	255	162	128	128	c
CHARACTER # 243	156	162	253	203	213	162	156	o
CHARACTER # 244	255	190	209	209	201	213	213	e
CHARACTER # 245	213	213	213	213	187	133	133	e
CHARACTER # 246	133	133	133	133	133	130	128	-
CHARACTER # 247	255	137	137	217	166	208	192	R
CHARACTER # 248	198	169	153	136	244	210	241	%
CHARACTER # 249	176	200	200	184	133	131	135	d
CHARACTER # 250	128	134	169	249	169	134	128	?
CHARACTER # 251	128	128	128	143	137	137	137	e
CHARACTER # 252	128	130	129	217	133	130	128	?
CHARACTER # 253	128	200	170	157	170	200	128	x
CHARACTER # 254	128	168	234	189	234	168	128	*
CHARACTER # 255	128	252	162	145	162	252	128	A

William O'Connell
 41 Marland Road
 Worcester, Massachusetts 01606 ■

ASK RICHARD

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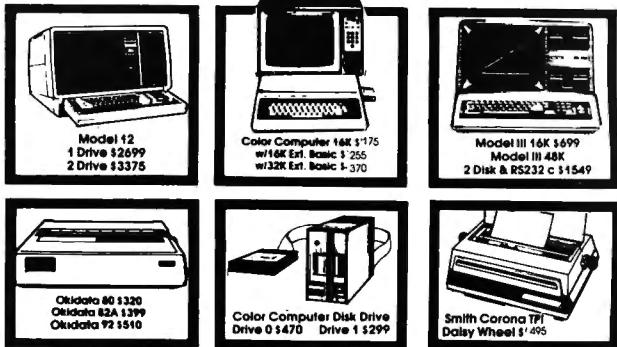
printers. Granted, there are some exceptions, namely non-standard connecting cables. But for the most part you can purchase a parallel printer and confidently know that it will function with your computer.

When you purchase a serial printer, however, it is usually necessary to purchase a printer driver. A driver is software which essentially tells the computer how to work the printer. Parallel printers need drivers, too, but they are usually standard and built into the computer. With a serial printer, it is usually necessary to purchase and load the driver separately, and sometimes this interferes with commercial software packages.

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COMPUTRONICS Issue #41 (January 1982) program diskette contains the following programs: Amortization of Loans, Matrix, Gauss Elimination, Linear Equations, Spellout, Currency Conversions, Density, and 110 Baud ASCII Radio Teletype Receive Program.

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COMPUTRONICS Issue #37 (August 1981) program diskette contains the following programs: Calendar, Labels, Pizza, Diving, Payroll, Citysort, Graph Print and Text Print, and Alien Invasion Force.

COMPUTRONICS Issue #42 (February 1982) program diskette contains the following programs: The Graphic Pie, Mortgage Comparisons, Statement of Income, Chainer, Windcrab, Horsepower, and Permute.

COMPUTRONICS Issue #43 (March 1982) program diskette contains the following programs: Interest Formulas, Depreciation under the 1981 Economic Recovery Tax Act, Electric, Sieve, and Horizon, and CLINTEST, a series of programs to help diabetics monitor their sugar levels, including Menu, Clintest, Foodlog, Calcount, Master and Print.

COMPUTRONICS Issue #44 (April 1982) program diskette contains the following programs: Check writer, Castle Adventure, Graphic Combinations, the Ladder, National Debt, Box, Roots, and April Fool.

COMPUTRONICS Issue #46 (June 1982) program diskette contains the following programs: Break Even Analysis, Coin Inventory program, Chase, Reaction Time, USA, Selling Price, Loan Processor, No Star Baseball, and Metric Conversion Calculator.

COMPUTRONICS Issue #48 (August 1982) program diskette contains the following programs: Information Retrieval System, including KW, Sort, Merge, and List; the Transportation method of linear programming; the Beale Treasure, including Filer, Write1, Write2, Write3, Process/Let, Process/L1, and Process/L2; and the Versatile Peeker.

COMPUTRONICS Issue #49 (September 1982) program diskette contains the following programs: the Simplex method of linear programming; Records and Files, including Schedule, Schedule/Sub, Schedule/Seq, Schedule/Ran; Monthly Expenditure Information package, including Update, Mstex, Monthre, and Report; and Scramble.

COMPUTRONICS Issue #50 (October 1982) program diskette contains the following programs: Cash flow analysis for real estate and other investments; Epson MX-80 Graftrax Initialization program; Kaleidoscope, Gascost, Permile, and Balloon by Gordon Speer.

COMPUTRONICS Issue #51 (November 1982) program diskette contains the following programs: the Cardwriter, the Graphical Method of Linear Programming, MACS-MAP, and Phone bill sorting program.

COMPUTRONICS Issue #52 (December 1982) program diskette contains the following programs: Regression Analysis with Confidence and Prediction Limits, Change baud rates on system tapes, PERT—Program Evaluation and Review Technique, Grid, and Monogram.

COMPUTRONICS Issue #53 (January 1983) program diskette contains the following programs: General Ledger Menu, Alpha Program, Roulette, Serious EDTASM, Surname Conversion, Jack and Jill, and Disk Checkbook Maintenance System.

COMPUTRONICS Issue #54 (February 1983) program diskette contains the following programs: Startup routines for General Ledger package, CLOCK/BAS, Findit, Boxer.

COMPUTRONICS Issue #55 (March 1983) program diskette contains the following programs: TRANS program to input transactions, Michigan and Graphics for Epson, Type, Alphabet Puzzle, Fraction Calculator, Memory Display, two programs for bit-image graphics, and Bowling Statistics Ledger.

COMPUTRONICS Issue #56 (April 1983) program diskette contains the following programs: SORTING demonstration program, CPA Program (Month #4 of General Ledger series), Ball Bearings, Football, SPACEX Assembly-Language game, Rubik's cube, and Interval program for time-shared condominiums.

COMPUTRONICS Issue #57 (May 1983) program diskette contains the following programs: Housekeeping programs UPDATE and YEAR (Month #5 of General Ledger package), 3-Across Mailing Labels, Service Territory and Manpower Planning Simulation program, Sword of Raschka game, Escape/Sketchit, Concentration, Tmult, Magic Squares, and Word Chase.

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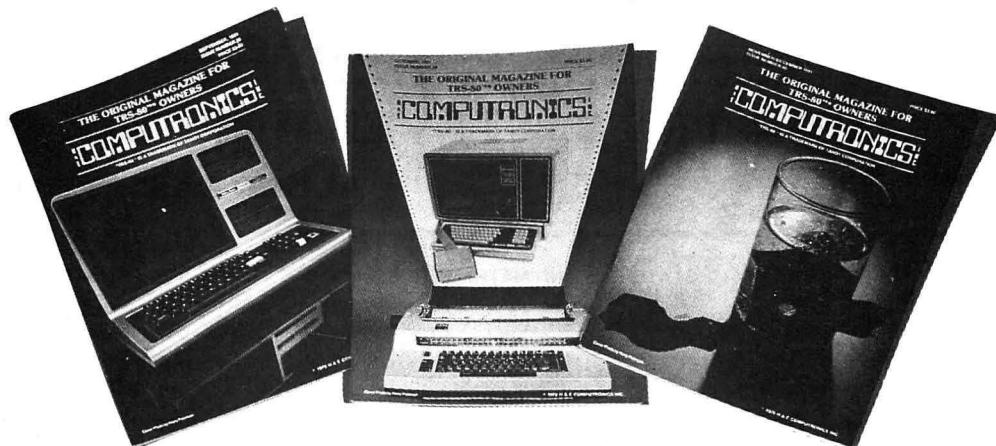
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2 ANNU1	Annuity computation program
3 DATE	Time between dates
4 DAYYEAR	Day of year a particular date falls on
5 LEASEINT	Interest rate on lease
6 BREAKEVN	Break-even analysis
7 DEPRSL	Straightline depreciation
8 DEPDRY	Sum of the digits depreciation
9 DEPRDB	Declining balance depreciation
10 DEPRDBB	Double declining balance depreciation
11 TAXDEP	Cash flow vs. depreciation tables
12 CHECK2	Prints NEBS checks along with daily register
13 CHECKBK1	Checkbook maintenance program
14 MORTGAGE/A	Mortgage amortization table
15 MULTMON	Computes time needed for money to double, triple, etc.
16 SALVAGE	Determines salvage value of an investment
17 RRVARIN	Rate of return on investment with variable inflows
18 RRCONST	Rate of return on investment with constant inflows
19 EFFECT	Effective interest rate of a loan
20 FVAL	Future value of an investment (compound interest)
21 PVAL	Present value of a future amount
22 LOANPAY	Amount of payment on a loan
23 REGWITH	Equal withdrawal from investment to leave 0 over
24 SIMPDISK	Simple discount analysis
25 DATEVAL	Equivalent & nonequivalent dated values for oblig.
26 ANNUDEF	Present value of deferred annuities
27 MARKUP	% Markup analysis for items
28 SINKFUND	Sinking fund amortization program
29 BONDVAL	Value of a bond
30 DEPLETE	Depletion analysis
31 BLACKSH	Black Scholes options analysis
32 STOCVAL1	Expected return on stock via discounts dividends
33 WARVAL	Value of a warrant
34 BONDVAL2	Value of a bond
35 EPSEST	Estimate of future earnings per share for company
36 BETAALPH	Computes alpha and beta variables for stock
37 SHARPE1	Portfolio selection model i.e. what stocks to hold
38 OPTWRITE	Option writing computations
39 RTVAL	Value of a right
40 EXPVAL	Expected value analysis
41 BAYES	Bayesian decisions
42 VALPRINF	Value of perfect information
43 VALADINF	Value of additional information
44 UTILITY	Derives utility function
45 SIMPLEX	Linear programming solution by simplex method
46 TRANS	Transportation method for linear programming
47 EOQ	Economic order quantity inventory model
48 QUEUE1	Single server queueing (waiting line) model
49 CVP	Cost-volume-profit analysis
50 CONDPROF	Conditional profit tables
51 OPTLOSS	Opportunity loss tables
52 FQUOQ	Fixed quantity economic order quantity model
53 FQEOWSH	As above but with shortages permitted
54 FQEOPQB	As above but with quantity price breaks
55 QUEUECB	Cost-benefit waiting line analysis
56 NCFANAL	Net cash-flow analysis for simple investment
57 PROFIND	Profitability index of a project
58 CAP1	Cap. Asset Pr. Model analysis of project

59 WACC	Weighted average cost of capital
60 COMBAL	True rate on loan with compensating bal. required
61 DISCBL	True rate on discounted loan
62 MERGANL	Merge analysis computations
63 FINRAT	Financial ratios for a firm
64 NPV	Net present value of project
65 PRINDLAS	Laspeyres price index
66 PRINDPA	Paasche price index
67 SEASIND	Constructs seasonal quantity indices for company
68 TIMETR	Time series analysis linear trend
69 TIMEMOV	Time series analysis moving average trend
70 FUPRINF	Future price estimation with inflation
71 MAILPAC	Mailing list system
72 LETWRIT	Letter writing system-links with MAILPAC
73 SORT3	Sorts list of names
74 LABEL1	Shipping label maker
75 LABEL2	Name label maker
76 BUSBUD	DOME business bookkeeping system
77 TIMECLK	Computes weeks total hours from timeclock info.
78 ACCTPAY	In memory accounts payable system-storage permitted
79 INVOICE	Generate invoice on screen and print on printer
80 INVENT2	In memory inventory control system
81 TELDIR	Computerized telephone directory
82 TIMUSAN	Time use analysis
83 ASSIGN	Use of assignment algorithm for optimal job assign.
84 ACCTREC	In memory accounts receivable system-storage ok
85 TERMSPAY	Compares 3 methods of repayment of loans
86 PAYNET	Computes gross pay required for given net
87 SELLPR	Computes selling price for given after tax amount
88 ARBCOMP	Arbitrage computations
89 DEPRSF	Sinking fund depreciation
90 UPSZONE	Finds UPS zones from zip code
91 ENVELOPE	Types envelope including return address
92 AUTOEXP	Automobile expense analysis
93 INFILE	Insurance policy file
94 PAYROLL2	In memory payroll system
95 DILANAL	Dilution analysis
96 LOANAFFD	Loan amount a borrower can afford
97 RENTPRCH	Purchase price for rental property
98 SALELEAS	Sale-leaseback analysis
99 RRCONVBD	Investor's rate of return on convertible bond
100 PORTVAL9	Stock market portfolio storage-valuation program

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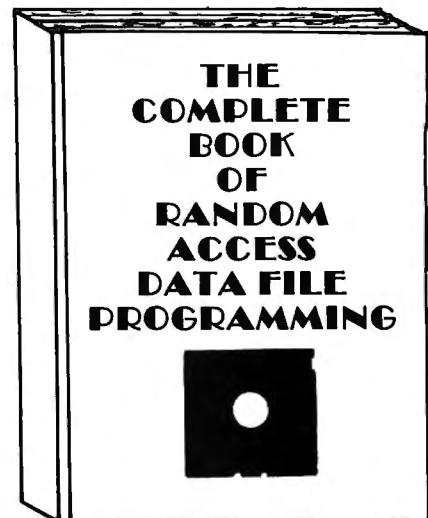
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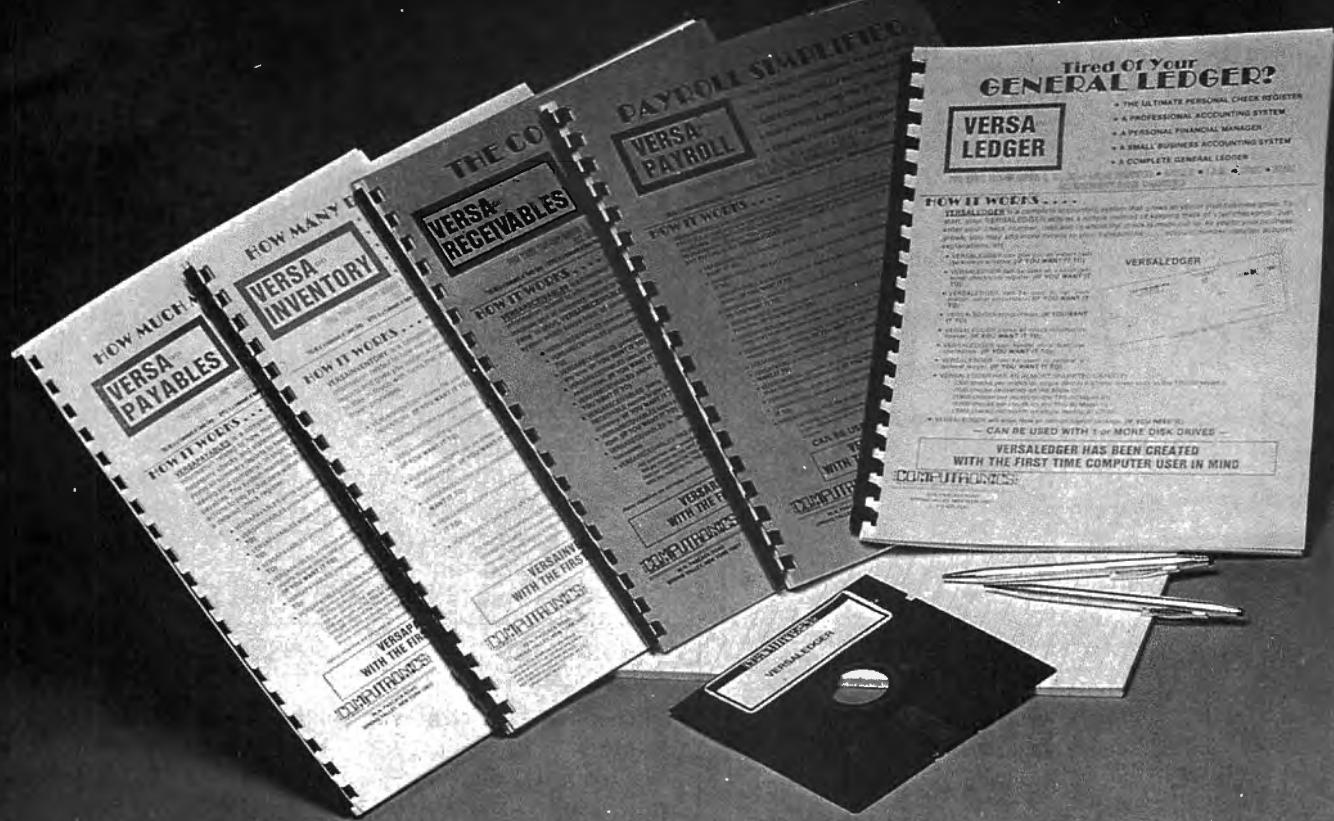
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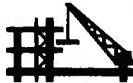
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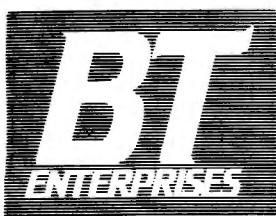
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ASK RICHARD

continued from page 61

Then when would you suggest purchasing a serial printer?

Obviously, there are sometimes economic reasons to purchase a particular type of printer. If you are reasonably familiar with your computer and you can get a good buy on a serial printer, buy it.

One drawback to a parallel printer is that there exists a limiting length for your printer cable. Due to some combination of the voltage and wiring involved, a parallel printer will generally not function reliably with a cable greater than 50 feet long, whereas this is not true of a serial printer. This generally does not prove to be a serious drawback, but some consider it significant enough to warrant purchasing a serial printer.

Finally, the very non-conformity of serial printer connections leads to greater flexibility. Generally a serial printer, through its driver, must be configured for transmitting speed, error checking (called "parity"), and a myriad of other functions. The end result is that if you are skilled in establishing these settings, you will have greater control of your printer's performance.

Questions not attributed to a specific person represent a typical computer user, a composite "character" drawn from the author's personal experience speaking with customers of H & E Computronics.

Questions from readers on all aspects of personal computing are welcomed. Please enclose a self-addressed, stamped envelope with your request.

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