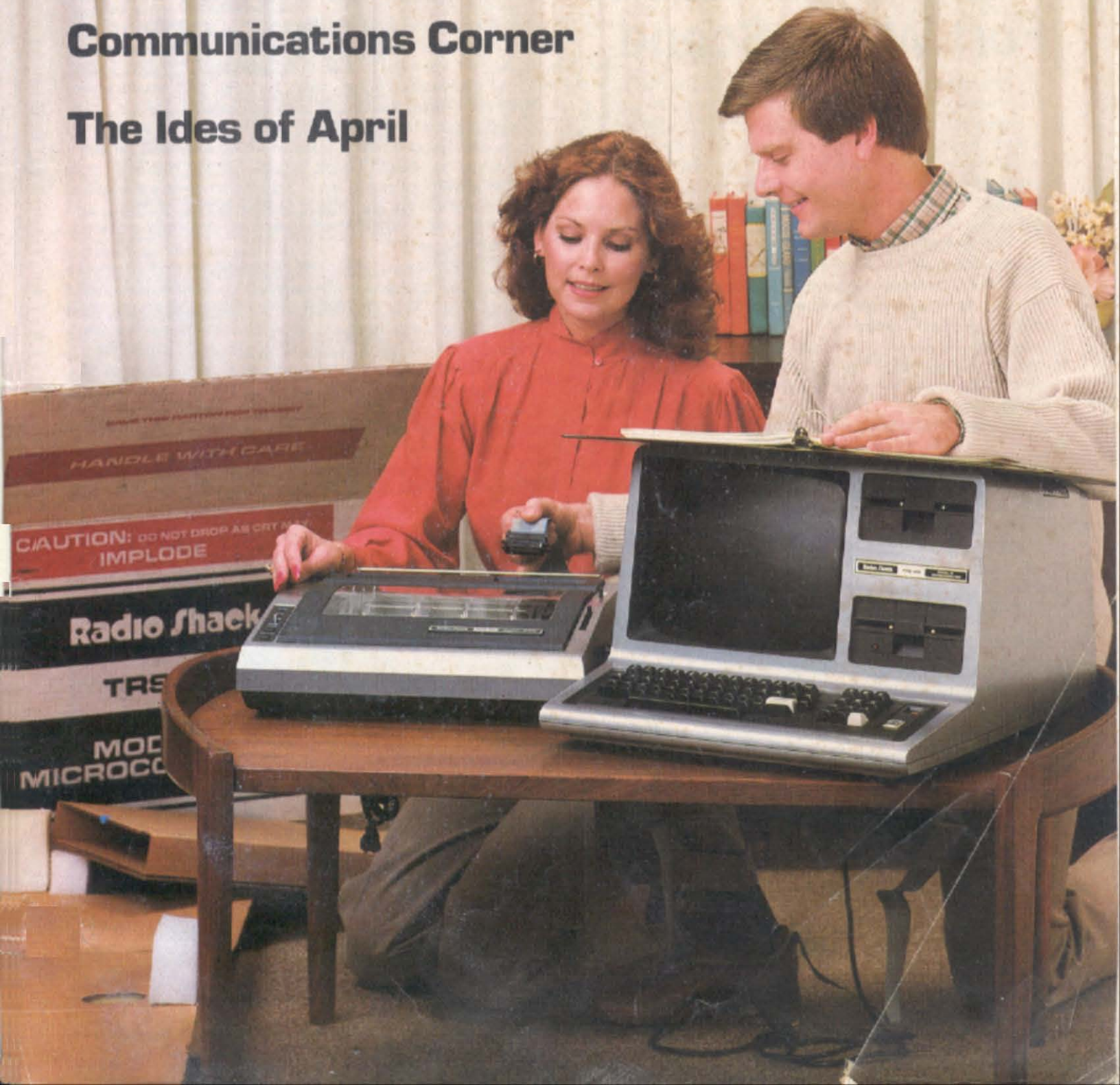
Volume 5, Issue 1
JANUARY 1983 $1.50

TRS-80® Microcomputer News

Getting Started with TRS-80s

Communications Corner

The Ides of April



Fort Worth Scene

This month's magazine has 'Getting Started' as its primary theme. Over half of the material in the issue is directed at providing you with information which, we hope, will help you with some aspect of getting your computer system running properly, or will help you in getting started in a new area of computing. Where possible, we have tried to make the material relate to all TRS-80s, not just a single model. We will appreciate hearing your comments on this format.

You noticed? Yes, the December issue was 4 pages shorter than usual. Aside from our usual goal of providing you with useful information, we have set two new goals for 1983—first, stay on schedule and second, increase accuracy especially in program listings.

Along the lines of increased accuracy in program listings, we are working toward a viable method of putting the longer (greater than 10 lines) program listings into CompuServe. CompuServe is working with us on this and we should have a working system shortly.

SURVEY RESULTS ARE IN!

We got the results! Finally, after what seems like a year (but really was much less), we have the results of the reader survey we conducted during late spring of 1982. We wanted to determine who you (our readers) are, what equipment you own, and what you want to read in Microcomputer News. We are still digesting the results, and will be talking more about them later.

EXTENDED SERVICE PLANS

While looking over the content of this issue, I suddenly realized that we had not really talked about a very important topic—Radio Shack Extended Service Plans. So here, cribbed from one of our brochures, is some quick information on the plans.

Radio Shack offers the most advanced in-house service network in the microcomputer industry. Radio Shack Service Centers are strategically located throughout the contiguous United States to support the needs of our customers. Many of these facilities are housed in Radio Shack Computer Centers and specialize in TRS-80 maintenance.

Some of the advantages that Extended Service Plans offer you are:

- Priority Service—Owners of Extended Service Plans are assured of fast, professional work. Equipment covered by one of the plans is serviced before any other equipment. This minimizes your down-time!
- Inflation Protection—"Public enemy number one" is inflation. Radio Shack's Extended Service Plans let you beat the rising costs of parts and labor. This way, you will get tomorrow's service . . . at today's price!
- No "Surprise" Repair Costs—Equipment covered by an Extended Service Plan will incur no additional charges. You will have the capability to plan your budget for an entire year!
- Choice of Plans—At least one Extended Service Plan is available for every TRS-80 system—from our Model II or 16 Business system to our Pocket Computers. In fact, many TRS-80 owners have two options—In-Shop or On-Site service.

The In-Shop Extended Service Plan is our most popular and affordable service agreement. Its low price and availability have made it the choice of thousands of TRS-80 owners. Small businesses, home users, schools, and amateur programmers have found that their equipment can be maintained at considerable savings. As the owner of an In-Shop Extended Service Plan, you will receive unlimited remedial service at any Radio Shack Service Center. You need only take your equipment to your local Radio Shack store. The equipment will be sent to the service facility, repaired, and returned to your Radio Shack store. You may then pick it up. It's that simple!

On-Site—More and more, businessmen and educators are turning to the convenience of an On-Site Extended Service Plan. The On-Site plan is invaluable if you need immediate service at your location. A technician will respond promptly to your call. All parts, labor and travel expenses are covered during regular working hours. Speedy remedial service is assured, but it doesn't end there! Radio Shack will also provide Scheduled Preventive Maintenance Service. Our technicians will even install and assemble your TRS-80 furniture!

Check with your local Radio Shack Store or Computer Center for full details on the Extended Service Plans.

TRS-80 Microcomputer News
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The subscription rate for renewals and other interested persons with U.S., APO or FPO addresses is twelve dollars ($12.00) per year, check or money order. Single copies of the Microcomputer News may be purchased from Radio Shack Computer Centers or Computer Departments for $1.50 suggested retail each.

The subscription rate for renewals and other interested persons with Canadian addresses is Fifteen dollars ($15.00) per year, check or money order in U.S. funds. All correspondence related to subscriptions should be sent to: Microcomputer News, P.O. Box 2910, Fort Worth, Texas 76113-2910.

Retail Prices in this newsletter may vary at individual stores and dealers. The company cannot be liable for pictorial and typographical inaccuracies.

Back issues of Microcomputer News prior to January, 1981 are available through your local Radio Shack store as stock number 26-2115 (Suggested Retail Price $4.95 for the set). Back issues of 1981 copies are available as stock number 26-2240 (Suggested Retail Price $9.95 for the set).

The TRS-80 Newsletter welcomes the receipt of computer programs, or other material which you would like to make available to users of TRS-80 Microcomputer systems. In order for us to reprint your submission, you must specifically request that your material be considered for reprinting in the newsletter and provide no notice that you retain copyrights or other exclusive rights in the material. This assures that our readers may be permitted to recopy and use your material without creating any legal hassles.

Material for publication should be submitted on magnetic media (tape, disk, or CompuServe). If you submit material on tape or disk, and it is accepted for publication, we will send you two cassettes or diskettes for each one you sent us. Cassettes will come from our box of mixed blank cassettes. If you submit material on CompuServe, and we think we may use the material, we will extend your Microcomputer News subscription by six months for each article accepted. If you are submitting material over CompuServe, please include your name and address or your subscription number so we can find you. If the material is very short, send it to us in E-Mail. If you have more than a few lines, you need to place the material in the ACCESS area of CompuServe and then let us know it is there by leaving a message on E-Mail.

Material may be submitted by mail to P.O. Box 2910, Fort Worth, Texas 76113-2910, or through CompuServe. The Microcomputer News' CompuServe user ID number is 70007,535.

Notes to Program Users:

Programs published in the Microcomputer News are provided as is, for your information. While we make reasonable efforts to ensure that the programs we publish here work as specified, Radio Shack can not assume any liability for the accuracy either of the programs themselves or of the results provided by the programs.

Further, while Microcomputer News is a product of Radio Shack, the programs and much of the information published here are not Radio Shack products, and as such can not be supported by our Computer Customer Service group. If you have questions about a program in the Microcomputer News, your first option is to write directly to the author of the program. When possible, we are now including author's addresses to facilitate communications. If the address is not published, or if you are not happy with the response you get, please write us here at Microcomputer News. We will try (given the limited size of our staff) to find an answer to your question and, in many cases, will publish the answer in an up-coming issue of Microcomputer News.

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TRS-80® Microcomputer News

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Prices shown in TRS-80 Microcomputer News are in U.S. Funds.

View from the 7th Floor

by Jon Shirley
Vice President
Radio Shack Computer Merchandising

This month's Newsletter is devoted to getting started in computing, so I thought I might share my experiences in getting started with you. I know there are a good many new TRS-80 owners out there, as we just had a great Christmas season. So as you try to read those pages in the manuals and make some sense out of it all, you might take some comfort in knowing it used to be much worse.

I received my first personal computer exactly five years ago this month, while I was in Belgium. It was a strictly stock 110 Volt USA Model I, 4K Level I and the first exported to anywhere. Now I had a little computer experience, I thought, so this should present no problem . . . right? Wrong! Directly below my office was our small office mainframe. We had two removable rigid disk drives, two tape drives and a 500 or so line per minute printer. We fed it punched cards and it talked back via a typewriter or an error display on the console.

It had two modes of operation, either computing or not computing. When it decided not to compute the error had to be tracked down, some punched cards put in, to fix the bug, and the program started over. It was super fast of course. Updating our Belgium mailing list took only 60 non-stop hours (remember Belgium is a very small country). This up-to-the-minute product came from Big Blue and was later replaced with a modern on-line mini system from another large computer company. You can guess how this background had me totally unprepared for a personal computer.

I will confess that since I knew the Model I was going to be shipped, I had our office in America send me all the books on little computers they could find. I acquired a good deal of technical Z-80 literature, which was worse than Greek to me, several books on how to build a microcomputer, and one book on BASIC. I quickly became a paper expert on BASIC and just knew I could do all sorts of things when my new toy arrived.

When it finally came and I unpacked the thing and found a four page mimeographed set of instructions(?) with a card to mail in for the "real manual." As I tried in vain to get the TRS-80 to do anything other than play blackjack, which it did very well, I realized that my book on BASIC and Level I were in two different worlds. My book assumed you had a terminal attached to a minicomputer and were running pure Dartmouth BASIC. After a lot of telex's and long nights, I did manage to sort some of it out and produce a few semi-useful programs. When I finally received the manual, it turned out to be about 30 mimeographed pages with another card to send in for the "real manual." I do admit that this version cleared up a lot of my questions, but not all.

Some five months after I started, about the time I received a set of Level II EPROMS with about five very terse pages of instructions, the REAL Level I manual arrived. It's 232 pages cleared up all the remaining questions and really made me feel good, until I tried out Level II! I might point out that the Level I manual is still boxed with the 4K Model III. It is sold in our stores. And has been translated into at least five languages and has been read by about one million people.

As you read this, bear in mind that this same experience was being shared by many thousands of original TRS-80 owners. The resulting mass of phone calls for help resulted in Computer Customer Services and more attention to manuals. You might contrast my experience with today's Color Computer owner who gets a 308 page programming manual, a quick reference card, and a 30 page operation manual. There are also now hundreds of books on BASIC, user groups, magazines etc., etc.

Additionally, there is the TRS-80 Microcomputer News, which has gone from four brown pages, to the rather slick product you are reading now. The Newsletter is your product. We depend on you for a great deal of what we print, and we need your comments to help guide us. We especially want the Newsletter to help you, the brand new owners, to learn to use your computers effectively. And while we have come a long way, we still believe we have a long way to go. We are always looking to improve those first few tough hours you spend with your new TRS-80. I sure wish there had been a Newsletter when I was getting started.

While on the subject of improvements, I have implemented a major new policy for software support. On January 1 we started using a new computer mailing list for the purpose of software support. Our policy for all disk, non-game software, will be to inform you by first class letter of all patches and re-releases. While the Newsletter and Computer Customer Services will still produce information on software updates, we intend to tell every owner on our mailing list of every bug that could effect their program. In order to implement this, we are creating a high accuracy mailing list of software owners.

It is very important for you to understand that the only way onto this list is with the software registration card contained in the software binder. Our Newsletter and our advertising mail lists are separate lists and do not contain any information on your software purchases. If you have registration cards you have not yet sent in, do it now! If you are not sure that you have the latest version of any given software package just call the nearest computer center or Customer Services and they will tell you what you need to do to be up-to-date. From then on you can expect a letter whenever we update a package you own.

Finally I would like to pitch another publication, one of a very specialized nature. There is a monthly newsletter written by lawyers for lawyers called, what else, The Lawyer's Microcomputer. It is unique in that it is only about the TRS-80 microcomputer. It has very useful information for the lawyer who has a TRS-80 or is considering the purchase of one. If you are interested write to R.P.W. Publishing Corp., P.O. Box 1046N, Lexington, S.C. 29072 or call (803) 359-9941. Until next month.

Getting Back To The Basics

Personal computers are still a relatively new idea. In this article we hope to acquaint, or re-acquaint, you with some guidelines that may provide you with "optimum" working conditions for the operation of your computer. Chances are you'll never encounter any of the problems we will discuss. However, being aware of potential problems and their causes can help you avoid them, or deal properly with them, if they should arise.

CHOOSING A LOCATION

The microcomputers, such as Radio Shack's TRS-80 line, differ from their larger counterparts primarily in speed and the amount of "on-line" data they can store and retrieve at one time. An ideal working environment is essential with both types of computers although it is not as critical with the TRS-80.

Any complex electronic equipment is sensitive to power line conditions affecting the voltage and current coming out of your wall socket. Computers are probably more sensitive than other electronic equipment because even the loss of one bit (one tiny electrical charge) of information can cause a program to "bomb-out" or a data file to be lost. This is rarely a problem, unless you are operating in an environment where heavy electrical machinery is in operation (i.e. office copiers, electrical industrial equipment, refrigerator). If you do have this type of equipment in your working environment, we suggest you isolate your computer's power by installing a "dedicated" power line, a line directly from your building's source of power to your computer.

Your computer's memory is "volatile," and it disappears if power is lost, even for very short periods. "Brownouts," periodic drops in line voltage, or power line "spikes," intermittent surges of very large voltage levels lasting only a fraction of a second can cause program and/or data to be lost or scrambled. If you are in an area where you experience these brownouts, spikes, or if power is lost completely on a regular basis, good data processing practice dictates that you periodically backup your program and data files. Since it is sometimes difficult to track down and eliminate these outside power problems, it is essential to have a recent backup to fall back on, in the event that any of these conditions exist. Power line problems are rare and many times can be solved before they occur by the proper choice of installation location for your computer system.

STATIC ELECTRICITY

In dry climates and certain seasons, you can walk across a carpet and feel a static discharge when you touch a metal object. Under some climatic conditions, even your clothing can build up this kind of charge, normally too small for you to feel. These static charges can damage magnetically-stored computer data. Larger charges can even wipe out your computer's memory or cause the computer to "lock up" (though this extreme type of static charge will rarely affect memory because the circuitry is well grounded). The ideal humidity level for the operation of a computer is 50% or above. If you live in a dry part of the country, the safest bet is to use a non-carpeted room for your computer and possibly even an anti-static floor mat at the computer operator's position. If you have already taken the aforementioned precautions and still experience static problems, we might suggest you investigate the purchase of a humidifier.

This is a rather infrequent problem in actual practice, so rest assured we're not implying that you will have this or any of the other problems discussed. We're simply explaining why you should consider carefully the location of your system and what you should do if the problems arise.

CASSETTES AND DISKETTES

Radio Shack's TRS-80 computers use magnetic storage media for permanent storage of programs and data files. Models I/III can use either cassette tapes or 5 1/4" mini-floppy diskettes. The Model II/16 uses either 8" floppy disks or a hard disk device.

Cassettes used for digital computer data must be of far better quality than those used in audio applications. A small "hole" in the magnetic coating of an audio tape causes no discernible absence of sound, but since 500 bits of data are recorded on tape each second, a small "hole" passing the head for only 1/500th of a second could cause loss of a bit or two and would thus render that tape file useless. We suggest you use certified digital cassette tapes, such as Radio Shack's 26-301, which have been individually tested and are certified not to lose bits of information.

Diskettes are much like cassette tapes but in a different form. They are round, flexible disks, magnetically coated, and housed in a protective jacket. Diskettes and cassette tapes are subject to the following rules:

1. Store diskettes and tapes in a plastic box, in a clean environment.
2. They should be kept away from electric or magnetic fields. This includes motors, magnetic tools, telephones, static electricity, excessive heat, etc.
3. For diskettes only:
   a. When not in use, store in an upright position in their storage envelope.
   b. Never touch exposed parts of the flexible disk.
   c. Do not bend or crimp a diskette.
   d. Use felt-tip and ball-point pens on the label.
   e. Insert the diskette into the drive carefully, and close the door g-e-n-t-l-y!! Don't force it.
   f. Remove diskettes from drive units before turning your system on or off.

WHAT NOW?

Now that you are aware of some important things to consider when setting up and maintaining the system, you can turn on your computer and operate it without any fears. Right? Well, we know it is not that simple. From time to time problems will arise that will not lend themselves to the various considerations or solutions offered by your computer Owner's Manual or software application manual.

Radio Shack's policy is not to sell you the equipment and leave you on your own. We want to provide you with knowledgeable and helpful people to support you, should problems arise. In the event you can't get in touch with a representative in your local store, we have provided access to trained personnel here in Fort Worth who are glad to help you when needed. These people have been divided into areas of expertise to provide you with the latest information concerning the products in their support group. The support group numbers are listed below.

Computer Customer Service Address and Phone Numbers

8AM to 5PM Central Time
Computer Customer Services
400 Atrium, One Tandy Center
Fort Worth, Texas 76102

Model I/III Business Group . . . . . (817) 390-3939
Model II/16 Business Group . . . . . (817) 390-3935
Languages and Compilers . . . . . (817) 390-3946
Color and Pocket Computer Group . . . . . (817) 390-3944
Hardware and Communications Group . . . (817) 390-2140
Educational Software . . . . . (817) 390-3302
Games, Books, and New Products . . . . . (817) 390-2133
Newsletter Subscription Problems . . . . . (817) 870-0407

Mass Mailing at the Naples Daily News

Naples Daily News
1075 Central Avenue
Naples, FL 33940

Using a home computer as a sales tool has become one way to obtain more national advertising at the Naples Daily News, according to National/Co-op Advertising Manager Rocky Strunk.

Armed with a Radio Shack Model III computer and a printer, the Naples newspaper is mass mailing marketing information and special section notices along with a personalized cover letter addressed to each advertising executive and mentioning their client or business throughout the letter.

"I can produce up to 70 letters per hour and the best thing about it is, there aren't any typos or strike-overs," says Strunk of his word processing system.

According to Strunk, word processing is a very efficient means of getting information out to advertising decision-makers that don't have time to look at form letters or an impersonal media kit presentation.

"Responses from agencies and advertisers have been much greater when approached by a quality letter typed to them and mentioning their name and business throughout the letter," Strunk said.

He also emphasized the importance of using direct mail in national sales efforts since the Naples Daily News, circulation 28,000, isn't represented nationally by one of the several newspaper rep firms across the country.

"You have to be able to generate interest in your market quickly in a letter by making it short and to the point," Strunk said. "Otherwise, it will end up in their circular file."

According to the national ad manager, the Naples market is loaded with statistics and demographics that usually attract attention from agency executives. Such factors as high household income, tremendous growth spurred by a new regional airport and interstate system, and a strong tourist trade have become selling points for the Southwest Florida market.

Although the same basic letters are used during letter campaigns, building a current name and address file is the most time consuming task in preparing a mailing.

"Unless you get the name of the right person controlling the account and then spell that person's name correctly, the mailing effort may be worthless," says Strunk of his computerized selling efforts.

Telephone calls and research are required to obtain names prior to a mailing. Because national accounts are continuously switching advertising agencies and personnel is changing within those agencies, maintaining an updated mailing list can become a difficult task.

According to Strunk, Naples has achieved about a 5% success rate thus far using computer-generated letters. He points out that the only investment required is the stationery used and a 20-cent stamp.

Usually a three to four letter campaign is developed when presenting the Naples Daily News to advertising agencies and national advertisers. This way letters can be kept short and still include all relevant information by presenting something different in each letter.

The frequency involved in writing several letters also keeps the Florida newspaper's name in front of advertising decision-makers and is most effective during planning periods for national advertising campaigns.

Starting in computers as a hobby, Strunk first got the idea of using his computer for work after purchasing a word processing program and learning how easy it was to produce quality letters. Equipment he uses includes a Radio Shack Model III computer with dual disk drives, a daisywheel printer, and a dot matrix printer.

Other business uses he has found for his home computer include producing mailing labels, managing salesmen's account lists, generating commission reports, lineage reports and projecting revenues.

Get Up and Running with Your TRS-80

By Linda Miller

Computers are everywhere these days—on desks, in homes, hidden away in cash registers, ovens, cars, and toys. It's anticipated that those reluctant to change will resist the innovative computer, and even the lionhearted have been know to cower when confronted with the mysterious computer. Many feel they are being drawn unwittingly and unwillingly into a world where they feel increasingly inept, illiterate, and ineffective. Often we have been led to believe that we are computer victims. When the amount due is incorrect and it is brought to the attention of the true perpetrator (a human being!!!), the error is frequently attributed to the innocent computer. "To err is human, but it takes a computer to really foul things up" has become a popular adage of our day. Meanwhile, the defenseless (but not indefensible) computer sits patiently waiting for the next instruction, which has been the computer's only option from the beginning!

Computers are sophisticated, technical, and inscrutable to many of us, but true to form, we won't be stopped from jumping on this technological bandwagon. No one wants to be left behind as the increasing numbers around us extol the virtues and practicality of this electronic workhorse.

GROUNDLESS FEAR

Like computers, cars are sophisticated, technical, and inscrutable to many of us, too, but that has never kept us from using them for transporting us wherever whim or necessity dictated. Fear rarely clutches at our hearts at the mere sight of an automobile except in situations where it looms as a menace to life and limb. You should no more be afraid of a computer than you are of a car. Computers don't even possess the kind of life threatening danger associated with cars unless we take a powered up one into the bathtub or have one dropped on us from the top of a thirty story building. Incidents of this kind are rare, in fact unheard of, except in the mind of obscure writers.

WHERE DO I BEGIN?

Productive use of a computer does not require intricate knowledge of hardware, languages, or programming techniques (though a passing acquaintance with all of these can be nice). What is necessary is an accurate assessment of what it takes to perform the task or tasks you need done. More simply put, it boils down to "What do you want the computer to do for you?" Other questions might be:

Is the computer for home, education, or business use? Or will it be used for a combination of these?

What type of data (accounting, word processing, etc.) has to be processed? Will it be large or small volume?

Do the people who will be using the computer have previous computer experience?

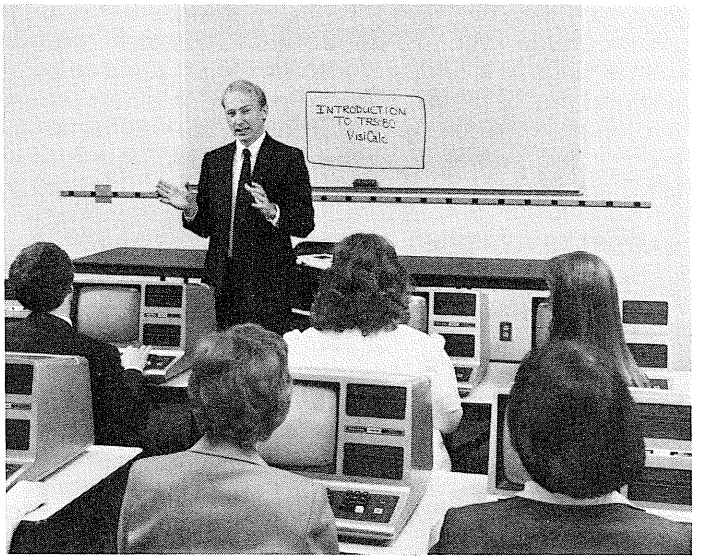
Where will the computer be used? Is portability important?

HARDWARE AND SOFTWARE

The computer salesperson can often serve as a helpful resource for answering your questions, since he or she has probably had experience answering similar questions before.

A salesperson can ease the transition from non-computer-user to computer-user by showing you what is available in his/her computer line and describing the capacities of each computer. The physical equipment (computer, printer, modem, etc.) is called hardware. Programs are instructions which are used to actually operate the computer and are called software.

While everyone recognizes the necessity of reliable hardware, equally important is the purchase of the right software. Software can be the most critical factor in the successful functioning of a computer system. If you were getting a new car and a driver for it, it wouldn't be hard to realize how useless the car would be if the driver couldn't drive. If the software is unreliable or unsuited for the assigned task, then no matter how good your computer may be, it will never operate at its full capability. Capabilities and capacities of both hardware and software need to be carefully considered.



ALONE AT LAST!

Once you've made your purchase, brought it to its new home or office, and removed it from the box, you suddenly find yourself alone staring into the cold, inanimate face of a video screen or LCD. (Unless yours is a Color Computer in which case you'll have to connect it to your television.) Gone are the lively games or Month-to-Date totals that appeared under the able hand of that glib-tongued salesperson. To a neophyte, getting a computer running for the first time without help is a challenging experience.

You are not alone. Included with all TRS-80 computers and software is documentation (otherwise known as operation and instructions manuals) which carefully explains everything from hooking the computer components and peripherals together to plugging it in, turning it on, and loading and running your first program.

Realistically, it will take a lot of work plus time, which may be peppered with bouts of mental anguish, before you feel completely comfortable with your computer. Just think of what it was like when you drove a car for the first time. Reaching a point where you could pass the driving test required a lot of work, but as the look on the face of a newly licensed driver attests, it's worth the effort. Learning to use a computer is definitely worthwhile and increasingly necessary.

MORE POWER TO YOU

All computers depend on electrical power whether from conventional wall plugs or batteries for life. A full sized TRS-80 requires a three pronged, 120 VAC 60 Hertz receptacle (which is probably just like the ones that you already have). It is best to have your computer on an dedicated line. If you have a computer, printer, and refrigerator all pulling electricity off the same line, you'll greatly increase the potential for crashed disks, re-booting systems, and the other fatal errors which are the stuff of which computer operator nightmares are made.

If you own a Radio Shack pocket computer, the Pocket Computer I requires four type 675 mercury batteries, and the Pocket Computer II uses four "AA" batteries.

HELLO, IS ANYONE IN THERE?

Once you've plugged it in and turned it on, you should begin to see signs of life from your computer. On the Model II, you'll see INSERT DISKETTE, while a Model III cassette system prompts you with CASS? Color Computers come up with all kinds of information such as version number, copyright, and licensing information. Pocket Computers tell you the computer mode (e.g. RUN, PRO, RESERVE), displays a prompt, and gives other pertinent information. Where there's life, there's hope!

CASSETTE SYSTEMS

So what happens next? Cassette based TRS-80s have built into ROM (Read Only Memory) an operating system that lets you write and run BASIC programs, save and load programs and data to tape, and operate peripherals such as a printer. The operating system gives you the ability to actually "operate" the computer. It handles all input/output, device interaction such as the keyboard, video, ports, etc. If an error occurs, it is the operating system that stops the action and gives you the clue (known as an error message) as to what's gone wrong. It handles all interfacing with other software such as compilers, programs, etc. Without the operating system, you could not run the computer. The software of the operating system and the hardware of the computer are mutually dependent. One is nothing without the other.

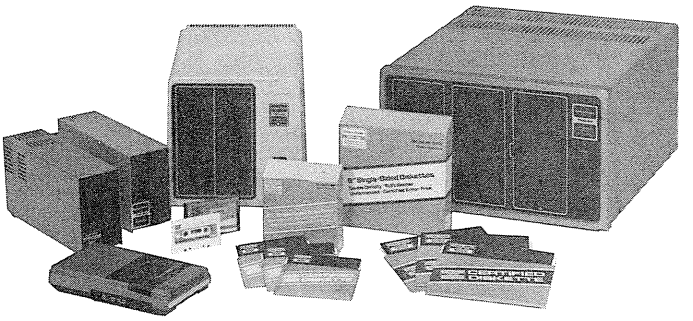
If your cassette tape player is connected, a cassette program is in place, and the play button is depressed, you can load in a BASIC or Machine Language program by following the instructions included with your program.

If you already know what you're doing, you can begin writing your own customized software. Most of us are not in that category—yet.

DISK SYSTEMS

On the Model II, the disk operating system loads in from disk when a TRSDOS disk is inserted in drive 0 at the INSERT DISKETTE message, and the door is closed. On the Models I and III, it loads when a TRSDOS disk is put in drive 0, and the Reset button is pushed. When the screen says TRSDOS READY, you're in business. From here you can go to BASIC, if it's available on your disk, and write your own programs, or you can follow the directions that accompany your software to load and run it.

The Color Computer should always be turned off before attaching the Disk Controller. If the drives are connected properly, the disk controller is installed, and the power is then turned on, you should get a message on the screen telling you that you are in Disk Extended Color BASIC. To keep your Color Computer running, make sure that the power is off before you install or remove any ROM cartridge or the Disk Controller.



WHAT IF THERE ARE PROBLEMS?

To avoid uncertainty and error, it would behoove you to read all the documentation provided with both the hardware and software. These materials are not just for the neophyte but will provide useful information as long as you own your computer. Familiarity with, and understanding of, documentation can prevent crashed disks and lost data in the future.

HELP IS AVAILABLE

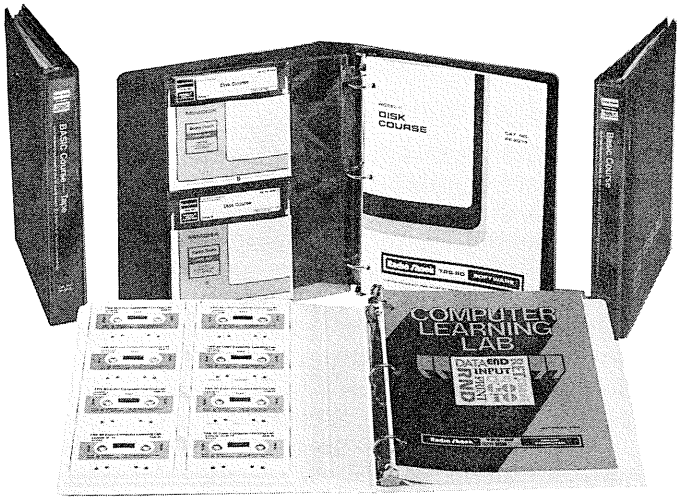
Once you've dispensed with the preliminaries and tried a few things on your own, you may want to take advantage of the operator course of instruction available at your Radio Shack Computer Center, which also offers programming and software classes.

There are innumerable how-to-books for the beginning programmer, and there are software packages such as Model III BASIC Tape Instruction Course, Model III BASIC

Course on disk, Model III Disk Course, and Color Computer Learning Lab for teaching yourself BASIC with the assistance of your computer.

In some instances, you may want to consult with the Customer Service Representative at your Computer Center, and if you're still perplexed, you may consider calling a Customer Service Representative in Fort Worth.

All of these resources are made available to insure that your computing time is as worry free as possible. The more knowledge and experience that you gain, the more trouble free will be your computing, and once you get it running, it will be easier to keep running.



Care and Feeding of TRS-80s

INTRODUCTION

A phenomenon of today's modern industrial world has been the incredible popularity of the personal computer. Enthusiasts everywhere have pounced on the microcomputer as an exciting challenge and opportunity. Small personal computers have found their way into every aspect of life, from home entertainment to financial planning. The TRS-80 computer, one of the first single board "microcomputers," is today one of the most widely used computers in the world.

As solid state technology reduced the physical size of the microprocessor, its computing power increased, and its purchase price plummeted. This amazing increase in the price/performance ratio is unique to the computer industry. In 1980, a successful computer manufacturer printed an interesting analogy stating that if the automobile industry had been able to reduce prices during the 1970's at the same rate at which the computer industry did, a 1980 Ford Mustang would have cost about $480.00. Now less than 3 years later, the analogy is similar, but it is applied to a Rolls Royce. If the same price reduction ratio to computers held, today's Rolls would cost about $2.50.

However, this article is not about Rolls Royces, nor is it about applications for a smooth-running TRS-80. It is a splash of cold water in the face of the average home computer user who, having made his purchase investment, feels his computer should run faithfully and flawlessly without any further attention.

IMPORTANCE OF COMPUTER CARE

Obligations to a computer are not unlike those to an automobile. Once you have bought it, you have to take care of it to insure that it runs efficiently and continues to operate without a major breakdown. Proper care for a computer should not be a sporadic thing any more than an oil change and tune-up should be for a car. As with an automobile, a computer requires a thoughtful, planned program of continual preventative maintenance to avoid that "breakdown 90 miles from the closest gas station."

Even as the purchase cost of computer hardware has steadily decreased, so have costs for computer service and maintenance steadily increased. Where barely 10 years ago the affordable cost for a computer service call was approximately $35.00 per hour, today a service call averages over $100.00 per hour. *(Editor's Note: Radio Shack currently charges $57.00 an hour for on-site service on a per call basis, that is for service not covered by a service contract.)* Current industry predictions are that by 1990, service rates will approach the astronomical figure of $500.00 per hour.

The era of the "throw away" computer may not be too far off. It would then be less expensive to buy a new one than to fix the old one. Naturally, it makes increasingly more sense to keep your computer and peripherals running as long as possible.

From these figures, it is clear that the total cost of running and maintaining a computer involves more than the purchase price. It behooves the computer buyer to plan ahead, to carefully consider a continuing preventative maintenance

program for his new computer. By following a simple computer care program, the computer user can avoid the shock of getting a gigantic bill for an expensive "overhaul."

HOW TO CARE FOR THE TRS-80

The TRS-80 can be cared for by following a few simple procedures for each of the computer components listed below.

Floppy-disk drive—This peripheral device is the one most likely to fail outright or marginally, causing disruption or actual loss of data. Fortunately, the disk drive is also the peripheral that can benefit most from careful maintenance. Often, the problem is with the floppy disk itself. You should use only top quality, full tested "certified" disks. However, even use of the best disks cannot guarantee that problems will not occur. Magnetic disks require careful handling.

The slightest bit of dust or oil between the recording head and the disk surface can cause improper contact. This can prevent data from being written on the disk and can interfere with reading data. The following rules for floppy-disk care are industry standard. You would be wise to follow them carefully.

1. Do not put fingers, pencils, or other objects through the head-access slot in the vinyl jacket.
2. Keep disks away from large motors or other magnetic fields.
3. Do not bend, fold, or wrinkle the disk's vinyl jacket.
4. Do not write on the vinyl jacket.
5. Write on a label before affixing it to the jacket.
6. Keep the disk in its envelope when the disk is not in use.
7. Keep the disk and envelope in a protected storage area.
8. Keep disks in an area with a temperature range of 50° to 110° F.
9. Avoid blowing cigarette smoke on the disks.

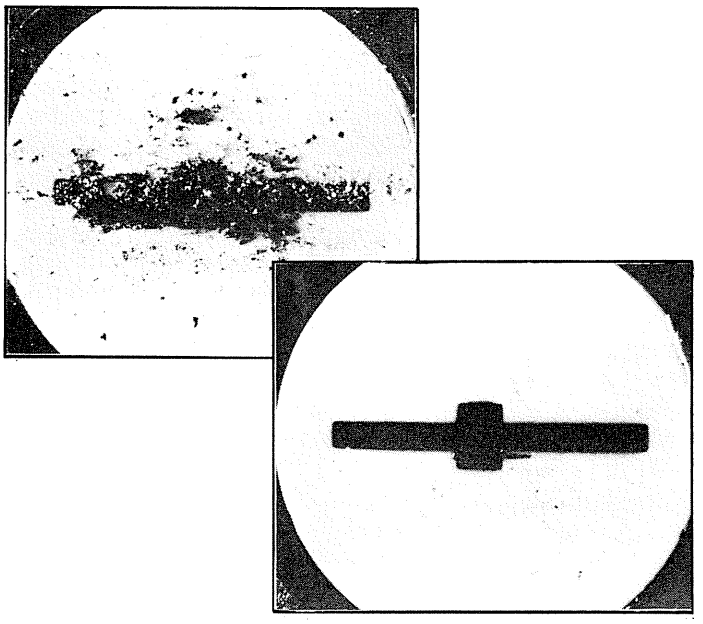


Photo 1. These enlarged photos of a read/write head show how a badly contaminated head was completely cleaned using the Radio Shack wet/dry head cleaning kit.

Caring for the disks is only part of the solution. Equally important is proper care of the recording head. During operation, the read/write head rides on the surface of the disk. When a ceramic head is in constant contact with a rapidly rotating magnetic disk, there is the continual potential for head contamination.

Contamination, in the sense used here, means that oxide from the disk is loosened in minute particles and smears onto the surface of the recording head. With oxide particles covering the recording surface of the head, magnetic signals can neither be recorded nor read. Until quite recently, the only way to rid a disk head of contamination was to have a qualified engineer dismantle a drive and manually clean the head surface by gently and carefully scrubbing it with a cotton swab soaked in alcohol. This procedure was both expensive and potentially dangerous to the drives. A safer and less expensive head cleaning method is now available to computer users. Radio Shack stores sell their own flexible disk drive head cleaning kit that takes about 30 seconds to use, costs about $1.15 per cleaning, and can be used by virtually anyone. This product uses the most effective method known in the computer industry today.

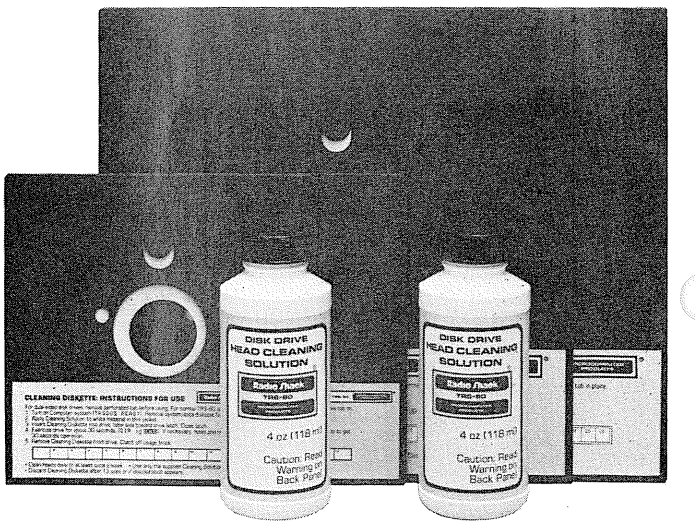


Photo 2. Radio Shack Head Cleaning Kits.

This method, known in the head cleaning industry as the "wet/dry" method, uses a proprietary cleaning solution and a cleaning disk of slightly porous, non-woven, non-abrasive polyester. The disk is sealed inside a modified diskette jacket. The procedure for using this kit is to saturate a portion of the cleaning disk with the solution and insert the diskette into the drive as you would a normal diskette. As the cleaning disk rotates, the wet/dry action of the disk on the surface of the head loosens oxide deposits and other contaminants and then gently buffs the head dry. This is the type of system recommended by Radio Shack (26-407 for Model I, Model III, and the Color Computer, 26-4909 for Model II and Model 16).

Printers—The second most vulnerable part of the computer system is the printer.

Being an electromechanical device, the printer is directly affected by environment. Paper dust has a way of infecting the movable parts of a printer causing at best distorted print and at the worst a breakdown of its operation.

Two types of printer which interface to the TRS-80, are Dot-matrix and Daisywheel. The first (Dot-Matrix) has very

few movable parts, forming letters by a series of very thin wires at the print head. The areas that a user can influence here are the platen and the print head. These should be kept free of accumulated dust by wiping them with a lint-free cloth either before or after use. In addition, a plastic cover should be placed over the entire printer when it is not in use.

The second type of printer is called a letter quality, or "daisywheel" printer. The same care should be followed as with the Dot-Matrix with one addition. The daisywheel (print element) itself can become contaminated with ink, bits of paper dust or foreign contamination. This shows up first in the tiny apertures in commonly used letters such as "p" or "e." An approved type element cleaner is an effective and simple way to assure legible, clear print. One further point about the daisywheel: it is an extremely sensitive device. When it is not in place on the printer, it should be returned to its storage box—not left sitting on a desk or in a drawer. A misaligned or bent arm can cause ghastly problems.

Photo 3. Radio Shack Daisy Wheel Printwheel Cleaning Kit—26-1320

Central Processor—This is the "brain" of the computer and fortunately one of its most reliable parts. Because the average personal computer system draws power in the range of 3 to 5 amps, you should not overload the same circuit with other appliances. Overloading a circuit could result in power surges that could blow a fuse or cause unpredictable problems. A typical indication that a fuse has blown is that absolutely nothing happens when the power switch is turned on. If a fuse does blow, replace it with the size recommended by the manufacturer. If the fuse continues to blow, you must bring the computer to a repair location.

Radio Shack sells two power control accessories which can make connecting your computer to power lines more effective. The Power Line filter (26-1451) is recommended for Model I and Color Computer owners. The power line filter limits AC power line interference. Its single switch controls eight outlets. The second item is the new Automatic Control Power Strip for Model II, III, or 16. This switch automatically activates up to five peripherals when you turn your computer on. In addition to the automatic power on feature, this power strip contains two stage surge protection for power line spikes.

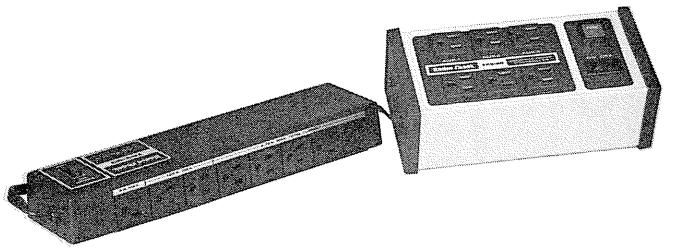


Photo 4. Power Line Filter (26-1451) and Automatic Control Power Strip (26-1429).

Another problem that can affect the operation of the central processor is static electricity. Static electricity, that annoying and shocking "zzzap" so common indoors in winter, can cause data loss or even component failure. An antistatic mat or an antistatic spray is an excellent investment to prevent such failures.

Photo 5. Anti-Static Spray (26-515) and Anti-Stat Screen Cleaner Kit (26-1318).

CONCLUSION

It is neither expected nor implied that every TRS-80 computer user should be a qualified electrical engineer in order to keep his computer running smoothly. However, one source of preventative maintenance can be worth many pounds of annoyance, aggravation, and expense. If properly, intelligently, and simply cared for with products readily available in every Radio Shack store, the computer user can postpone or avoid breakdowns and expensive service calls.

CompuServe Information Service–An Overview

Editor's Note: The CompuServe Information Service is one of the largest information and entertainment services available to owners of personal computers and computer terminals. With each issue of TRS-80 Microcomputer News, various features of CompuServe will be discussed. The CompuServe Information Service is sold at Radio Shack stores nationwide and in Canada.

So you bought a personal computer or a computer terminal. Any ideas on what type of things you want to do with it? Maybe some programming? How about some home services or making the most of those investment ideas you've had? Maybe you want to do some banking, but you don't want to go to the bank. How about going to the CompuServe Information Service? We have what you're looking for.

What is the CompuServe Information Service? The CompuServe Information Service (CIS) is a videotex service enabling thousands of personal computer users to access a variety of business, consumer, and entertainment offerings including electronic banking and shopping, current and historical corporate stock and commodities information, electronic mail and real-time communications, family information and education, computer games, up-to-the minute news, and computer power for programming activities.

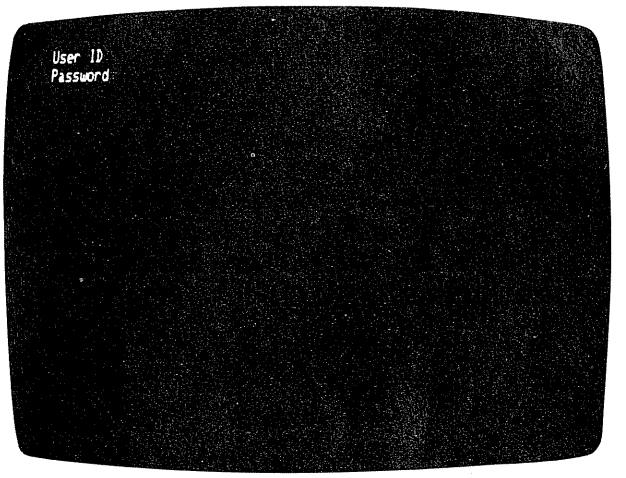
Where do you find this CompuServe Information Service? At your nearest Radio Shack computer center. CompuServe is available at Radio Shack outlets in the U. S. and Canada. Ask the gentleman or lady behind the counter for the CompuServe Information Service Starter Kit. This Starter Kit is your gateway to a world of information.

Does it cost to pass through these gates into the world of information? Your CIS Starter Kit sells at Radio Shack for $29.95 ($19.95 for a dumb terminal) and includes your User ID number, secret password, CIS User's Guide, and one free hour of time. With these components and your personal computer equipment, you'll be able to access the service in more than 150 cities in the U.S. and Canada through the CompuServe network.

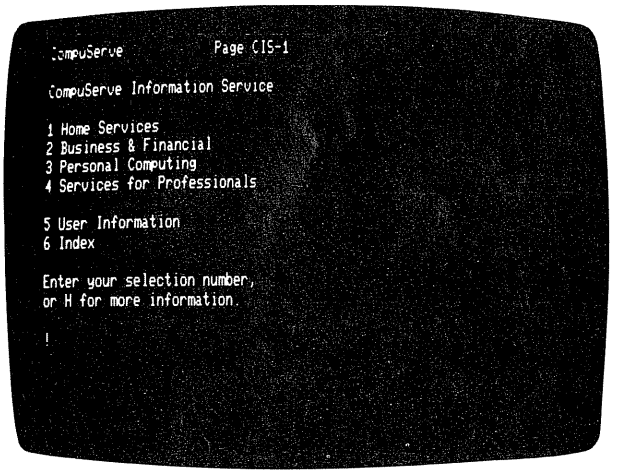
What other costs are there? Our standard service connect time rate is $5 per hour from 6 p.m. to 5 a.m. weekdays and all day on weekends and holidays. If you access the service during the prime service hours, which are 8 a.m. to 6 p.m. weekdays, it will cost $22.50 per hour for connect time.

How do you do all this? Once you have your equipment and your Starter Kit, you hook up to the CompuServe network. To do that, you connect your computer to your telephone and television set. Determine the local access number for your city, and dial it on the telephone. You will receive a high pitched tone. This means the computer has answered and is now saying "hello" to you.

At this time a message will appear on your screen which prompts you for your User ID number. Once that is inserted, another prompt will appear requesting your secret password. As you type this, the cursor will remain stationary on your screen, thus providing you with security against others learning your password without your permission. You are now connected with the CompuServe Information Service.

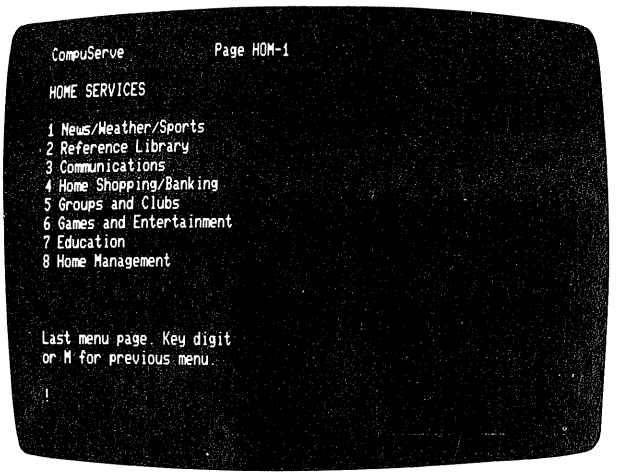


So what happens now? The CompuServe Information Service main menu will be displayed on your screen. It reads as follows:

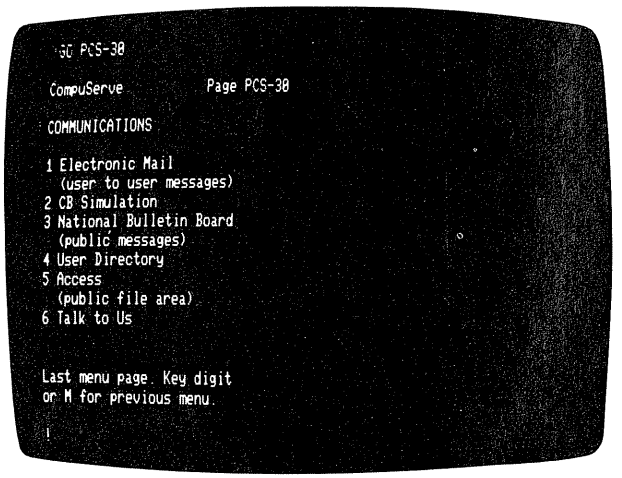


You will next decide which category you'd like to investigate and then type it in at the CIS prompt.

Where will those topics lead you? By typing in one of the six numbers, you will be taken to a submenu which lists the topics for that category. You then choose a topic from that category and continue to investigate the service.



This approach is often called a "menu driven system." To bypass the menus, CompuServe also offers "Go" commands. By typing "Go" followed by a specific electronic page number, CompuServe will take you directly to the page containing the information you want.



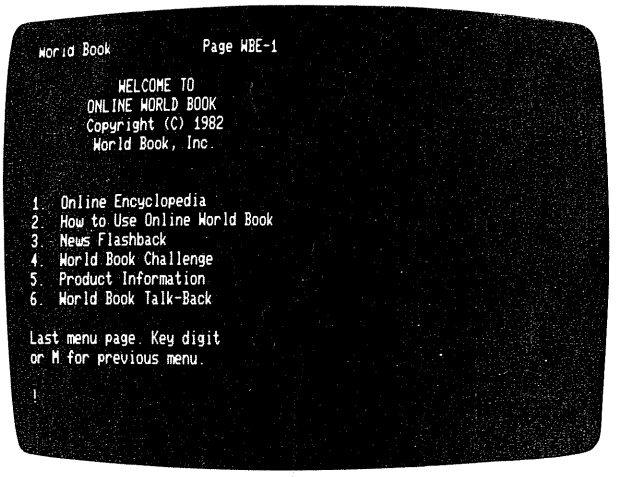
What kinds of services will you find? We offer many types of services as discussed above including three comprehensive and innovative offerings.

The On-line World Book Encyclopedia provides an electronic reference service for CompuServe users at no extra charge other than connect time. The 22 volume set features 31,000 subject entries with a 10-million-word text. There are a variety of services offered in the World Book, including a Help section with details on how to use the service; the World Book Challenge, a section for trivia and quizzes; Flashbacks, which features current news tied in with history; Today in History, a look at what happened "on this date" in history and a Feedback section for customer questions and comments.

The World Book reference service utilizes a search term method of finding the articles you wish to read. The search term allows the user to insert as many as 30 or as few as one or two characters to carry out the search for a specific article. A search term of one or two characters produces only articles which match those terms exactly, whereas a term of more than two characters presents all articles that begin with that name.

Helpful hints for users of the service include getting acquainted with the articles. Many of the articles, such as those on foreign countries, contain sections describing the lifestyles. Articles such as those on history are written in chronological order making it especially easy to become acquainted with their arrangement.

All of the World Book articles include helpful features, such as the Phonetic Spellings category, which is provided for the searching of unusual or unfamiliar words. Facts in Brief are tables of key facts about states, provinces, and other demographics. And Cross References are references that direct you to other entries for additional clarification. Other useful sections include Related Articles, Questions, and Bibliographies.



And what about the other services? There is the Huntington National Bank's "BancShare," the service of electronic home or office banking. BancShare operates through our computer network and a computer terminal personal computer in the Huntington customer's home or office in over 300 cities in North America or by a long distance phone call from anywhere in the world.

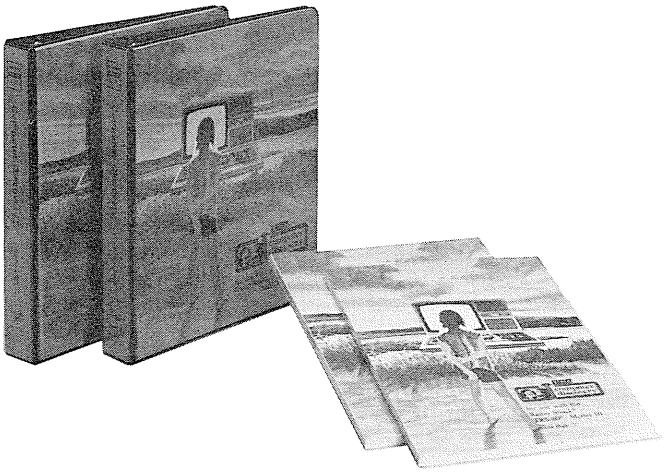
Huntington customers link their computers to the bank's computers through CompuServe to pay bills, transfer funds between accounts and review their checking and savings accounts and loan balances. Customers are also provided with interest rates, news of new banking products and services, feature articles and a Feedback service enabling them to electronically communicate with the bank.

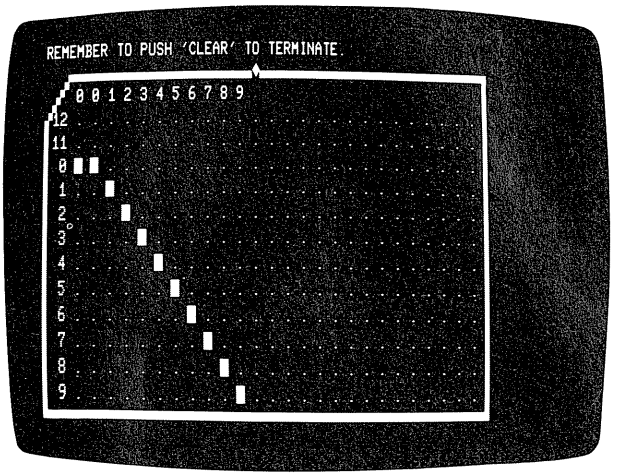
The procedure for personal and business accounts is the same and follows the identification number and secret password sign on procedure of other CIS services.Other banks offering bank-at-home services through CompuServe include Shawmut Bank in Boston and United American Bank in Knoxville and Memphis, Tenn.

(Continued on Page 16)

Getting Started with Computer Discovery™

"Getting started" in computing can be easy and fun with the SRA® Computer Discovery™ program. Computer Discovery for the TRS-80® Model III 32K disk system is a courseware package that teaches secondary students about computers — what they are, how they can be used, and how they can affect our way of life. Workbooks and computer activities on diskette are the media used in Computer Discovery.





Computer Discovery is designed to build computer literacy in four major areas:

1. Computer History
2. Analysis and Programming
3. Computer Concepts
4. Impacts and Applications

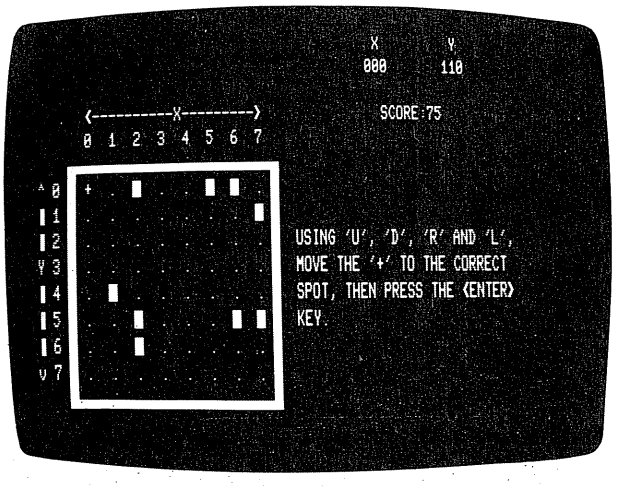
Lesson material is presented in the student workbook. Then students reinforce their understanding through hands-on exercises at the computer.

Chapter One of Computer Discovery, "History," introduces students to computer history and general computer terms. It traces the development of calculating machines, programmable machines, and the computers that combine the capabilities of both kinds of machines. At the end of the chapter, the student should be able to match advances in computing with inventors and dates, and should understand how each advance relates to computing today. Exercises in the student workbook test the student's understanding of computer history and computer vocabulary. Model III computer activities for Chapter One include a tutorial about the Hollerith card (or "punched card"), plus exercises that let students practice encoding Hollerith cards on the computer display.

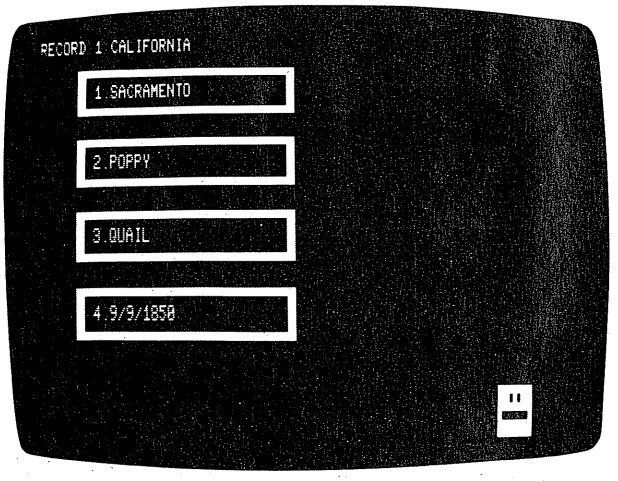
Chapter Two, "Analysis and Programming," introduces programming concepts. Students learn about algorithms by making flow charts that tell how to carry out everyday tasks. The difference between ambiguous statements and unambiguous statements is explored. At the computer, students use simple commands to make an on-screen "robot" move around the screen and kick a ball. These computer exercises allow the student to progress from simple to more advanced programming concepts (such as the use of conditionals and subroutines) and provide a good background for study of a real programming language such as BASIC.

Chapter Three, "Computer Concepts," uses familiar examples to show how a computer works. The computer is compared to a human clerk who records payments according to very specific instructions (the program) given by the boss (the programmer). Parts of the computer are also discussed. The computer's input device is compared to the clerk's "In" basket, while the output device is like the "Out" basket.

A game of "Binary Bingo" is one of the Chapter Three computer activities. Students are given a Bingo format on the screen and are given the binary form of one "X" and one "Y" number. They convert binary "X" and "Y" to decimal numbers and then place a mark in the square designated by decimal "X" and "Y." Ten points are given for each correct answer and five points are subtracted for each incorrect answer. The object of the game is to complete a row, column, or diagonal, making as many points as possible.



Chapter Four, "Impacts and Applications," discusses the role that computers are playing in society today and asks the student to see how many ways computers affect his or her own life. Representative computer careers are discussed. The chapter also raises ethical questions such as the computer's effect on privacy. And profiles of computer use in supermarkets, medicine, and the U.S. Census are presented. At the computer, students reinforce their understanding of the "database" by using a framework that lets them create a database with information about states and other databases that could be used as study aids.



Two versions of Computer Discovery are available from Radio Shack—one with workbooks at the sixth-grade reading level and the other with workbooks at the ninth-grade reading level. The workbooks look alike and present the same subject matter in a parallel way, so students of different reading abilities can work together in the program. The Computer Discovery Instructor's Guide includes instructional objectives, bibliography material, additional activities, and the answers to all chapter exercises.

Computer Discovery for Junior High (Cat. No. 26-2630) and Computer Discovery for Senior High (Cat. No. 26-2632) both include interactive exercises on diskette, 25 student workbooks, and the instructor's manual. These packages are listed as $189.95 each, though prices may vary at individual stores and dealers. Additional workbooks for junior high (Cat. No. 26-2631) or for senior high (Cat. No. 26-2633) are available at a list price of $4.25 each. For further information, contact your local Radio Shack store or Computer Center.

The developer and original publisher of Computer Discovery, Science Research Associates, Inc., is widely known by professional educators as an established educational publisher. Before SRA released Computer Discovery for classroom use, the program was field tested at three Illinois secondary schools. Now Computer Discovery for the TRS-80 Model III joins the list of Radio Shack's computer education offerings. These computer education materials include Radio Shack's Basic Computer Literacy package (Cat. No. 26-2755), the "My TRS-80 Likes Me" teacher's guide (Cat. No. 26-2751), and the Computer Education Series for secondary students. (Volumes One through Three of the Computer Education Series teach programming in the BASIC language.)

The Problem of Evaluating Courseware

By William D. Gattis
Director, Radio Shack Education Division

Editor's Note: The following article by William D. Gattis, Director of the Radio Shack Education Division, first appeared in Electronic Learning Magazine, published by Scholastic Inc. Copyright© 1982 by Scholastic Inc., All Rights Reserved.

The teacher who must locate suitable microcomputer courseware for the classroom can face a difficult and frustrating task. Too often, I hear the same story of disappointment with instructional programs that are not suitable for classroom use. Typically, these include at one extreme programs that are developed by technically competent programmers but that are not instructionally sound, and at the other extreme programs that do make sense from an instructional standpoint but that suffer from an amateurish job of programming.

Our own experience at Radio Shack in reviewing hundreds of educational programs submitted to us as possible products tends to confirm this. A well-crafted program that makes full and efficient use of the computer it runs on and that also embodies an effective instructional approach is a rare find.

Not only are programs of this quality uncommon; they almost always have been developed through a lengthy process of testing and revision in actual classroom use. This single criterion of whether a program has been used in a classroom for any appreciable length of time has become the key to our own initial screening of submissions. The process of classroom use and revision and change to the programs based on that experience is central to our in-house development and field-test program as well. I recommend that any teacher considering a courseware package for use in the classroom begin by asking the following questions:

1. Has the program been used in a classroom? If so, where has it been used? If the package doesn't

have any history of classroom use, or if the seller can't direct you to a user site, you would probably be wasting your money, as well as a lot of valuable classroom time, in experimenting with an untested and unproven program.

2. How has the program been used? Has it been used as a supplemental program? In a learning lab? What kind of students participated? A program that is successful in one school or classroom may not be in another; differences in the way it is used are usually the reason.
3. What has been accomplished with the program? Was it effective as an instructional program? Was any attempt made to measure achievement gains?

It may be worth the time or expense to write or telephone one or more users, particularly if the program you are considering is an expensive one or if it is important to your classroom plans. There is no better or more objective source of information about a program than teachers who have used the program in a classroom.

Finally, I would like to comment about the "courseware reviews" being published in a number of educational magazines. To the extent that a review addresses the questions that I have listed, I would say that it was a worthwhile source of information for a teacher who wants to consider a particular program. However, I have not yet seen a single review in any publication that even begins to address these key questions.

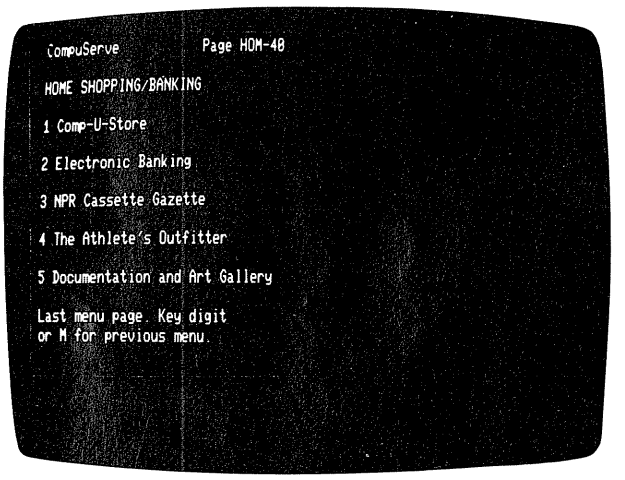
Instead, a typical review involves a sample of the program obtained from a publisher and sent to a teacher for a "review" that is little more than a quick reaction, usually under the pressure of a publishing deadline that is only a few weeks away. The reviewer may try the program in his or her classroom for a short time — but unless the program being evaluated is limited to the simplest of drills or educational games, such an approach is unlikely to even begin to constitute any real evaluation.

CompuServe (From Page 13)

And the third service? That is the home shopping service called Comp-U-Store. Comp-U-Store used to be known as Comp*U*Star until Aug. 1, 1982 when they re-debuted making the full shop-at-home database accessible for trial membership for new members and for demonstration for those who had been subscribers to CompuServe. Comp-U-Store also offers free VISA cards to qualifying members. (Please note that as a qualifying member you are eligible for a "no fee" VISA, but credit approval is up to the discretion of the bank.)

Rather than the previous additional charges to use Comp-U-Store, members can now access the service for the standard CompuServe service rate of $5 per hour and $22.50 per hour for prime service. Comp-U-Store also offers an electronic auction which allows customers to bid on items twice a week rather than just once a week.

Comp-U-Store is a discount shop-at-home system offering over 50,000 brand name products, all available for home delivery at discount rates. Products include brand name appliances, cameras, musical instruments, TV's, and stereos equipped with full guarantees and manufacturer's warranties in effect.



So you like what you hear and you want more information on CompuServe? Questions and comments about the CompuServe Information Service can be sent to Richard A. Baker, editorial director, or Jacqueline A. Farthing, assistant editor, CompuServe Information Service, 5000 Arlington Centre Blvd., P. O. Box 20212, Columbus, Ohio 43220 or through Feedback, main menu item 5, CompuServe User Information.

I Bought a PC-2

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I purchased a TRS-80 PC-2 pocket computer 3 weeks ago. I wanted a computer to use until I found the larger one I want. Besides, a pocket computer has the advantage of portability which the larger ones don't.

Being a computer science instructor, I am looking for a machine with disk capabilities and other features. In the meantime, I wanted a small, cheap, and portable, but powerful computer.

When Radio Shack announced their PC-1 a year ago, I anxiously tried it. I found it slow for my uses. Editing was very slow and so was execution. My standard benchmark of taking the square root of (20), ten thousand times would have taken over 2 hours. (Typically, I tried it for 10 to 100 square roots, and computed the time needed for 10,000.)

This summer, when the PC-2 reached the stores, I again rushed out to try it. My benchmark needed between 8-9 minutes, near Radio Shack Model III.

However, there were problems. Most dealers weren't familiar with the PC-2 yet. At one store, I spent an hour just trying to get the PC-2 to print my name. All I could do was multiply 5 by 6. In retrospect, that computer only needed to be reset—but neither the salesman nor I knew about that. At another dealer, the salesman understood the PC-2 but was too busy with other customers. After we struggled for an hour, the salesman suggested that we type "UNLOCK." Like magic, the PC-2 started to work. I tried many little tricks on the PC-2 (including my benchmark) and was impressed. After a few more visits, I bought the PC-2, the printer/cassette interface, a minisette-9 cassette, and an 8K RAM. I've been experimenting with the PC-2 now for 3 weeks. Below I'll explain some of my findings.

First of all, the keyboard is tiny: a mere 7 inches wide, by 1 3/4 inches tall (the entire PC-2 is a little larger). Though the key-board has the usual QWERTY layout, the keys are too tiny for speed typists. There is both a ⟨**SML**⟩ (small) key and a ⟨**SHIFT**⟩ key. The ⟨**SML**⟩ key sets up lower or upper case for usage. The ⟨**SHIFT**⟩ key lets you use the opposite case for the next key stroke. It also lets you access the character printed just above the next key you strike. Unfortunately, the ⟨**SHIFT**⟩ key is just above the ⟨**CL**⟩ (clear) key; many times I erased my line with the ⟨**CL**⟩ key in trying to reach the ⟨**SHIFT**⟩ key.

Several of the most frequently used punctuation symbols require two key strokes, including the colon, comma, and semi-colon. In contrast, less frequently used symbols, such as the sharp, percent, and ampersand, require a single stroke. However, the user can program the former to act like the latter.

The top row of keys has 6 special function keys which can be used to define up to 18 special strings. If left undefined, they take on the meanings of the characters printed above them.

The ⟨**DEF**⟩ key is used with other keys to generate character strings or commands. For example, ⟨**DEF**⟩ followed by ⟨**Y**⟩ is short for RETURN. In fact, all of the letters in the QWERTY row are pre-defined. These pre-definitions are not shown on the keyboard. But Radio Shack includes a plastic cut-out sheet with these pre-definitions typed out. I glued my sheet (at the corners) on my PC-2 for quick references.

In your BASIC program, you can label a line with a letter below the QWERTY line inside quotes. For example:

```
70 "B"WAIT 64:PRINT "BLUE"
```

This line, and those following it can be executed by the ⟨**DEF**⟩ key, followed by the letter ⟨**B**⟩. This is a very handy feature, as it allows you to have 18 different programs in memory at once, each accessible by just 2 keystrokes. If 18 is not enough, you can give programs longer names and use a different method to run them, as shown later.

Most dealers were confused about the ⟨**RCL**⟩ key and the key to its left (I'll call it ⟨**UD**⟩ key, as it has a triangle pointing up, and another pointing down). The ⟨**UD**⟩ key lets you switch to reserve areas I, II, III; the functions F1 through F6 can be defined differently in each of these areas, allowing you to save 18 different character strings (defined using the "reserve" mode), accessible by a single key stroke (if you are in that area). The ⟨**RCL**⟩ key lets you see how you defined those function keys (if you bothered to document them while in the reserve mode). So neither the ⟨**UD**⟩ nor the ⟨**RCL**⟩ key is essential to use the PC-2. You may need the ⟨**RCL**⟩ key initially to set a prompt. But after that, you do not need either key.

On the right, there is a ⟨**MODE**⟩ key, which permits you to enter 3 modes. Depressing this key successively switches you back and forth between program mode and run mode. To set the reserve mode to define the 6 function keys, you depress the ⟨**SHIFT**⟩ key followed by the ⟨**MODE**⟩ key. But again, beginners can skip this.

The PC-2 permits many convenient abbreviations, such as I. for input, DE. for DEGREE, U. for USING, and M. for MEMory—quite nice. But some of these are redundant. For example, ⟨**DEF**⟩ followed by ⟨**Q**⟩ also gives you INPUT in 2 keystrokes.

When I bought my PC-2, hardly anything worked. The manual says when your PC-2 hangs up, press the ON key, and press a pen in the ALL RESET hole (in the back of the PC-2) simultaneously for 15 seconds. It failed. The MEMory command said I had 0 bytes of memory left. So I returned my PC-2, assuming the RAM was bad. Not so. The documentation was wrong. We needed 30-40 seconds, not just 15.

Editor's Note: To properly initialize the PC-2 for operation after inserting batteries for the first time, or after pressing ALL RESET, follow this procedure:

1. *After inserting the batteries and turning the unit over, the display should read:*
   NEW0:CHECK?
2. *At this point, press* ⟨**CLEAR**⟩.
3. *Be sure you are in PROgram mode. If not, press* ⟨**MODE**⟩ *until PRO is displayed.*
4. *Type: NEW0* ⟨**ENTER**⟩.
5. *Press* ⟨**SHIFT**⟩⟨**MODE**⟩. *The PC-2 will then be in RESERVE mode.*
6. *Type: NEW* ⟨**ENTER**⟩.

This procedure will clear the PC-2's main and auxiliary memory areas.

From there on the PC-2 worked flawlessly. Several times I was tempted to return the PC-2 again; but I didn't, for in every case, I had misinterpreted the manual. Further experimentation cleared up the problem. I didn't return to the dealer except to pick up my 8K RAM and cassette drive, which were not in stock when I bought my computer.

The PC-2 manual has many errors and crucial omissions. Hopefully my notes here will help you reduce the amount of experimenting you'll need until the promised new manual comes out.

Let's first use the computer as a calculator. We'll assume that the batteries (4-AAs) are in place, that the computer is properly reset, that it is not in the "LOCK" state, that it is "ON", set for capital letters, with the prompt showing. Press the ⟨**MODE**⟩ key repeatedly until the display shows "RUN" at the top. Type ⟨**5**⟩⟨*⟩⟨**6**⟩ followed by the ⟨**ENTER**⟩ key. Note the 30 at the right. Let's add a term to this: type ⟨+⟩⟨**9**⟩⟨*⟩⟨**8**⟩⟨/⟩⟨**7**⟩ on the display; you did not have to copy the 30 over by hand. After the ⟨**ENTER**⟩ key, you see the answer 40.28571429 shown. Note the 10-digit accuracy. Suppose we want to use this in later calculations but don't want to write it down. Press cursor right key (the key with a triangle pointing right). Our full expression shows up, with a blinking cursor on the 3 of the 30. Use ⟨**SHIFT**⟩ followed by cursor right, this combination, three times, to shift the expression right 3 columns. Now we can type ⟨**T**⟩⟨**M**⟩⟨=⟩ followed by ⟨**ENTER**⟩. The same answer appears. We can now use TM in place of that awkward number. The calculator will forget the expression but not the value.

We can also place several calculations on the display at the same time, as shown on page 48 of the manual:

A=5/(12−4),B=87/24,C=12/(7+8),A*B/C

Depress ⟨**ENTER**⟩ and you see the result of A*B/C.

You can use functions in this calculator mode, such as RND 17 (random integer between 1 and 17), TAN 30 (tangent of 30 degrees or radians), depending on whether RAD or DEG shows on the display.

Enough on the calculator. Let's write several short BASIC programs. Depress the mode key. "RUN" should disappear from the top of the display, and "PRO" (for program mode) should appear. Depress cursor up (key with an arrow pointing up) to see the last line of the current program. Suppose it is 15990:END. We'll start our program just beyond this so as not to destroy anything. Our first program will be to print my name. Type the following lines, followed by ⟨**ENTER**⟩:

```
16000 "JIM":PRINT "JAMES L. BOETTLER"
16010 END
```

Note that line 16000 was too long to fit on the display of 26 letters; but it scrolled right for you automatically, as you entered it. Depress ⟨**MODE**⟩ key to enter RUN mode and type G."JIM followed by ⟨**ENTER**⟩ key; my name should appear. Note that I named it "JIM" and used a "GOTO" command to execute it. We could use just "J" as a label and execute it by ⟨**DEF**⟩⟨J⟩ (just 2 keystrokes) if we knew there were no programs with that label already. Or we could omit the label completely and use the G.16000 command.

With our first success, let's add a second line: depress ⟨**MODE**⟩ to set back to PRO mode and type: 16005 PRINT "572 SHERRIE LANE" followed by the ⟨**ENTER**⟩ key. Switch the mode and execute it. Our first trouble. Only the first line is printed. We see the second line only by depressing the ⟨**ENTER**⟩ key again. How can we make it automatic?

Back to PROgram mode. Use cursor up to reach line 16000. Cursor right until you reach the first colon. Insert columns by using ⟨**SHIFT**⟩ cursor right, 5 times. Type in :W.64 followed by ⟨**ENTER**⟩. We have inserted a WAIT statement. Back in the program mode again on running the program, we will find my name showing for 1 second and my address for 1 second.

These 2 simple programs should give you the flavor of the PC-2. From now on, rather than describing programs, I will describe features of the BASIC, for brevity, since this is not intended to be a manual.

First, the storage of programs is very compact. Before I got my 8K RAM, I had only 1.85K of RAM for programming. I wrote around 60 lines of short programs and still had half of the memory left. In contrast, a program this size would use up about 3-4K on the PDP-8 computer at the college where I teach. Radio Shack does this by compaction. Each key-word is replaced by a 2-character code. So are the line-numbers. Extra spaces are removed. I determined this by playing with the MEMory command and by deleting characters in lines one-by-one.

On the PC-1, variable names were restricted to 1 letter. But on the PC-2 they can be any length, although only the first 2 letters are significant. Thus AV and AVERAGE are treated as the same variable. Their values can reach nearly 10E100 (10 to the 100th power), and can maintain 10-digit accuracy.

String variables end in $; they can save up to 16 characters as values. This is a severe restriction for my use. But it turns out that one- and two-dimensional string arrays can have elements up to 80 characters long. And these must be dimensioned: DIM AA$(5,5)*80. As a general rule (not mentioned in the manual), you should precede your DIM statements by a CLEAR statement. Otherwise, on subsequent executions of your program, you will encounter an "array already dimensioned" error. In fact, it's a good idea to start each program with a CLEAR statement, to reset all variables to 0 and strings to null, before execution (unless you need values from a previous program). The max array size is 255 elements.

If you use strings in DATA statements, they must be enclosed in quotes. If you have several programs in memory at once, use READ/DATA with extreme care; you may accidentally read data set up for an earlier program. There are simple ways to circumvent this program if needed.

As in most BASICs, the LET is optional. (But we'll see an exception below.) In the PC-2, you can assign logical values to variables. For example:

```
17005 K=(X>Y)
17006 IF K THEN PRINT "TRUE"
```

In this example, "TRUE" will be displayed if X>Y; otherwise, the PRINT will be skipped.

The condition in the IF statement can use AND, OR, or NOT, as in most better BASICs. However, there is no ELSE clause. Further, the word "THEN" must be followed by a line number, a line label (in quotes), a string variable, or a key-word. If an assignment statement immediately follows the "THEN," then the key-word "LET" is required. By the way, the manual documents only the use of the line-number after "THEN"; I found the rest out by experimentation.

The other branch instructions also allow you to use line numbers, line labels (in quotes), or string variables. These include GOTO, GOSUB, ON ERROR GOTO, ON . . . GOSUB, ON . . . GOTO. For example:

```
17009 Z$="SONG":GOTO Z$
```

is legal. A nice feature.

The PC-2 has many built-in functions. The ( ) around the arguments is optional. Most of the functions are conventional. A few are not. TAB can be used only with the printer (using LPRINT instead of PRINT). On the display, TAB is replaced by CURSOR. With functions GCURSOR, GPRINT, and POINT, you can control every dot on the 7 × 156 dot display. There is the ASC(A$) function giving the ASCII Code of the first character of string A$, and CHR$(a) giving the character for ASCII Code a. However, the characters are not conventional. The set includes a square root sign and Greek letter Pi after capital Z. You have no access to control characters. To set a bell (character 7 in ASCII), you need to use the BEEP function.

The BEEP function is badly documented in the manual. It is of the form:

```
BEEP N, C, D
```

where N is the number of beeps, C is related to the pitch, and D is the duration. By comparing the pitch with my piano (which hasn't been tuned in 2 years), I found that C = (58000/f) – 7.5, where f is the frequency. I used middle C (f = 262 cps) for my reference. For each half step above middle C, multiply the frequency again by 2^(1/12). The manual implies that frequency and C are linear—definitely not true. The manual says the lowest pitch (at C = 255) is 230 cps; and the highest (at C = 0) is 7000 cps.

The PC-2 has a clock accessible by the TIME function, giving you the month, day, 24-hour clock, minutes, and seconds. The clock lost no more than 15 seconds in 2 weeks.

The PC-2 shuts itself off after 7 minutes of non-use. But the programs and data and everything (except the display) remain intact while the power is off. We took the batteries out and put in new ones and found that none of our programs had been destroyed. But when we left the batteries out for half an hour, only a few lines of our programs were left.

Editor's Note: Normally, the PC-2 will have enough power to retain memory contents for 1 to 2 minutes during battery change. To be sure memory is retained, follow the instructions given on page 13 of the PC-2 Owner's Manual. The ability of the PC-2 to retain memory during a battery change depends on the condition of the old batteries (if they are dead, do not expect the PC-2 memory to retain its contents). If the batteries were very weak or dead, it may be necessary to re-initialize the PC-2 as we described earlier.

The PC-2 needs 6 volts (4 AA batteries) whereas the printer needs 9 volts. Yet, the same AC adapter fits both.

Other functions, statements, and commands included in the PC-2 are the trig functions, CHAIN, FOR/NEXT, INKEY$, INT, LEFT$, LEN, LIST, LOCK, MID$, NEW, PAUSE, PI, RADIAN, REM, RESTORE, RUN, SGN, SQR, STATUS, STR$, TRON (Trace on), VAL, just to select a few.

The PC-2 BASIC is not completely compatible with the PC-1. For example, on the PC-1, AB means the product of A and B; this translates to A*B on the PC-2 —a major improvement. BEEP and USING are different. But there is enough compatibility that books on the PC-1 are still useful.

The PC-2 is quite impressive for its size and price. I did find several things missing which I would have liked to have seen.

First, there is no DEF function statement, standard in some BASICs nearly since Dartmouth introduced it in 1965. I would love to see not only user-definable functions in BASIC, but also multi-line recursive functions. Fortunately, my present applications seldom need the DEF function.

There is no function to indicate the position of the last column of the display used. A statement like 17020 WAIT 60:PRINTX; occurring in a loop causes problems: the last number printed on the display may straddle the current and the next display. Currently, one can only use the POINT function, which I did not find well-suited for this situation.

The IF statement has no ELSE. There are no WHILE loops or other structured BASIC features.

Though some kinds of editing are real easy on the PC-2, other aspects are very awkward. You can control the cursor nicely, insert and delete single characters easily, and change characters easily. If needed, you can change a line number, to copy (but not move) a line elsewhere. But you cannot easily move individual statements from one place to another, delete groups of lines, or renumber them. It would be handy to be able to insert many columns without having to use the ⟨SHIFT⟩ key each time. (Deleting is easy: just overprint unwanted characters with a space; the BASIC removes extra spaces.) But regardless of these editing deficiencies, editing with the PC-2 is far superior to many mini-computers I've used.

The error messages are numbered. You have to refer to the manual or quick reference card to determine their meanings. A minor irritation.

The area that I had the most problems with was documentation. There is no table of contents or index (though the chapters are tabbed). There are errors in the manual; some took me several days to unravel (like the BEEP function). Some of the errors were minor misprints (troublesome to beginners; but a few minutes delay for experienced users). Very serious are the omissions. The manual gives only one form of the IF statements, as mentioned earlier. The manual says nothing about the oddities of the INPUT statement, nor when CLEAR and WAIT are needed.

The manual includes the instructions PEEK, PEEK#, POKE, and POKE# for accessing the alternate buffer and the alternate memory buffer. But what are these buffers? There is a CALL statement to use machine-language routines; but there is not mention of the micro-processor used, nor how to enter the machine language routines.

The manual is not very detailed on how to use the single-step mode. I found that, after "breaking" a program, you

need both the up and down cursors to find out what is going on. The book mentions only the down cursor.

This discussion is not an exhaustive list of the features of the PC-2, nor of the problems I encountered with the PC-2. But I hope I've listed the most important ones and have given you an idea of the power of the PC-2. Regardless of my complaints, it is quite an impressive computer.

I have not done much with the printer yet. But it too is quite interesting. You use LLIST to print your program out and LPRINT to output values to the printer during execution. The COLOR statement allows you to choose one of the 4 colors (black, blue, green, or red) for printing. The CSIZE statement lets you select one of 9 print sizes. ROTATE allows you to write letters in any of 4 directions. The printer is really a combination printer-plotter with 2 cassettes interfaces, and an I/O channel. The paper (2 1/4 inches wide) can move up or down for use as a plotter. Radio Shack has interesting demos for use in the store, including the printing of the American flag in 3 colors, a pie chart in 4 colors, a three-dimensional plot of a "black hole", and a demonstration of the 9 print sizes.

Good luck on your PC-2.

A selection of programs from Mr. Boettler:

Greatest Common Divisor using Euclid's method

```
24000 "A"
      : INPUT N, D
24002 WAIT 0
      : PRINT N; D;
24003 IF N<D THEN LET T=N
      : N=D
      : D=T
24004 Q=INT (N/D)
      : R=N-Q*D
      : N=D
      : D=R
24006 IF D>0 THEN 24004
24008 WAIT 60
      : PRINT N
      : GOTO 24000
```

Base Change

```
25000 "BASE" CLEAR
      : DIM G(26), N$(1)*80
25002 INPUT "SOURCE BASE", S
      : GOTO 25004
25003 GOTO "END
25004 INPUT "FINAL BASE", D
      : GOTO 25006
25006 "BASELOOP" INPUT "NUMBER", N$(1)
      : GOTO 25008
25007 GOTO 25002
25008 N=0
25010 FOR K=1 TO LEN(N$(1))
25012 M$=MID$(N$(1),K,1)
25014 M=ASC(M$)-48
25016 IF M>9 THEN LET M=M-7
25018 IF M>=0 THEN LET N=N*S+M
25020 NEXT K
      : M=0
25022 M=M+1
      : Q=INT(N/D)
      : G(M)=N-Q*D
      : N=Q
25024 IF N>0 THEN 25022
25026 WAIT 0
25028 FOR K=M TO 1 STEP -1
25029 IF K=INT(K/3)*3 THEN PRINT ",";
25030 R=G(K)
25032 IF R>9 THEN LET R=R+7
25034 R=R+48
      : PRINT CHR$(R);
25036 NEXT K
      : WAIT
      : PRINT
      : GOTO "BASELOOP"
65279 "END" END
```

HANGMAN for the PC-1

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Here is a quick and easy program for the PC-1 that provides a two player version of the popular and educational game—HANGMAN.

```
10 "H" PAUSE "HANGMAN"
20 BEEP 1
     : PAUSE "SPELL OUT A WORD"
30 CLEAR
40 IF W>10 BEEP 1
     : PAUSE "TOO MANY LETTERS"
     : PAUSE "SPELL ANOTHER WORD"
     : GOTO 30
50 INPUT Y$
     : W=W+1
     : A$(W)=Y$
     : GOTO 40
60 FOR Z=11 TO W+10
     : A$(Z)="-"
     : NEXT Z
70 PAUSE W; " LETTERS"
     : GOTO 100
80 "=" AREAD Y$
     : X=X+1
     : FOR Z=1 TO W
     : IF Y$=A$(Z) LET A$(Z+10)=Y$
     : V=V+1
     : IF V=W GOTO 110
90 NEXT Z
100 PRINT K$;L$;M$;N$;O$;P$;Q$;R$;S$;T$;"    "
     ;X;" TRIES"
     : GOTO 20
110 BEEP 2
     : PAUSE "THATS RIGHT!"
     : GOTO 100
120 "G" PAUSE A$;B$;C$;D$;E$;F$;G$;H$;I$;J$
     : GOTO 20
```

To play the game, start the program and key in the mystery word entering each letter one at a time. When the full word is entered (10 letters maximum), pass the computer to your opponent. Pressing ⟨ENTER⟩ again will tell the player how many letters are in the word and then display dashes in the letter locations.

The player tries letters by keying in the letter followed by ⟨SHIFT⟩⟨ = ⟩. If the letter is in the word it is placed in the proper place in the display, and the current number of guesses taken is displayed at the right.

When the word is correctly spelled, the computer happily tells you so and shows how many guesses you required. If, however, you want to give up, ⟨SHIFT⟩ ⟨G⟩ will display the mystery word. Press ⟨ENTER⟩ to play again.

Communications Corner

Hello, welcome to Communications Corner, a column dedicated to teaching you and your TRS-80 how to speak to the outside world.

All questions and comments should be addressed to:

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Communications Corner
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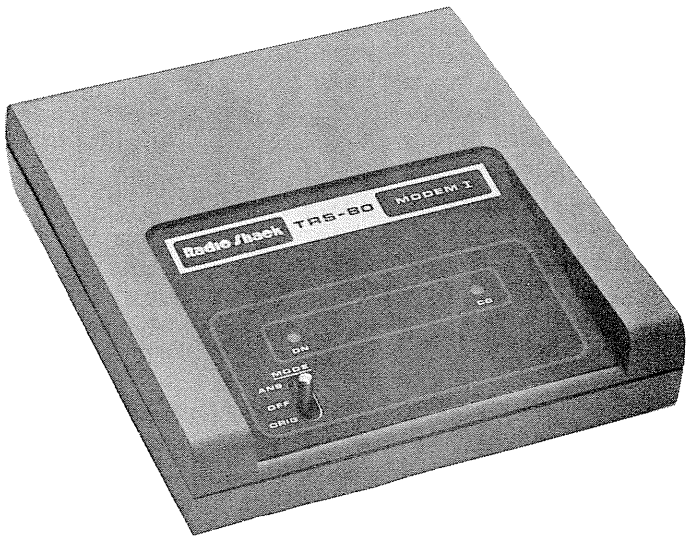
In this first column, we will begin to discuss the phenomenon which is known as Community Bulletin Boards, most often referred to as BBS. Bulletin boards are a free service provided to a community by a systems operator (or "sysop" for short) for various purposes such as public enjoyment & education, sometimes for the selling of various merchandise, and generally speaking for the enjoyment of the systems operator as well! While most of the services themselves are free, it nonetheless does cost you for the phone call, so I would heartily recommend that before you start calling, you purchase some second source long distance calling privilege such as MCI, Sprint, or Citycall to help keep your phone bills down!

In order to enter the world of bulletin boards, you must have three things—your TRS-80 computer, a modem, and communications software. Have those? Fine . . . but wait—don't dial that number yet, you're not quite ready! The first thing you must do is set up your equipment to be ready to talk to the outside world. If you are using a direct connect modem, the primary thing for you to do is inform your telephone company that you are installing a user-owned device on your line and report to them the ringer equivalence and FCC numbers which you will find on the bottom of your modem. Once that has been done, you may have to have them install an RJ11C (modular) jack for your modem (if you don't already have them and your modem requires one).



The next thing to be taken care of is communications parameters. In this first column, I am not going to go into detail on them, but the majority of BBS use one of 2 sets of parameters. Try the first set first, and if you don't seem to be receiving data properly, try the second set. In the Model III, the command to set your communications parameters is as follows:

SETCOM (BAUD = 300,WORD = 8,PARITY = 3, STOP = 1)

For the Model II (or 16) use the following:

SETCOM A = OFF
SETCOM A = (300,8,N,1)

If the first set of parameters doesn't seem to work, change the word length to 7, the parity to even. The stop bits and baud rate remain the same. At this point, you are ready to talk to the outside world!

Load your terminal software, pick up your phone, and dial your number. (An abbreviated list of numbers is going to be included later; however, there are over 500 BBS in the country at any given time.) Most services will recognize that you are on line the moment you sign on. Some, however, require you to hit the ⟨**ENTER**⟩ key to send a carriage return.

Having done this, you will then be prompted for some information, such as the type of equipment you're on, your name, and your address. Don't be reluctant or afraid to give them; it is for your own benefit so that during future calls the system will recognize you faster, thus saving you money on the phone call.

Once you are logged onto a bulletin board (BBS), there are a variety of "command menus" to choose from, depending on which board you have chosen. Most boards include helpful instructions for the novice user and are fairly clear.

According to an article for the Louisville Times by writer Ric Manning, bulletin boards came into being in 1978 when a group of computer hobbyists in Chicago sought an easy way to communicate with each other. Once their system was set up, it was natural for others to follow suit.

These days it seems as though almost every computer hobbyist in America either uses bulletin boards or wants to run one himself. My own system has been in service for somewhat over a year at this writing and to date enjoys in the neighborhood of 40-60 successful calls each day. The actual number of people who attempt to call but receive a busy signal is significantly higher. While doing some program modification not long ago, I attached my telephone answering device (an old but reliable TAD 20) to my computer phone line and experienced an average of one call each six minutes for a number of hours!

Bulletin boards serve a multitude of purposes. They are greatly entertaining, educational, helpful, and eminently convenient for the computerist. Most bulletin boards have a number of very similar features, such as program downloading and uploading, various types of "Electronic Mail" mes-

sage centers, game playing sections, options which allow the caller to chat with the system operator, public interest bulletins covering a wide range of subjects, lists of other callers or other bulletin boards, and so forth. I will discuss these features individually, as each deserves attention for the purpose it serves. Some boards have special-interest-group sections or are entirely devoted to one particular subject. The possibilities and variations are as limitless as the imagination, and boards have become so popular, both to visit and to program, that they spring up like mayflies all over the country. At any given time, there are said to be approximately 500 bulletin boards in operation. The software for several different types of boards are available for sale, and some of these have become widespread networks—some devoted to the TRS-80, some for the APPLE, some for other computer types, and some not specific to any particular make or model at all.

LONG DISTANCE EDUCATION?

Computer bulletin boards, as computers themselves, provide an educational experience in a painless manner. Quite a number of people call boards to become familiar with their hardware, while having fun at the same time. Certain features like downloading or uploading (which will be discussed later on) provide the opportunity for the user to learn some of the many options their equipment provides. In order to successfully do either, one has to become fairly fluent with the operating system one is using. It is a "hands on" experience which puts the user at ease quickly and builds confidence as each attempt at obtaining public domain programs is successful. Many of the programs offered (at no cost) are utilities that will further the capabilities and versatility of the user, and some are just plain fun. Games or print files are favorites on my own board, and if a user can successfully upload an original program to me, he/she is rewarded by membership in my private club module, in which I distribute more valuable public domain programs from my private collection.

I believe it is quite useful for people to quickly become familiar and comfortable with their computers. First, it lessens the computer's image as some kind of eerie mind quietly plotting the takeover of the world. Second, before long the computer will doubtless take the place of the telephone, and the sooner people realize how easy and how much fun computers are to use, the quicker this may happen.

Already the computer is being used in schools to give important individual attention to students, allowing a large group of people to learn at their own pace. Children learn from a computer very quickly—my own daughter learned the alphabet by the time she was 17 months old because the computer is a fascinating thing to play with—and communication via the computer can be quite a thrill. Even though it is quicker to speak via voice, there is an excitement to seeing words being written by another person on your screen. It is exciting to be able to take a program from another system and to accomplish the task by yourself. Also, since use of the board is a very private thing, if the user makes mistakes, nobody knows but himself.

Anything that helps a user to know his equipment better is an advantage; just using and reading different sections on different boards is educational. It cannot help but be so, as the user is exposed to so many people and ideas.

SERVICE FEATURES

Most bulletin boards share several common features as a service to their users. The first and most important of these is a list of Instructions to inform the caller of the uses and descriptions of the features available on the board. Usually instructions come in the form of a list of command options, their purpose, and how to use them. System operators always suggest that new users go straight to these lists to familiarize themselves with the system they are on (since there are SO many variations from board to board), although I admit that they are not read as often as could be desired.

Another common feature is a list of the hardware and software used on the board. This can give the caller some idea of the scope of the system he is in communication with, also of the options he might have if he becomes interested in running a board himself. More exact details are usually available through chatting with the system operator, as I know many programmers are more than eager to discuss their work!

A list of other callers often called Userlog (or any of a number of variations on that same basic name) is also available on many bulletin boards. If a caller wishes to look for a specific person's name or just take a peek at the names of others who frequent his favorite board, the Userlog provides this service. Often the listing includes certain types of computers used as well.

When a person is a new user to a board, he needs to have the list of command options printed out carefully for him, but once he has become familiar with the system he knows his options by heart, and the careful listing becomes a time-consuming bother. This fact is allowed for on many systems by an electronic "toggle switch" which allows the user to change from a printed out list of options to a list of only the first letters of each option—saving an enormous amount of time, since each different area in a board has its own set of command options. If the caller forgets his command options at any time, he can toggle again and be returned once more to the entire printed list. My system (like many others) abbreviates the command listing starting with the user's second visit, but at any time this can be changed at the caller's whim.

Often a caller will get so involved in enjoying the board that he loses track of time and cannot say how long he has been online. Many boards provide a service called Elapsed Time, or How Long (or similarly named sections), which will promptly give the caller the day, date, current time, and the amount of time he has been connected to the board. This comes in handy quite often, and more than once I have seen a hasty termination after the Elapsed Time feature has been used!!

Speaking of termination, one feature included on all boards is the Terminate feature. This would seem superfluous, because if you just hang up you have certainly terminated your connection to the board! It isn't though. On some boards a person's name is not added to the userlog until they have properly terminated. This allows the board to update all its internal information, reset its several variables, and be ready for the next caller. I know that all system operators like to stress the importance of proper termination, but many callers merely hang the phone up when they are through. We are aware that in some cases this is because someone's boss has come into the room unexpectedly, but we still request that

whenever possible the callers make use of the termination feature.

MESSAGES

Most bulletin boards have options for reading or leaving messages for other users. Usually the user can read messages which are left open to the public and are of general interest, such as items for sale by the owners, used equipment and so forth, or people's opinion of just about anything under the sun,—even the latest bad joke circulating around.

There is usually the option of leaving private messages that only the recipient (and the system operator) can read. In this manner communication can be established with people all across the country; you can write a lengthy letter to someone, and all it costs you is the phone call to the board. (The limitation being that your recipient must also have a computer with which to pick up his "mail".) Some boards have message "bases" which have particular themes. Some are devoted to finding you your perfect mate (A number of boards are entirely devoted to this end.), some specialize in couples, or special interest groups of one kind or another. A number are sexually oriented and carry warnings to the potential user that explicit material is contained therein.

Computer bulletin boards have started a new method of communication between individuals, a reliable and fun way for people to exchange ideas and information in many different forms.

GAMES

Another option available on many bulletin boards is that of game playing, usually of the Adventure type, which puts the player in a particular situation and gives the objective of either simple survival or winning treasures, points, or both. Some of these games get very involved and sharpen one's wits and logic, as different "dangers" or "treasures" are presented before the player. Some are public domain programs and available through the download sections of the boards displaying them, and others are copyrighted and for sale through various media.

Usually there is a time limit imposed, as some games can keep one busy for over an hour, and when involved in a thought-provoking game, it is hard for anybody to keep track of so mundane a thing as the time. Thirty minutes usually are allowed for these games, and usually that is enough time to complete one. (Tho' I admit that a few are mind-boggling!!) As entertainment, the Adventure games are very popular and add quite a bit to the attractiveness of the boards that offer them. I do not know of any that present arcade type games, where graphics is a must, but even without them, the games sections of boards are always very popular and diverting both to younger and older callers.

FILE TRANSFERS

One of the greatest attractions of bulletin boards today is the feature of program downloading. Most boards have lists of public domain programs that one may "download" (take into one's own memory buffer) without cost, thus expanding the caller's library of computer programs at the cost of a phone call. The programs available range from business utilities to print files or games and everything imaginable in between. At the same time, callers are encouraged to donate (or "upload") their own original public domain programs to the board for the enjoyment of other callers, thus distributing an enormous variety of programs over the entire country from bulletin board to bulletin board. In this way, public domain programs reach a tremendous number of people.

BULLETINS

What would a bulletin board be without bulletins? These sections are generally listings of items of information of varying natures which the system operator feels are valuable to the users on his own particular board. They may be certain items on sale at special prices or specific instructions on how to use a particular command or section of the board. They are updated and changed as need arises and often are as important to the user as the list of instructions, although they are read with as little frequency.

REFERRALS

Most boards contain a feature which I'm certain the phone company loves . . . an insidious feature known by many names, such as Referrals, Friends, or Other Numbers. They are lists of varying lengths specifying other bulletin boards one can call around the country (some international ones are listed as well). The choices seem almost endless and are generally categorized by network, with special interest items or sections noted in various ways. Keeping an updated list of these boards is almost impossible, as boards go on and offline with almost alarming speed, although a number of boards make a point of keeping carefully checked lists.

PEOPLE

As a system operator, I have found that running a bulletin board is quite an education in human nature! I am exposed to approximately 1000 callers every month, and quite a number of these take advantage of one of the system's options and page me to have a live chat "finger to finger" (if not face to face).

One learns a lot about people from even such impersonal contact as through a computer, where each side of any conversation is well protected by the distance between the terminals. My conversations have run the gamut of both time

and subject, ranging from one minute apologies of "Sorry, I pushed the wrong command button!" to 2 hour discussions of personal problems or philosophies of life. (I DO try not to be too long winded though because of the volume of calls my system receives each day).

RUNNING A BULLETIN BOARD

Boards are so much fun to use that many, many people get the notion to run one themselves. It certainly seems, on the surface, to be fun, easy, and somewhat glamorous to become known across the country and be the one who is able to read ALL the messages.

I have found that many of my younger callers have this ambition. It seems as though every fifth eighteen year old I speak with wants to write a bulletin board program. Often I am asked questions as to how my system handles a certain problem or two, and I answer but also warn these ambitious people that keeping a board up and running is not the piece of cake they imagine it to be. Although the costs (after the hardware) are negligible (those being the electricity to keep it running and the phone line for callers to use), the time and effort required are more than one might think at first.

The usual everyday maintenance (file backups, message updating, etc.) is just the beginning. These alone may take from fifteen minutes to well over an hour and must be done each day. The bulletins and opening messages also need periodic attention, as do program menus for downloading purposes. If items are offered for sale, one must keep track of these as well as being certain that prices and so forth are correctly reflected and updated, and orders placed must be followed through from beginning to end.

Then come the bugs and the hardware problems. With constant usage, things are bound to need periodic repair and maintenance. No new program is entirely "bugless", and these must be corrected as quickly as possible.

There is also a breed of clever young people who abound on the bulletin board "circuit" (pardon the pun) whose fun is derived from trying their best to "break" or "crack" or otherwise destroy bulletin boards. It is not rare for a sysop (system operator) to come home to find his entire board neatly erased or sections of his hard work ruined by some shrewd kid who had fun at his expense. Backups of course are a necessity which goes without saying, but if someone can "crash" a system then it needs further work on its security!

Also, a system operator must try to make him/herself available to chat with callers. This can be both time-consuming and frustrating, as (in compliance with Murphy's Law) callers somehow always seem to want to chat while the sysop is eating supper, taking a bath, or trying to staunch blood. I don't know how this mechanism works, but it hardly ever fails! (One gets used to typing with a tourniquet.) Seriously though, one of the great attractions of a board is the opportunity to discuss things with the sysop, sort of a built in friend when one is lonely or a technical advisor who can't see you blush when you make a mistake. I try to be available as much as possible and can be paged to the computer from 9 every morning to midnight every night—that's seven days each week! Unfortunately not everyone is polite and pleasant, though most are a lot of fun to speak with. It is just one more thing one must expect if one wishes to run a board. There are indeed rewards, but it is not at all the easy job that many imagine it to be.

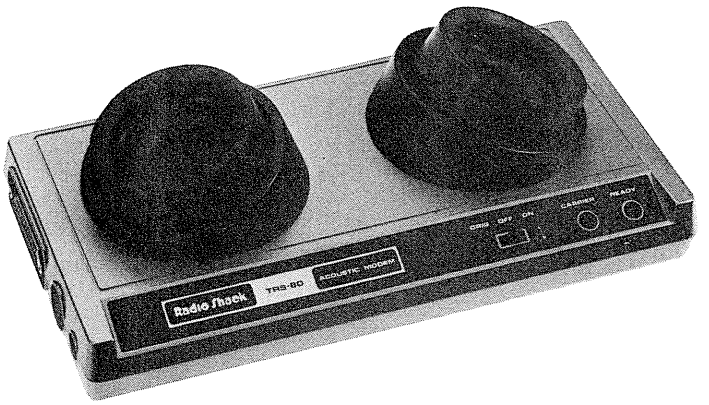
All in all, the world of computer bulletin boards is an exciting place to visit and work in. It is as complex, busy, and ever-changing as any beehive ever was, and its possibilities are limited only by the imaginations of those who program and frequent them. Using bulletin boards is as much of an education as running them, both in computer knowledge and human nature. I must admit that I have learned a tremendous amount in the last year, and the journey has been worth the troubles along the way.

For anyone interested in learning about his own computer, increasing his library of programs, communicating with a wide variety of people from every corner of the country, or just plain having a whole lot of fun in a new and exciting way, computer bulletin boards are without doubt THE place to be!

Here are the headquarters for each of the following BBS Networks:

CBBS	312-545-8086	Chicago, IL
Commnet-80	714-359-3189	Riverside, CA
Communitree	201-627-5151	Danville, NJ
Connection-80	516-588-5836	Centereach, NY
CP/M *	312-671-4992	Chicago, IL
Drucom	215-855-3809	North Wales, PA
Forum-80	816-861-7040	Kansas City, MO
Message-80	516-334-3134	Long Island, NY
Net-Works *	404-733-3461	Atlanta, GA
Northstar	404-926-4318	Atlanta, GA
Peoples Message System (PMS)	714-561-7277	Santee, CA
Rats Nest *	609-468-3844	Wenowah, NJ

(* = not HQ but representative of system)



Well—that's all for this month. I'm looking forward to receiving your questions and comments. Until next month—HAPPY COMMUNICATING.

A Program to Start Your Printer

Doble Engineering Company
85 Walnut Street
Watertown MA 02172

The "user population" is changing. It was not so long ago that a computer was an omnipotent mechanical wonder which could only be tended by someone who, supposedly, "knew what he was doing." The programmers were an elite; they were the magicians who could actually run the machines and not accidentally "break them."

But now, our systems have become interactively available to those who are not intimate with them, people like schoolchildren, scientists, and businessmen. It has become necessary and profitable to make computers easy to use, instead of forcing everyone who wants to use them to get a college degree in CompSci.

THE SITUATION AT DOBLE

Doble Engineering is a small company that makes instrumentation for power utilities. It has a management level interested in printing sales trends and plans with VisiCalc. Its drafting department uses Scripsit, regularly running off an inventory of their new drawings. There is always a number of state of the art development efforts, in which large numbers of calculations regarding magnets, electric fields, and insulators are performed in BASIC, then printed out. Doble's TRS-80 and printer have a full load of work.

Now, that printer, an LP VIII, has proven utterly reliable. Still, it IS a printer, and Murphy's Law dictates that, from time to time, it runs out of paper or is unplugged or is in any one of a number of states in which it will not run. Murphy's Law also necessitates that this happens when a programmer who understands this printer is not available.

Back in the seventies, the obvious response to this situation would have been 1) make sure everyone who even touched the printer had read the manual, and 2) make sure there was always a local "printer expert" nearby during printer use. Thankfully, neither of these stringent measures is necessary today.

USER FRIENDLY SOFTWARE

What the situation calls for is "User Friendly Software," software that makes the computer do its job. In this case, it is the computer's job to do the remembering of the technical details regarding the printer, and it is the computer's job to solve the printer's problems. If the printer is set off-line, for instance, there is no reason why the computer can't just say so.

So, what is needed? A program like PRINTER/BAS, the utility in Listing 1, is what is needed. When run, its first task is to see if the printer is running correctly. If it is not, the program gives the user very detailed instructions on how to make the printer run correctly. If outside help is needed, the program says so and may even tell how to get it.

The program's second task is to configure the printer to the user's needs. In Doble's case, only two configurations are required, that of 80 columns across the page and that of 132 columns. More can be added in the future, as needed.

The program's last task will be to help the user run the application he/she desires. Before that happens though, if the user wants to test the printer, the program should make that easy.

At all times, the user will want a detailed, plain English explanation of what is happening and what he/she is being told to do.

YOUR PROGRAM

The program in Listing 1 is what we at Doble are using. You are free to use it in any way you like, except to sell it for profit.

For those of you with Model III's, level II BASIC, 48K RAM, and an LP VIII, it should run, as is. For the rest of you, you might consider typing it in, as is, because it may run without any changes. Otherwise, it could serve as an example as you develop a similar program for your setup.

I tried to implement a structured program. If you look at the listing, you may see a useful structure still there.

```
Lines 10 - 170      (* Documentation *).
lines 180 - 200
            BEGIN
                  Initialize;
line 210          GET printer status;
line 220          IF printer status = "READY" THEN 290;
lines 230 - 280
            CASE of statuses;
line 230          RIBBONCABLE: PRINT "Cable un-
                  plugged; Get help.":
                  (End program here.)
line 240          POWEROFF : PRINT "Printer turned off.
                  Turn on."
lines 245 - 257   OFFLINE? : PRINT "Wait."; : Then wait.:
                  IF STILL OFFLINE THEN PRINT "One
                  of 3 off-line conditions. Please check
                  and fix."
lines 260 - 270   end of CASE; PAUSE until user presses
                  a key.
line 280          GOTO 210;
lines 290 - 350   Printer is ready. Say so, then configure it.
lines 355 - 370   Print a test string.
lines 380 - 400   Conclude and return to the DOS.
            END;
```

In line 210, the computer gets the printer status. This is stored in various bits of location 14312 in the Model III or I. This location is specified by the reference manual under "Checking the Printer Status" (footnote).

That section of the manual also specifies a method of checking the status that, I found, sometimes will not catch a "not ready" printer. To find my own procedure, I used the following program . . .

```
10 P = PEEK(14312): PRINT P: GOTO 10
```

. . . letting it loop while I played with the printer. I turned the printer on and off, disconnected its cable, had the paper run out, etc., and noted how the status variable P changed. I determined that ANDing P with 248 instead of 240 (in binary, 1111 1000 instead of 1111 0000) was necessary to determine the difference between an unpowered LP VIII and one ready to go.

My algorithm for a "Readiness Check": The printer is ready to print, whenever, and only whenever,

```
PEEK(14312) AND 248 is equal to 56.
```

I also had several other printer status "codes." They all corresponded to states the printer can be in. What should the program do in each case? I had 5 categories.

1. STATUS OF "THE PRINTER IS READY" : The program goes on to configuring the printer.

2. STATUSES INDICATING PROBLEMS: These include "The printer isn't turned on" and "The printer is not connected to the computer." The user is told what the problem is and what to do about it. The program loops back to retest the printer.

3. STATUSES NOT WORTH DEALING WITH: There are some things that aren't going to happen in the course of the user doing what he/she is supposed to. Things like "The printer is in self-test mode" require an elaborate procedure to start. If a user runs into this problem, then he/she'll know right away because the printer will be doing a lot of strange stuff.

On the other hand, these things ARE likely to happen if some computer whiz is trying to fool the program. This is dealt with when he/she lists the program, lines 70 to 150.

4. FATAL STATUSES: Some things you don't want the user to try to fix. For instance, if the ribbon cable is unplugged, I want someone familiar with ribbon cables to put it back on. In a case like this, the program tells the user to get help and gives enough information to define the problem. Then the program terminates.

5. TRANSITORY STATUSES: At first, I wasn't going to include these. An example of a transitory status is found when I run my one line program and then reset the printer. For about 1/4 second, the location 14312 shows a value of 135. Then for a couple of seconds is equal to 31. Finally, the status assumes the value 63 and stays there.

I thought a printer reset wouldn't happen during this program's execution unless someone was fooling around, as in status type four. I also thought that if by some chance a user DID just happen to run the program while the printer was resetting, the user's first response would be "Well, I'll try it again." It just seemed like such an unlikely situation, it wasn't worth the coding time to deal with it.

But, after experimenting a while with the hardware, I reluctantly concluded that it was actually very, very likely that, at some time, a user would start this program, look over at the printer, notice that it wasn't on, and say "Gosh, better start that printer up fast before the computer notices!" By starting the printer up at that point, the user would accidentally confound the program.

The resulting response is in line 250. The user is told to "WAIT. . . ", using a semicolon to keep the cursor in position after the message. A timing loop "FOR P = 1 TO 1600: NEXT P" makes the TRS-80 wait about a second and a half. Then the "WAIT . . ." message is written over "PRINT STRING$(8,8);" (note the semicolon again). Then the status is checked again, and an appropriate response used.

The last step in the process of checking out the printer is most important. RUN IT YOURSELF, MAKING BELIEVE YOU ARE THE USER. Try making believe that you don't know your own computer. This is hard, but necessary. Be honest and say "Suppose I were John, the company president, and I wanted to PRINT a VisiCalc screen, and the printer was out of paper. Would this message the program is displaying tell me how to handle the situation? Or would it just confuse me?" Then err on the excessive side when it comes to putting explanations into the program. Therefore, talk about "THE BLACK, RECESSED SWITCH ON THE BACK OF THE PRINTER JUST ABOVE THE CORD THAT PLUGS INTO THE WALL" instead of just saying "POWER SWITCH". On the LP VIII, even if the user knows what the power switch looks like, he/she could literally spend ten minutes looking for it.

CONFIGURATION

Okay, the program, into line 290, has displayed "PRINTER IS READY". At this point of the program (lines 300-348), it asks what configuration the user wants, then sets it and tells the user that it has done so.

(At this point, I gave my users the option of printing a test string because sometimes, after changing ribbons or adding paper, the print head might have been accidently left unable to reach the ribbon. However, I find that they don't use it. They don't mind catching a mistake like that at the time they print their reports. Therefore, because it is an extra step for the user, and, in effect, doesn't do anything, I'll be eliminating it from version 2.4. I present it here in case it is useful for you.)

TERMINATION

The program terminates by telling the user that everything is "ALL SET," then jumping into the DOS. Line 390 gives the user time to read the message. I also like to press ⟨BREAK⟩ and stop the program before it leaves BASIC, if I don't happen to want to go back to the DOS. (Yes, I use this program myself; It's convenient.)

Line 400 drops the user out of BASIC, so he/she can enter VisiCalc or Scripsit. It will work, as is, under TRSDOS 1.3.

A final note: In the pursuit of "user friendliness," I give the user this program and SCRIPSIT on a NEWDOS disk, having set it up so that when reset is pressed, the TRS-80 automatically runs PRINTER/BAS. When PRINTER/BAS is finished, it automatically runs SCRIPSIT. My instructions to the user, then, who wants to run Scripsit, is just "Press reset."

The author uses NEWDOS; to make this program more general we changed line 400 to automatically execute SCRIPSIT under TRSDOS 1.3. To get the PRINTER/BAS to run automatically when you press reset, enter an AUTO command like this one:

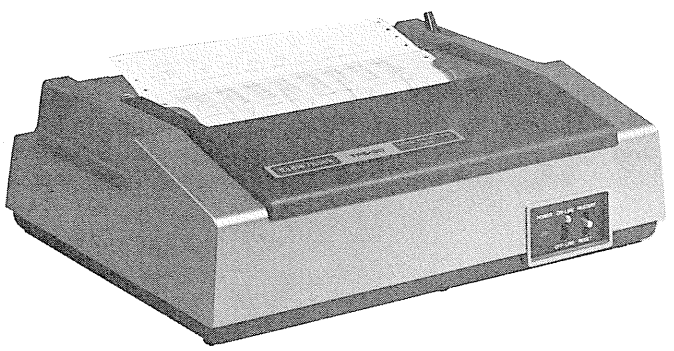
```
AUTO BASIC PRINTER/BAS
```

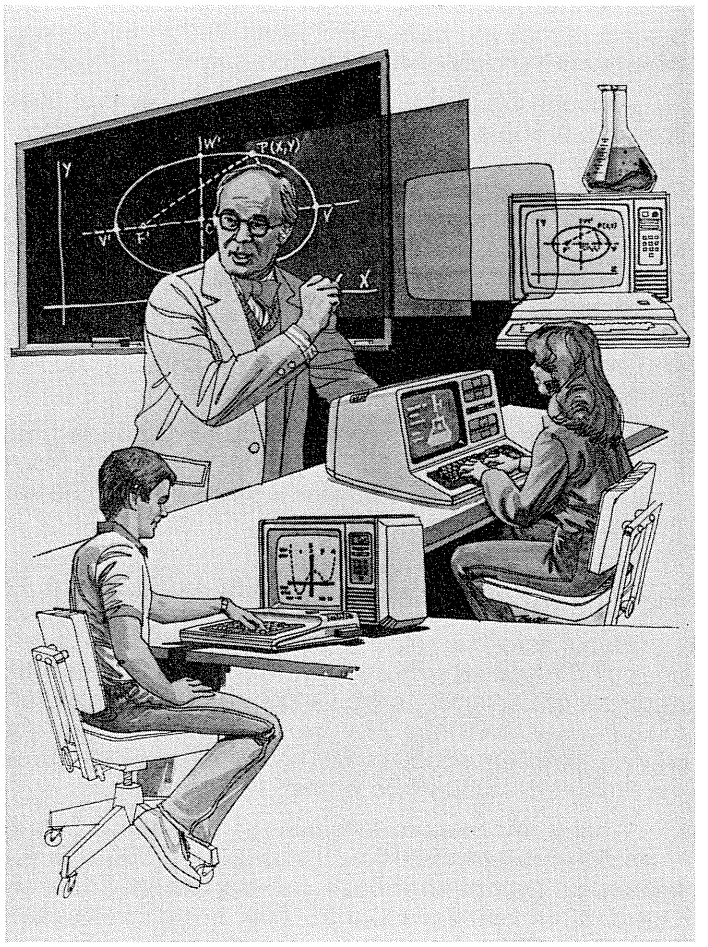
When the Model III is first turned on, TRSDOS 1.3 will request DATE and TIME and then load BASIC and execute

the PRINTER/BAS program. After the initial power-on sequence, pressing ⟨**RESET**⟩ *will automatically load and execute the PRINTER/BAS program.*

Footnote: The reference is to "TRS-80 Model III Operation and BASIC Language Reference Manual" (Radio Shack, 1980), p. 38.

```
1Ø ' INITIALIZE PRINTER
2Ø ' PROPERTY DOBLE ENGINEERING COMPANY, WATERTOWN,
     MASS.
21 '
22 ' copyright (c) 1982 Doble Engineering Company
23 '
25 ' This program can be used freely for any purpose,
27 '  save that of being sold for profit.
3Ø '
4Ø '
5Ø ' VERSION 7/8/82
6Ø '
7Ø ' LINE 25Ø WILL FALSELY DIAGNOSE THE "SELF-TEST"
     MODES IN
8Ø ' WHICH THE PRINTER IS PRINTING ALL THE CHARACTERS
     IT KNOWS,
9Ø ' OR IN WHICH THE PRINTER IS DOING THE "CARRIAGE
     MOVEMENT
1ØØ ' TEST". A USER WHO STARTS THESE TESTS TO FOOL
     THIS PROGRAM
11Ø ' WILL SUCCEED.  CONGRATULATIONS.  AFTERWARDS, HE
     OR SHE
12Ø ' SHOULD STOP FOOLING AROUND WITH THE EQUIPMENT
     AND USE
13Ø ' THIS PROGRAM TO INITIALIZE THE PRINTER.  OTHER
     USERS
14Ø ' WILL BENEFIT FROM BEING TOLD ABOUT THE
     "ON-LINE/
15Ø ' OFF-LINE" SWITCH.
16Ø '
17Ø '************************************************
18Ø CLS
     : PRINT "PRINTER INITIALIZATION 2.3"
19Ø      PRINT "*************************
     (property of Doble Engineering)"
2ØØ PRINT
21Ø P=PEEK(14312) AND 248     ' CHECK PRINTER
22Ø IF P=56 THEN 29Ø
23Ø IF P=248 THEN PRINT "I think the printer does not
     have its blue ribbon       "
     : PRINT "cable plugged in.  Would you have that
     fixed, please? "
     : END
24Ø IF P=48 THEN PRINT "WOULD YOU TURN THE PRINTER
     ON, PLEASE?  I THINK THAT IT"
     : PRINT "IS NOT POWERED."
245 IF P<>24 AND P<>144 AND P<>176 THEN 26Ø
25Ø PRINT "WAIT ...";
     : FOR P=1 TO 16ØØ
     : NEXT P
     : PRINT STRING$(8,8);
     : P=PEEK(14312) AND 248
     : IF P=24 OR P=144 THEN PRINT"I am getting an
     'OFF-LINE' condition from the printer."
     : PRINT"This is caused by one of three things.
     Would you check"
251 IF P<>24 AND P<>144 THEN 26Ø
255 PRINT "and remedy them, please?  They are ..."
     : PRINT "    1. The printer's 'ON-LINE/OFF-LINE'
     switch, on the front"
     : PRINT "       of the printer, is set wrong.
     It should be 'ON-LINE'."
256 PRINT "    2. The printer is out of paper, or the
     paper is jammed."
     : PRINT "    3. Inside the printer, right behind
     the 'POWER' light,"
     :    PRINT "       there is a row of eight tiny,
     white switches."
257 PRINT "       They should all be pushed, VERY
     carefully, towards"
     : PRINT "       the word 'OPEN'."
     : PRINT
26Ø PRINT "                PLEASE PRESS ANY KEY WHEN
     THE PRINTER IS READY.";
27Ø YN$=INKEY$
     : IF YN$="" THEN 27Ø
28Ø GOTO 2ØØ
29Ø PRINT "PRINTER IS READY ..."
3ØØ PRINT "Choose either   1.  8Ø columns (1Ø
     characters per inch)"
     : PRINT "           or   2. 133 columns (16
     characters per inch)"
     : PRINT TAB(3Ø);"Input '1' or '2', please";
31Ø INPUT YN
32Ø IF YN<>1 AND YN <>2 THEN 3ØØ
33Ø IF YN=2 THEN LPRINT CHR$(2Ø);CHR$(27);CHR$(2Ø)
34Ø IF YN=1 THEN LPRINT CHR$(2Ø);CHR$(27);CHR$(19)
345 PRINT
     : PRINT "SET FOR **";
     : IF YN=2 THEN PRINT "16"; ELSE PRINT "1Ø";
348 PRINT "** CPI."
35Ø PRINT
355 YN$="+----+----+----+----+----+----+----+----+--
    --+----+----+----+"
36Ø PRINT "INPUT A TEST STRING TO BE PRINTED (ENTER
     'NONE' FOR NONE)";
37Ø INPUT YN$
     : IF YN$<>"NONE" THEN LPRINT YN$
     : GOTO 36Ø
38Ø PRINT
     : PRINT "ALL SET."
39Ø FOR P=1 TO 1ØØØ
     : NEXT P
4ØØ CMD"I","SCRIPSIT"
```





What If It Doesn't Work? Basic Survival Techniques

by Annette Zamberlin-Main

So you have chosen your TRS-80, its environment, and have set up the system. Great, right? Well, yes, if it's all working properly and to your satisfaction. But probably one of the more frustrating feelings in the world is when it isn't working properly and to your satisfaction. And haven't we all been there a few times!

What follows is a basic strategy for survival checklist. To many of you, this article will just be a review of procedures that you have already installed during your time with the machine. For others, we hope to provide some general directions in which to work and explanations of alternatives that are available to you in seeking help for your particular problem.

SELF-DIAGNOSTICS

There you sit in front of your particular model, and the procedure that you have just implemented is not working. What a sinking feeling! What do I do now?

Although this may sound too rudimentary even to question . . . but, is everything connected properly? In my office I have a Model II, Model III, DMP 200, Modem I, and PC-1. Occasionally printer cables get misplaced or removed. I can also assure you that I have sat before my share of blank Model II screens, wondering why I wasn't able to log-in to CompuServe. All the while my RS-232 cable was innocently connected to my Model III and Modem I. Or even more embarrassing, the Modem I wasn't plugged into my power strip. Ah yes, confessions of a relative newcomer to the field of microcomputers.

What these confessions are all leading to is the basic idea that you should retrace your steps through a given procedure, if you haven't been successful on the first run. Reread the procedure in the manual or rerun the procedure.

THE DREADED ERROR CODES

If your screen is displaying an error code what should you do? The types of error codes you can encounter and their descriptions contained in the various models' manuals are too numerous to list here. We have run articles before on the wide variety of error codes which could be encountered (see the Profile article in our December, 1982 issue).

What is important to remember is the various lines of distinction between the different sets of codes. Be sure you know what type of error code you are getting. There are Operating System Error Codes, Disk Basic Error Codes, Basic Error Codes, etc., etc.

Photo 1. A collection of manuals

What is unfortunate, and somewhat confusing for the beginner, is that different sets of error codes for one particular model will have the same number. A Model II TRSDOS Error Code 2 is listed as a "Character Not Available," while a Model II BASIC Error Code 2 is a Syntax error.

The manuals contain a wealth of information which may help in the translation and correction of the various error messages which you are liable to get. Page after page of lists containing code numbers and explanations are invaluable and should be read whenever a problem is encountered.

A further technique of cross-referencing by key words in the error code explanations may help you ferret out and correct a given error. For example, an Error Code 5 in Model II BASIC is an Illegal Function Call. The manual tells you that "an attempt was made to execute an operation using an illegal parameter. Examples: square root of a negative argument, negative array dimension, negative or zero LOG arguments."

If you require further explanations of the above go, back into the Index and look up some of the key words such as Functions, Arrays, or LOGs. Each have several pages dedicated to them in other areas of the manual. Perhaps in reading these, you can better diagnose what has gone wrong.

IMMEDIATE LINES OF DEFENSE

If you have gone through all the self-diagnostic suggestions listed above and are still encountering some problems,

your next line of action would be to call or come into your local Radio Shack Store or Computer Center and talk to the store personnel. They have all been especially trained to support your needs and problems long after the initial sale has been made.

Preparation before you make that visit or phone call to the store is all important. Don't come in or phone in with a general idea of what went wrong. Be sure to note everything that you did to get to this state of non-operation. Even the tiniest point that you remember or write down may help the salesperson in the store assist you.

FURTHER ALTERNATIVES

"I've gone through all the above, and it's still not working properly or to my satisfaction, now what?"

It sounds like it's time for Computer Customer Service!

We published an overview of the purposes and goals of Computer Customer Service in the May, 1982 issue of the News. And in each of our monthly issues, we publish their phone numbers. Some facets of the May article need to be reviewed here, for a better understanding of the essential role the groups in Computer Customer Service play in the solution of your problems.

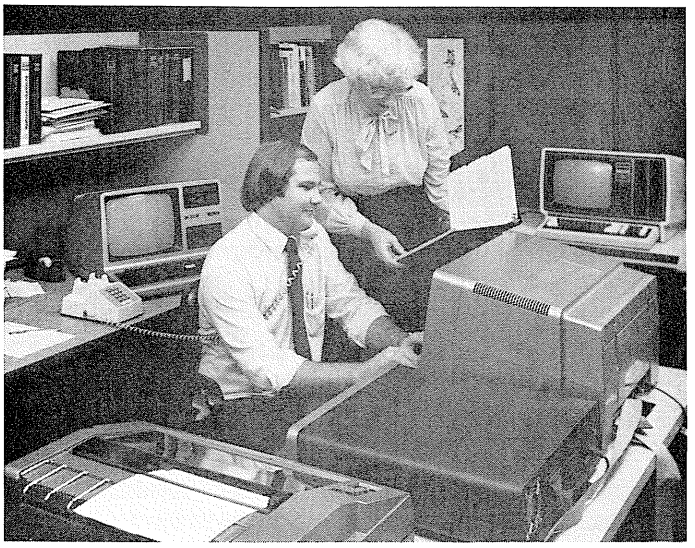


Photo 2. Two Computer Customer Service representatives

There are seven main groups of customer support personnel:

1. Model I/III Business Software
2. Model II/16 Business Software
3. Languages and Compilers
4. Color and Pocket Computers
5. Hardware and Communications
6. Educational Software
7. Games, Books, and New Product Information

The individuals that make up the support groups at Computer Customer Service have been trained to give you expert advice each time you call. However, no two people learn at the same rate, and one representative will be more knowledgeable than another. Consequently, when you call there may be an occasion when your representative must confer with his/her fellow group members to confirm an answer to your question or to assist with your problem. We will try to keep this to a minimum.

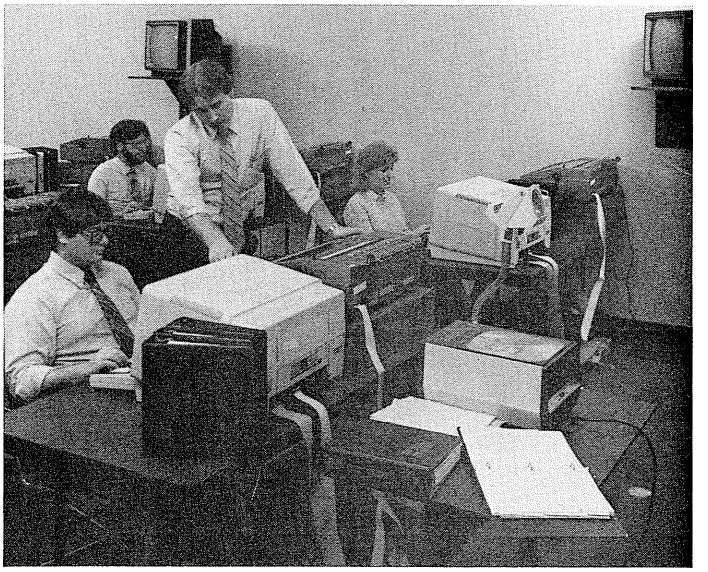


Photo 3. Computer Customer Service classroom

Remember, if you find yourself in a situation that seemingly cannot be solved by your local Radio Shack store, Computer Department, or Computer Center, consider a call to Computer Customer Service. Take a few minutes to gather some pertinent information to help our representatives and keep the length of your call to a minimum. Here is the information you should have before placing your call.

1. Your name
2. Your telephone number
3. What TRS-80 computer system you are using and the number of disk drives in the system, if applicable.
4. The stock number and name of the software package you are using.
5. The version number of the software.
6. What error codes the software is generating.
7. How the error occurred and the function you were performing when it occurred.
8. Information about any patches or program corrections you may have made.

What is important to remember here is that you may not be alone in the problems which you are experiencing. There may be a bug in your software package that is causing the difficulties (we never said we were perfect, just trying to be). Computer Customer Service is your first line of defense here.

The Microcomputer News will continue to publish information on software updates, some of which are based on material sent to us by Computer Customer Service. The Radio Shack philosophy is, and always has been, to maintain total customer support.

AND WHAT IF IT'S A HARDWARE PROBLEM?

If your problem has been defined as a hardware problem, one further item remains for you on the checklist. Help is as near as your local Radio Shack store. With 250+ repair facilities located in all major metropolitan areas, Radio Shack is there to help.

Quality is the key word here. The technicians who will be working on your hardware, are fully trained in the most current state-of-the-art technology. And their training is kept up-to-date.

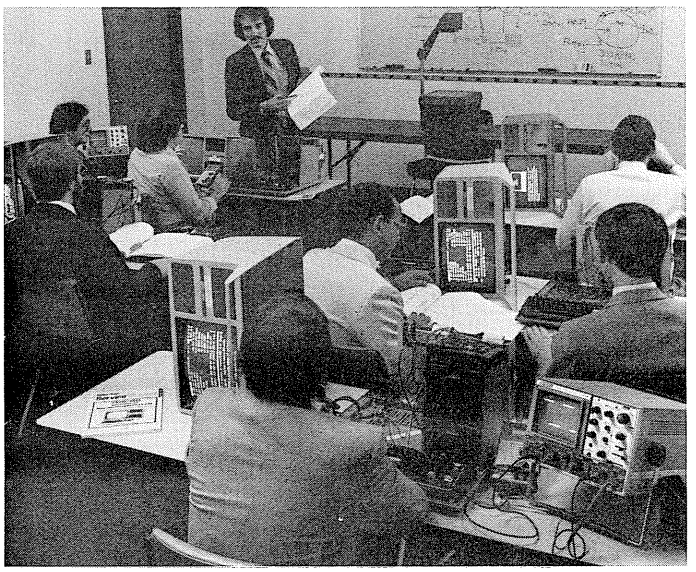


Photo 4. A technician's classroom

The customer must aid the technician in this situation. Think of the technician as a detective. Your job is to supply him with enough of the clues to get the repair done successfully and to your full satisfaction. What happened or did not happen? What procedure were you attempting to do when the hardware failed? Even the most insignificant of observations may help the technician to locate the problem.

Another important factor to keep in mind is that a phone call to your local Radio Shack store or repair facility, before you bring the suspect hardware in, is certainly a good idea. For instance, say you thought you were having problems with your printer and wanted to bring it in for repair. You might find out through a phone call that the printer and the printer cable must both be brought in for examination. The call can save a trip back to the location of the system for added hardware that could have come along on the initial trip.

Photo 5. Technicians with equipment

Radio Shack also offers numerous types of maintenance and on-site service contracts which insure the continued high quality and performance of their hardware. Information on these are available at your local Radio Shack store, Computer Department, or Radio Shack Computer Center.

CONCLUSION

The checklist is now complete. We hope that by seeing the various alternatives open to the customer, the problems which are bound to develop in any operating system can be minimized. Remember, Radio Shack has not left you alone with your hardware or software. There is an entire network of support as close as your telephone or nearest Radio Shack, Computer Department or Computer Center.

A Poem

Rick Paulson
848 Messmer
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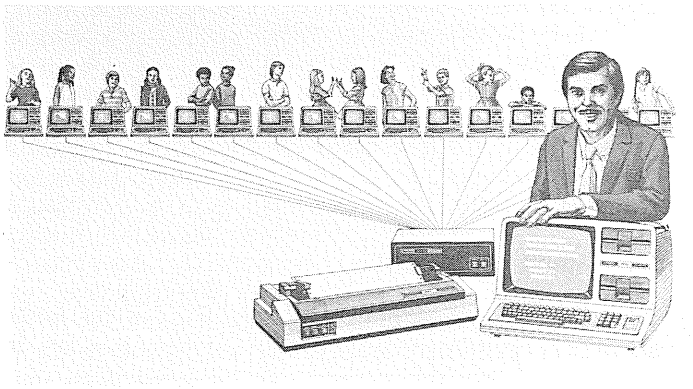
Since I enjoy working on my TRS-80, I decided to write a poem about it:

Decoder, disk, diskette, display,
Address, compiler, core, array.
Assembler, controller, bits and bytes,
Lasers, colors, noises, lights.
CPU and DIP
ALU and CRT
Cards and keys and silicon chips
Loops and bugs and flops and disks.
Input, output, data page.
This is the computer age.

October Profile Article

There were two errors in the October Profile article. The first was under the "Letters" section where we neglected to say that expanding the file to make new segments 'catch up' to the rest of the file works only for PROFILE III+ and PROFILE PLUS, not PROFILE II.

The second error was in the BASIC program. Lines 10 - 70 should have an apostrophe as the first character in each line. If the program is run as it was printed, it will fail.



Bugs, Errors, and Fixes

Note to Users:

The following changes and corrections are provided for your information. If you have an applications program which is working correctly, you should probably NOT make any changes to it. If you feel that changes should be made, but you do not feel qualified to make the change yourself, please contact your local Radio Shack Computer Center or Expanded Computer Department for assistance. If you do not have access to one of these stores, then you may want to call Computer Customer Service in Fort Worth for assistance.

Model I/III

DOUBLE DENSITY OWNERS MANUAL (26-1143)

On page 25, under the BACKUP section, the Note should read:

Note: The destination diskette must not be write-protected.

The next sentence should be deleted.

Delete:

Placing a write protect tab on the source diskette is recommended until a successful BACKUP is made.

CASSETTE MAILING LIST (26-1503)

An insertion should be made in the Cassette Mailing List Manual on page 5, near the bottom of the page after the SHIFT D TO DELETE NAME paragraph and before the C TO CHANGE A FIELD. The insertion should read: If you are using a Model III, you must hold down the shift key and press 0, then press D. When you have finished deleting names, you must hold down the shift key and press 0 before you can use the other options.

ENHANCED VISICALC (26-1569)

The initial release of Enhanced VisiCalc was produced on version 1.2 TRSDOS and was later produced on version 1.3 TRSDOS. To interface Enhanced VisiCalc (26-1569) with Profile III Plus, it is necessary to have your VisiCalc program on 1.3 TRSDOS. Therefore interfacing isn't possible for an early edition of Enhanced VisiCalc on 1.2 TRSDOS.

To get your Enhanced VisiCalc program on the proper version of TRSDOS follow this procedure:

(1) Insert a TRSDOS 1.3 system diskette in Drive 0

(2) Insert your Enhanced VisiCalc (1569) disk in Drive 1

(3) At TRSDOS READY type XFERSYS ⟨ENTER⟩

(4) Answer the prompt "Diskette to convert in Drive 1 (Y/N)" by typing Y ⟨ENTER⟩

(5) If your VisiCalc disk is already on 1.3 TRSDOS the message "Destination Disk is ALREADY Version 1.3" will appear and abort the process. If your VisiCalc disk is on 1.2 TRSDOS the conversion will proceed.

SuperSCRIPSIT (26-1590)

To use SuperSCRIPSIT (26-1590) with the DMP 200 (26-1254), use the printer driver for the DMP 400 that is on the SuperSCRIPSIT program diskette. To use this driver, the user types "DMP 400" for the "Printer type" when opening a document.

Model II

PAYROLL (26-4503 VERSION 2.0)

The following change to program STATETAX makes an optional change to the Minnesota State Tax Tables to increase the state withholding taxes.

Line:

```
1785 PRINT#1,USINGL$;SN+35;:PRINT#1,"G#=G#*.9Ø72DØ"
```

MAILING LIST II (26-4507 VERSION 2.0)

Mailing List II produces a phantom linefeed on the third set of two-up labels when printing a three line address using the Line Printer II or IV. The following program change to MLS/BAS is required for those who will use two-up labels and who are using either the Line Printer II or IV. The change is optional for other users.

Line:

```
3Ø1Ø IFH=ØTHENL$(LZ,1)=H2$ELSEL$(LZ,Ø)=" "
```

PROFILE PLUS (26-4515)

Following are five (5) separate sets of changes to Profile Plus (26-4515 Version 1.0)

Correction 1—In the BASIC program SELECT/BAS provided on the Profile Plus master, if a comma occurs in the selected text, all text after the comma will be out of order. To correct this error make the following required line changes to SELECT/BAS.

Line:

```
8Ø LINE INPUT #1,A$:IF LEN(A$)=Ø THEN GOTO 1ØØ
```

Line:

```
14Ø IF EOF(1) THEN CLOSE:END ELSE LINE INPUT#1,A$:IF
    LEN(A$)>1 THEN A$=MID$(A$,2,LEN(A$)-2)
```

Correction 2—When RG is specified for range selection and associated fields are used, all appropriate records may not be selected. The scan will be terminated prematurely by a member of the associated group that is higher than the end of

the range. To correct this error make the following required patches to the Profile master disk.

```
PATCH CLERK/EFC A=5879 F=C3ØB58 C=C39364
PATCH CLERK/EFC A=6493 F=ØØØØØØØØØØØØØØØØØØØØ
                       C=2A5B4D2B225B4DC3DB57
```

Correction 3—Record selection will be incorrect if the scan mode is entered before any record has been displayed on the screen and then ⟨CTRL⟩⟨R⟩ is used to recalculate. The following patch is required to correct this error.

```
PATCH CLERK/EFC A=8132 F=C27C58 C=C2A15D
```

Correction 4—When expanding a data base, you may encounter a DISK FULL condition. If you subsequently provide new disk space and try to expand the data base again, you may lose data. Make the following required patch to the Profile Plus master diskette to correct this problem.

```
PATCH EXPAND/EFC A=3A97 F=FEFFCA C=CB7FC2
```

An incorrect patch was previously made available to correct this problem. If you have already applied a patch different from the one shown above, then you need to follow the steps listed below.

a. Apply the following patch:

```
PATCH EXPAND/EFC A=3A98 F=CF C=7F
```

b. From TRSDOS READY, enter the Profile main menu by typing:

```
M <ENTER>
```

c. Expand your existing data bases (one at a time) by typing:

```
6 <ENTER>
```

Respond to the data base name prompt with the name of your data base, then type ⟨ENTER⟩.
In response to the prompt requesting How Many Additional Records, type ⟨ENTER⟩.

d. Repeat step c as many times as necessary to expand your remaining data bases.

Correction 5—It is possible to encounter incorrect totals in columnar data on reports after experiencing a D0 (divide by zero), or /OV (field overflow) error. To correct this error make the following required patches to the Profile Plus master diskette.

```
PATCH PRINT/EFC A=36A4 F=D63ØED6F C=CD155EØØ
PATCH PRINT/EFC A=36AB F=D63ØED6F C=CD155EØØ
PATCH PRINT/EFC A=5E15 F=ØØØØØØØØØØØØØØØØØØØØ
                       C=FE3ØDA1F5EFE3ADA215E
PATCH PRINT/EFC A=5E1F F=ØØØØØØØØØØØØØØ
                       C=3E3ØD63ØED6FC9
```

PROFILE PLUS UPGRADE (26-4517 VERSION 1.0)

Record selection will be incorrect if the scan mode is entered before any record has been displayed on the screen and ⟨CTRL⟩⟨R⟩ (recalculate) is used. The following patch is required to correct this error.

```
PATCH EDIT A=8132 F=C27C58 C=C2A15D
```

Or, apply the following patch to all upgraded PROFILE PLUS Diskettes:

```
PATCH CLERK/EFC A=8132 F=C27C58 C=C2A15D
```

SCRIPSIT (26-4531 VERSION 2.0)

Correction 1—After repaginating a document which contains centered lines, some lines are left un-centered and some others are incorrectly indented. Also, the program hangs during the check for enough disk space for some documents. The following patches are required to correct this problem.

NOTE: The date on the STARTUP screen must be 06/09/1982 before applying these patches. If it is not, obtain and apply all previous patches.

```
PATCH SCRIPSIT/SYS R=59 B=21Ø F=35 C=36
PATCH SCRIPSIT/SYS R=59 B=132 F=869E C=98D5
PATCH SCRIPSIT A=D598 F=ØØØØØØØØØØØØØØØØ
                      C=7ED68F3235D6C8DD
PATCH SCRIPSIT A=D5AØ F=ØØØØØØØØØØØØØØØØ
                      C=CBØØ7EF5CD869EF1
PATCH SCRIPSIT A=D5A8 F=ØØØØØØØØØØØØØØØØ
                      C=C8DDCBØØFEC93A35
PATCH SCRIPSIT A=D5BØ F=ØØØØØØØØØØØØØØØØ
                      C=D6B7C82A4CF47EC9
PATCH SCRIPSIT A=D636 F=2A4CF47E C=E5CDAED5
```

After applying the above patches, apply the following patch to change the date in the STARTUP screen:

```
PATCH STARTUP A=E4ØF F=B6AFBØB9 C=B8AFB3BØ
```

NOTE: The following corrections should be done on Scripsit disks that display the STARTUP date of 8/30/1982. If you have a different STARTUP date than this, then you must make all previously published patches.

Correction 2—The patch space was being overwritten due to a bug in the page number input routine. The following patches will alleviate the problem and free up patch space:

```
PATCH SCRIPSIT A=B541 F=CD1AB9
                      C=CDCBD4
PATCH SCRIPSIT A=D4CB F=ØØØØØØØØØØØØ
                      C=CD1AB916Ø5C9
```

Correction 3—When creating a new document if, for whatever reason, the document is not exited properly with ⟨CTRL⟩ ⟨Q⟩ or ⟨ESQ⟩ ⟨Q⟩, the Scripsit directory will be destroyed. The following patches will correct the problem:

```
PATCH SCRIPSIT/SYS R=11 B=15Ø F=1414141414141414
                                C=Ø1ØØØØED43ØC83C9
PATCH SCRIPSIT/SYS R=16 B=14Ø F=Ø1ØØØØ C=CD6DE9
```

Correction 4—Under certain conditions when trying to use ⟨CTRL⟩ ⟨R⟩ to recall text which contained too many lines to fit on the existing page, the error condition was ignored. The system might lockup and text could be lost or the directory blown due to the problem described in Correction 3 above. The following patches will fix the problem.

```
PATCH SCRIPSIT A=B1C1 F=C1E178 C=C38CD5
PATCH SCRIPSIT A=D58C F=ØØØØØØØØØØØØØØØØØØØØØØØØ
                      C=C1E12ØØ478C3C4B1D1C32CB2
```

Correction 5—When using either the ↑ or the ↓ for scrolling between pages, if an error condition occurs (e.g. DISK DRIVE NOT READY), the system can sometimes scramble text between pages. The following patches will correct the problem:

```
PATCH SCRIPSIT A=A184 F=CDFEC4CCE5A3
                      C=3A6B84CD5CD5
PATCH SCRIPSIT A=C54Ø F=322A9Ø C=ØØØØØØ
PATCH SCRIPSIT A=A121 F=C3D9C4 C=C351D5
PATCH SCRIPSIT A=D551 F=ØØØØØØØØØØØØØØØØØØØØØØØØ
                      C=3A6B84F5CDD9C42Ø13F1C9F5
PATCH SCRIPSIT A=D55D F=ØØØØØØØØØØØØØØØØØØØØØØØØ
                      C=CDFEC42ØØ5F1CDE5A3C9FE95
PATCH SCRIPSIT A=D569 F=ØØØØØØØØØØØØØØØØØØØØØØ
                      C=2ØØ2F1C9CD6FBFF1326B84
PATCH SCRIPSIT A=D574 F=ØØØØØØØØØØØØØØØØØØØØØØØØ
                      C=21ØØ7F221B84211E8436ØØC9
```

Correction 6—When typing text at the end of the last page of a document and the 84th line is filled, if the lines per page was set to 84, the system will lock up when it tries to scroll to the next page. The following patches will limit the specified lines per page to 83. A document can still be repaginated to 84 lines per page and an 84th line can be inserted into a page.

```
PATCH SCRIPSIT/SYS R=22 B=177 F=54 C=53
PATCH SCRIPSIT/SYS R=29 B=1Ø1 F=34 C=33
PATCH SCRIPSIT/SYS R=1Ø2 B=96 F=34 C=33
PATCH DOCUMENT/CTL R=39 B=42 F=63 C=53
```

Correction 7—When paper runs out while using the sheet feeder, sometimes a sheet has not been completed when the error code is sent to the system. When this happens Scripsit will display a message "Sheet feeder out of paper. Continue (Y or N) ?". At this time the operator is supposed to press reset on the sheet feeder and answer (yes or no). The sheet is supposedly finished and fed into the hopper. The message, "Load sheet feeder with paper and continue (Y or N)?" is then displayed. The paper is supposed to be loaded, ⟨Y⟩ pressed, and the process continues. Since the LAST SHEET IS NOT ALWAYS INCOMPLETE, this causes the printer to print on the platen when the Sheet feeder reset is pressed and ⟨Y⟩ is pressed. The following patches will eliminate the second message routine and change the text of the first message to "Load sheet feeder with paper and continue. (Y or N)?"

```
PATCH SCRIPSIT/SYS R=175 B=91 F=32Ø3DB C=ØØØØØØ
PATCH SCRIPSIT/SYS R=155 B=164 F=B3 C=B2
```

Correction 8—When backspacing during input into an align tab field, the cursor pointers get lost. If the character to which you are backspacing is a CTRL X print control code, the pointers really get lost. This has caused documents and/or diskettes to be destroyed due to the problem described in Correction 3 above. The following patch will alleviate the backspacing problem:

```
PATCH SCRIPSIT A=A2DA F=AFC9 C=18CB
```

Correction 9—When printing with justification by space insertion, the system sometimes go haywire. This happens when there is a large amount of "wrapped" spaces at the end of a line. The following patch will correct the problem:

```
PATCH SCRIPSIT/SYS R=161 B=247 F=2DFD35371ØF5
                               C=371ØF8FD352D
```

After the patches contained in Correction 2 - 9 have been applied, the following patch should be made so the STARTUP screen will display 09/30/1982

```
PATCH STARTUP A=E4ØF F=B8AFB3BØ C=B9AFB3BØ
```

SCRIPSIT DICTIONARY (26-4534 VERSION 1.0)

Following are two sets of corrections for Scripsit Dictionary.

Correction 1—When flagging a three letter word using the Scripsit Dictionary, the "flag" routine returns the code for BREAK. Follow the procedure below and make the required patch to correct this problem.

1. Insert any Scripsit 2.0 system diskette which has had dictionary installed on it in drive 0.
2. At TRSDOS Ready make the following patch.

```
PATCH SCRIPSIT/RST A=E317 F=26ØØ C=AF67
```

Correction 2—When a hard hyphenated word (e.g. mother-in-law) is split during Hyphenation, the end of line code embedded in text is lost when the text is reformatted or recalled. This can cause an unwanted wrap.

The following patches will fix the problem for Scripsit 2.0 and 2.1 and should be done on your master Scripsit 2.0 or 2.1 diskette:

```
PATCH SCRIPSIT A=D5C2 F=ØØØØØØØØØØØØØØØØØØØØ
                      C=3DCADBE121ØØEØC3EØE1
```

The next patch should be done on your master Spelling and Hyphenation Dictionary diskette:

```
PATCH SCRIPSIT/HYP A=E1DD F=21ØØEØ C=C3C2D5
```

Both patches below should be done on your master Scripsit diskette with the dictionary installed:

```
PATCH SCRIPSIT A=D5C2 F=ØØØØØØØØØØØØØØØØØØØØ
                      C=3DCADBE121ØØEØC3EØE1
PATCH SCRIPSIT/HYP A=E1DD F=21ØØEØ C=C3C2D5
```

INVENTORY CONTROL SYSTEM (26-4602 VERSION 1.0)

When attempting to add records to an indexed or relative file, COBOL improperly handles a disk full condition (error 24) by improperly changing the indices of indexed files. As a consequence, the next attempt to write a record produces an invalid index error (error 98).

At this point, the user can only revert to his most recent back-up copy because the invalidated file cannot be recovered. To correct this error make the following patches.

```
PATCH RUNCOBOL A=761D F=3Ø14FD7Ø71FD717Ø21
                       C=DØ2125ØØ19EB3E2CCF
PATCH RUNCOBOL A=7626 F=25ØØ19EB3E2CCF28Ø4
                       C=2ØØ7FD7Ø71FD717ØC9
```

COMPILER BASIC (26-4705 VERSION 2.4)

BEDIT does not properly store source files when running under Model II TRSDOS 4.1. The result is garbled source.

* * NOTE * * The following patch is required for running under TRSDOS 4.1!

The following patch is optional for TRSDOS 2.0 or 4.0!

The following patch should NOT be applied on TRSDOS 1.2!

```
PATCH BEDIT (A=4184 F=3E3ØCF C=ØØØØØØ)
```

Notes Previous

JULY/AUGUST 1982
SuperSCRIPSIT

Robert M. Gutchen
P.O. Box 334
Kingston, RI 02881

I am writing to suggest that people using the new SuperSCRIPSIT program together with the equally new Daisy Wheel 410 printer should be sure to set the "Printer Type" field of the Open Document Options to "DWP410". The documentation for SuperSCRIPSIT only offers "DW2" as an option for daisy wheel printers, and when DW2 is specified the toggle print codes for underscore, double underscore, bold and strike-through functions do not operate on 410. Specifying "DWP410" will allow those functions to work. On this subject, also, the SuperSCRIPSIT Reference Manual (p.71) states that the double underscore is only available on the Daisy Wheel II; it is in fact also available on the Daisy Wheel 410.

SEPTEMBER 1982 PLANETARIUM

J. W. Hurley
3403 Onyx
Torrance, CA 90503

Editor's Note: Since its appearance in our September issue, Mr. Hurley tells us that he has received over 100 responses to his program. What follows is a portion of a letter we received from him and a full set of corrections to the program.

The Planetarium program has been out about two weeks now and I think you might be interested in some of the results.

So far I have received some two dozen letters and had even more phone calls from across the country. Some of the letters were just to say thanks, others to swap programs, some wanting to distribute my program or programs, and some asking why their program wouldn't work. I have answered all that need replies, and I think I was able to help those who were having trouble.

From the phone calls, I think most problems were in data lines. In more than half the cases, the error was a quote or comma out of place in the line ahead of the line that kicked out an SN error.

One caller I really couldn't help. He was having trouble with the PMODE line. I now think he must have not had Extended Color BASIC.

Two people with Model I machines called. One of these people may send you a program for that machine. One of these Model I owners called back three days later saying he just went out and bought a color machine and stayed up until 5 a.m. typing the program. He had a problem easily solved and watched the program come up while on the phone.

As you probably know, the program runs exactly as printed, although there are errors that affect the planets.

I realize that it is a difficult program to type. It seems most people took four or more hours. All this points out to me that submitted programs should be on tape, and I will comply in the future. Even your experienced typists misplaced a comma or two.

You might pass on to your readers that it is a great help and speeds up replies if one is required to enclose a self-addressed envelope, as some did. Thanks.

To those who phoned, I enjoyed talking to them and learned some surprising things on their quarter (or much more).

Again I say, if anyone calls you about the program quitting on a data line, my advice is to check the line ahead or even in the days of the month data.

I am sorry that the program was not perfect as published. I sent in corrections about the second day after I got my copy, but since have discovered some additional ones. Some were definitely my fault. I got in a hurry to clean up the program for submission and deleted more than I meant to. The program will work better with these changes:

DELETE LINES:

```
1070
1080
1090
1100
```

Change

```
450 DATA "PAU", "FOM", 22.9, -30
460 DATA "CEN", "HAD", 14, -60
520 DATA "CMA", "SIR", 6.7, -17
970 IF F$=E$ THEN CIRCLE(X, Y), 3
980 IF B$=C$ THEN CIRCLE(X, Y), 3
1110 IF H>24 THEN H=H-24
1350 FOR Z=1 TO MM
     : READ VA, MA, JA, SA
     : NEXT
1360 IF VA=0 THEN 1390
1400 T=T+11
     : MA=24-MA
     : A=MA+T
     : GOSUB 1570
     : GOSUB 1630
     : IF Y<LA THEN GOTO 1420
1430 JA=24-JA
     : A=JA+T
     : GOSUB 1570
     : GOSUB 1630
     : IF Y<LA THEN GOTO 1450
1460 SA=24-SA
     : A=SA+T
     : GOSUB 1570
     : GOSUB 1630
     : IF Y<LA THEN RETURN
1520 DATA 44, 10.7, 16.5, 14.2, 46, 11.9,  16.9,
14.5, 42, 13.0, 14.7
1560 DATA 43, 0, 21.1, 15.3, 38, 0, 20.9, 15.3,
     30, 10.4, 20.7, 15.4, 23, 11.1, 20.7, 15.6,
     16, 12.7, 20.8, 0, 0, 13.7, 21.2, 16.1
1650 CIRCLE(X, Y), 1
     : IF C$="SUN" THEN CIRCLE(X, Y), 2
     : RETURN
```

PRIME NUMBER GENERATOR #1

Kirit K. Parikh
7720 Gerald
Middleburg Hts., OH 43336

The program submitted by Gary M. Greer in the September issue will undergo dramatic transformation in speed, especially for higher prime number generation, by a simple change in line 50.

```
50: FOR A=2 TO √N
```

PROGRAMMING TECHNIQUES IN READ SCREEN

Paul Roberts
8222 Canyon Drive
P. O. Box 7366
Amarillo, TX 79109

I was happy to find some information on the Model II Debug Program. I have been looking for this type of information for three months. Too little is written about the Model II and its powerful functions. The program listed in your magazine works perfectly with a few modifications.

May I suggest when loading the program as described on Page 35, Instruction 5, that the Operator press the ⟨F2⟩ key in lieu of the ⟨ESC⟩ key, and under Instruction 7, the quotation marks be deleted when typing in the dump program instruction.

microRESEARCH Responses to Problem #1

Richard V. Andree
microRESEARCH Problems
P. O. Box 2910
Fort Worth, TX 76113-2910

Editor's Note: We are very pleased to present four of the more unique programs we received in response to Richard Andree's microResearch Problem #1, which appeared in our July/August, 1982 issue.

U. Neumann
P. O. Box 2011
Salmon Arm, B. C.
VOE-2TO
Canada

The following program utilizes the PC-1 for a solution of Problem #1.

```
1Ø "=" INPUT "STARTING POINT? ";P,"DISPLAY? ";W$
     :GOTO 2Ø
15 P=P+1
     :N=PP
     :IF N=1E1Ø END
2Ø FOR Z=3Ø TO 4Ø
3Ø N=N/1Ø
4Ø A(Z)=N-INT N
     :NEXT Z
6Ø FOR X=3Ø TO 4Ø
     :A(X)=INT (A(X)*1Ø)
     :NEXT X
7Ø A=A(39)
     :B=A(38)
     :C=A(37)
     :D=A(36)
     :E=A(35)
     :F=A(34)
     :G=A(33)
     :H=A(32)
     :I=A(31)
71 J=A(3Ø)
     :Q=Ø
72 IF ((A=Ø)+(B=Ø)+(C=Ø)+(D=Ø)+(E=Ø)+(F=Ø)+(G=Ø)
     +(H=Ø)+(I=Ø)+(J=Ø)) THEN 74
73 PAUSE P
     :GOTO 15
74 IF W$="Y" PAUSE Q
     IF Q=O PAUSE P
75 IF (((A=Q)*((B=A)+(C=A)+(D=A)+(E=A)+(F=A)+
     (G=A)+(H=A)+(I=A)+(J=A))) THEN 2ØØ
76 IF (((B=Q)*((A=B)+(C=B)+(D=B)+(E=B)+(F=B)+
     (G=B)+(H=B)+(I=B)+(J=B))) THEN 2ØØ
77 IF (((C=Q)*((A=C)+(B=C)+(D=C)+(E=C)+(F=C)+
     (G=C)+(H=C)+(I=C)+(J=C))) THEN 2ØØ
78 IF (((D=Q)*((A=D)+(B=D)+(C=D)+(E=D)+(F=D)+
     (G=D)+(H=D)+(I=D)+(J=D))) THEN 2ØØ
79 IF (((E=Q)*((A=E)+(B=E)+(C=E)+(D=E)+(F=E)+
     (G=E)+(H=E)+(I=E)+(J=E))) THEN 2ØØ
8Ø IF (((F=Q)*((A=F)+(B=F)+(C=F)+(D=F)+(E=F)+
     (G=F)+(H=F)+(I=F)+(J=F))) THEN 2ØØ
81 IF (((G=Q)*((A=G)+(B=G)+(C=G)+(D=G)+(E=G)+
     (F=G)+(H=G)+(I=G)+(J=Q))) THEN 2ØØ
82 IF (((H=Q)*((A=H)+(B=H)+(C=H)+(D=H)+(E=H)+
     (F=H)+(G=H)+(I=H)+(J=H))) THEN 2ØØ
83 IF (((I=Q)*((A=I)+(B=I)+(C=I)+(D=I)+(E=I)+
     (F=I)+(G=I)+(H=I)+(J=I))) THEN 2ØØ
84 IF (((J=Q)*((A=Q)+(B=Q)+(C=Q)+(D=Q)+(E=Q)+
     (F=Q)+(G=Q)+(H=Q)+(I=Q))) THEN 2ØØ
85 Q=Q+1
     :IF Q=1Ø THEN 88
86 GOTO 72
88 N=N*1E11
     :PRINT P
     :PRINT N
2ØØ GOTO 15
```

J. F. Atherley
35 Faraday Cresc
Deep River ONT
KOJ 1PO

I wish to congratulate you on your microRESEARCH column and add my hopes that it will be a long series. During the years that I have been programming, I have found a great deal of pleasure and satisfaction from solving such problems. As a spin-off, the programming and "computer sophistication" practice has been well worth while.

Recently I purchased a FORTRAN compiler for my TRS-80 Model III. My previous FORTRAN experience was on a CDC-CYBER 175 with 60 bit words.

Notes on MICRES

Object:

Determine all integer X's for which X * X is a 10 digit number in which each of the 10 digits (0-9) occur exactly once.

Algorithm:

The range of possible values of X is

$\sqrt{1023456789} < X < \sqrt{9876543210}$

$= 31992 < = X < = 99380$

$31992^2 = 1023488064$

$\sum_{i=0}^{9} i = 45$ and therefore

i) since 45 is a multiple of 9, only values of X that are multiples of 3 are possible solutions.

ii) since the sum of the digits in the squares is easily calculated, it was used to reject any squares in which the sum was not 45, without checking it for repeated digits.

The values of the squares exceeded the range of INTEGER * 4 variables. Therefore the squares were stored digit by digit in a BYTE array, PR(10). When this array contained the square of X, the square of the next possible value (X+3) was obtained by adding 6*X+9, digit by digit, to the array, a relatively simple operation.

Checking for repeated digits is fairly straight forward.

Output:

Since the squares could not be assigned to an integer variable, a second BYTE array RP(10) was used to reverse the order of digits in the PR array. Each digit was then output separately from the RP array.

Comments:

Extensions to the problem were looked at. For cubes rather than squares, the limits and the incrementing expression were altered and no cubes were found. Fourth powers were examined with a programmable calculator and none were found. Only one factorial gave a 10 digit number, so there are no factorials as a solution.

```
ØØ1ØØ           PROGRAM LINES
ØØ1Ø5   C       micro-RESEARCH Problem #1
ØØ1Ø6   C       TRS-8Ø Microcomputer News - 82Ø7/Ø8
ØØ1Ø7   C       Determine all values of X for which the value X**2
ØØ1Ø8   C       contains each of the 1Ø digits exactly once.
ØØ1Ø9   C       Programmed by : J.F. Atherley
ØØ11Ø   C                       Deep River, Ontario.
ØØ111   C
ØØ2ØØ           INTEGER*4 X,Y
ØØ3ØØ           BYTE PR(1Ø),RP(1Ø)
ØØ4ØØ   C
ØØ425           WRITE(2,1ØØØ)
ØØ45Ø    1ØØØ   FORMAT(15X, 'micro-RESEARCH Problem #1' //
ØØ475        $  12X, 'X', 1ØX, 'X**X' //)
ØØ5ØØ           X = 1Ø23488Ø64
ØØ6ØØ           DO 1Ø I = 1,1Ø
ØØ7ØØ           PR(I) = X - X/1Ø*1Ø
ØØ8ØØ           X = X/1Ø
ØØ9ØØ      1Ø   CONTINUE
Ø1ØØØ   C
Ø11ØØ           X = 31992
Ø12ØØ      11   Y = 6*X + 9
Ø13ØØ           ISUM = Ø
Ø14ØØ           DO 12 I = 1,9
Ø15ØØ           PR(I) = Y - Y/1Ø*1Ø + PR(I)
Ø16ØØ           J = I + 1
Ø17ØØ           PR(J) = PR(J) + PR(I)/1Ø
Ø18ØØ           PR(I) = PR(I) - PR(I)/1Ø*1Ø
Ø19ØØ           ISUM = ISUM + PR(I)
Ø2ØØØ           Y = Y/1Ø
Ø21ØØ      12   CONTINUE
Ø22ØØ           ISUM = ISUM + PR(1Ø)
Ø23ØØ           IF (ISUM.NE.45) GO TO 15
Ø24ØØ           DO 13 I = 1,9
Ø25ØØ           II = I + 1
Ø26ØØ           DO 13 J = II,1Ø
Ø27ØØ           IF (PR(I).EQ.PR(J)) GO TO 15
Ø28ØØ      13   CONTINUE
Ø31ØØ           DO 14 I = 1,1Ø
Ø32ØØ           J = 11 - I
Ø33ØØ      14   RP(I) = PR(J)
Ø37ØØ           Y = X + 3
Ø38ØØ           WRITE(5,2ØØØ) Y,RP
Ø39ØØ           WRITE(2,2ØØØ) Y,RP
Ø4ØØØ    2ØØØ   FORMAT(I15,5X,1ØI1)
Ø41ØØ      15   X = X + 3
Ø42ØØ           IF (X.LT.99385Ø) GO TO 11
Ø43ØØ           STOP
Ø44ØØ           END
EOF
```

William F. Terrell, Jr.
423 Jewel Drive West
Liverpool, NY 13088

I've gotten a number of hours of enjoyment out of microRESEARCH problem #1. By now, a number of readers have probably pointed out the error in the "brute force" solution published in the September issue. In line 70 the given equation suffers from a round-off error and produces an incorrect double precision square. You should have used:

```
7Ø TEMP# = CDBL(I) * CDBL(I)
```

As you know, the solution you published will take 10 to 12 hours to complete the calculations. I believe I have a "more elegant" solution in BASIC. It takes about 6 hours to complete the calculations. I read the digits from the screen, and check the screen for a match.

```
1ØØ CLS
11Ø DEFDBL S
12Ø DIM D$(1Ø)
     :FOR I = Ø TO 1Ø
     :D$(I) = " "
     :NEXT
13Ø A=VARPTR(D$(Ø))
     :FOR I = Ø TO 9
     :POKE A+3*I+1,I+1
     :POKE A+3*I+2,6Ø
     :NEXT
     :POKE A+3*I,1Ø
     :POKE A+3*I+1,31
     :POKE A+3*I+2,6Ø
14Ø S1 = 1Ø23456789
     :S2 = 9876543210
15Ø N1 = INT(SQR(S1))
     :N2 = INT(SQR(S2))
16Ø FOR I = N1 TO N2
17Ø S= CDBL(I)*CDBL(I)
     :PRINT@Ø,S,I
18Ø FOR K = Ø TO 9
     :POKE 15391 + PEEK (15361+K) -48,
     PEEK(15361 + K)
     :NEXT
19Ø IF D$(1Ø) = "Ø123456789" THEN PRINT@128,I,S
2ØØ PRINT@Ø,"
21Ø NEXT
```

I never did let the program run through completely. This problem seemed a natural for the speed of a machine language program. The following assembled listings of RESEARCH/CMD are my first cut at it. It takes about 1 minute, 35 seconds to complete the calculations. The program can probably be improved to reduce the calculation time further. However, I've carried it about as far as I want to.

I was a little disappointed that microRESEARCH Problem #2 was so close to Problem #1. But, I'll probably try it anyway. Keep up the good work.

```
                ØØ1ØØ ;RESEARCH/SCE  :  FIND ALL INTEGERS WHICH, WHEN SQUARED,
                ØØ11Ø ;              PRODUCE A SUM WITH EACH OF THE 1Ø DIGITS
                ØØ12Ø ;              APPEARING ONLY ONCE.  W. F. TERRELL  1Ø/4/82
FFØØ            ØØ13Ø          ORG     ØFFØØH
ØØØA            ØØ14Ø BUFFER   DEFS    1Ø        ;WORKING STORAGE TO CHECK SQUARE
FFØA Ø1         ØØ15Ø SUM      DEFB    1         ;STORE INITIAL NUMBER SQUARED
FFØB ØØ         ØØ16Ø          DEFB    Ø
FFØC Ø2         ØØ17Ø          DEFB    2
FFØD Ø3         ØØ18Ø          DEFB    3
FFØE Ø4         ØØ19Ø          DEFB    4
FFØF Ø2         ØØ2ØØ          DEFB    2
FF1Ø Ø4         ØØ21Ø          DEFB    4
FF11 ØØ         ØØ22Ø          DEFB    Ø
FF12 Ø8         ØØ23Ø          DEFB    8
FF13 Ø1         ØØ24Ø          DEFB    1
FF14 2Ø         ØØ25Ø          DEFM    '
FF1A Ø3         ØØ26Ø NUMBER   DEFB    3         ;STORE INITIAL NUMBER
FF1B Ø1         ØØ27Ø          DEFB    1
FF1C Ø9         ØØ28Ø          DEFB    9
FF1D Ø9         ØØ29Ø          DEFB    9
FF1E Ø1         ØØ3ØØ          DEFB    1
FF1F ØD         ØØ31Ø          DEFB    ØDH       ;CR
FF2Ø CDC9Ø1     ØØ32Ø ENTRY    CALL    Ø1C9H     ;CLS
FF23 211AFF     ØØ33Ø SPLUS1   LD      HL,SUM+1Ø ;PTR TO LSD
FF26 Ø6ØA       ØØ34Ø          LD      B,1Ø      ;1Ø DIGITS
FF28 CD6FFF     ØØ35Ø          CALL    PLUS1     ;S=S+1
FF2B CD8ØFF     ØØ36Ø          CALL    PLUSNO    ;S=S+N+1
FF2E CD8ØFF     ØØ37Ø          CALL    PLUSNO    ;S=S+2N+1
FF31 211FFF     ØØ38Ø          LD      HL,NUMBER+5 ;PTR TO LSD
FF34 Ø6Ø5       ØØ39Ø          LD      B,5       ;5 DIGITS
FF36 CD6FFF     ØØ4ØØ          CALL    PLUS1     ;N=N+1
FF39 21ØØFF     ØØ41Ø          LD      HL,BUFFER ;PTR TO NEW SQUARE
FF3C Ø6ØA       ØØ42Ø          LD      B,1Ø      ;1Ø DIGITS
FF3E 3E2Ø       ØØ43Ø          LD      A,2ØH     ;SPACE
```

```
FF4Ø 77       ØØ44Ø CLEAR   LD      (HL),A  ;CLR WKG STORAGE
FF41 23       ØØ45Ø         INC     HL
FF42 1ØFC     ØØ46Ø         DJNZ    CLEAR
FF44 Ø6ØA     ØØ47Ø         LD      B,1Ø    ;1Ø CHAR
FF46 DD21ØAFF ØØ48Ø         LD      IX,SUM
FF4A FD21ØØFF ØØ49Ø         LD      IY,BUFFER
FF4E DD7EØØ   ØØ5ØØ LOOP    LD      A,(IX)  ;GET CHAR
FF51 DD23     ØØ51Ø         INC     IX
FF53 3258FF   ØØ52Ø         LD      (OFFSET+2),A ;MODIFY OFFSET
FF56 FD77ØØ   ØØ53Ø OFFSET  LD      (IY+Ø),A ;PUT IN BUFF
FF59 1ØF3     ØØ54Ø         DJNZ    LOOP
FF5B Ø6ØA     ØØ55Ø         LD      B,1Ø    ;1Ø CHAR
FF5D FD7EØØ   ØØ56Ø CHECK   LD      A,(IY)  ;GET CHAR FOR CHECKING
FF6Ø FD23     ØØ57Ø         INC     IY      ;TO NEXT POSIT
FF62 FE2Ø     ØØ58Ø         CP      2ØH     ;BLANK ?
FF64 CA23FF   ØØ59Ø         JP      Z,SPLUS1 ;IF SO, GO DO NXI NO.
FF67 1ØF4     ØØ6ØØ         DJNZ    CHECK
FF69 CDA2FF   ØØ61Ø         CALL    DSPLAY  ;OUTPUT TO VIDEO
FF6C C323FF   ØØ62Ø         JP      SPLUS1  ;GO DO NEXT NUMBER
FF6F 2B       ØØ63Ø PLUS1   DEC     HL      ;SUBROUTINE TO ADD 1
FF7Ø 7E       ØØ64Ø         LD      A,(HL)
FF71 3C       ØØ65Ø         INC     A
FF72 FEØA     ØØ66Ø         CP      1Ø
FF74 CA79FF   ØØ67Ø         JP      Z,PUTZER
FF77 77       ØØ68Ø         LD      (HL),A
FF78 C9       ØØ69Ø         RET
FF79 AF       ØØ7ØØ PUTZER  XOR     A
FF7A 77       ØØ71Ø         LD      (HL),A
FF7B 1ØF2     ØØ72Ø         DJNZ    PLUS1
FF7D C32D4Ø   ØØ73Ø         JP      4Ø2DH   ;EXIT TO DOS IF OVERFLOW
FF8Ø 2114FF   ØØ74Ø PLUSNO  LD      HL,SUM+1Ø ;SUBROUTINE TO ADD NUMBER
FF83 111FFF   ØØ75Ø         LD      DE,NUMBER+5
FF86 Ø6Ø5     ØØ76Ø         LD      B,5
FF88 AF       ØØ77Ø         XOR     A       ;CLEAR CARRY
FF89 2B       ØØ78Ø PLUSN1  DEC     HL
FF8A 1B       ØØ79Ø         DEC     DE
FF8B 1A       ØØ8Ø0         LD      A,(DE)
FF8C 8E       ØØ81Ø         ADC     A,(HL)
FF8D FEØA     ØØ82Ø         CP      1Ø
FF8F DA94FF   ØØ83Ø         JP      C,PUTSUM
FF92 D6ØA     ØØ84Ø         SUB     1Ø
FF94 77       ØØ85Ø PUTSUM  LD      (HL),A
FF95 3F       ØØ86Ø         CCF
FF96 1ØF1     ØØ87Ø         DJNZ    PLUSN1
FF98 DØ       ØØ88Ø         RET     NC
FF99 21ØFFF   ØØ89Ø         LD      HL,SUM+5
FF9C Ø6Ø5     ØØ9ØØ         LD      B,5
FF9E CD6FFF   ØØ91Ø         CALL    PLUS1
FFA1 C9       ØØ92Ø         RET
FFA2 E5       ØØ93Ø DSPLAY  PUSH    HL      ;DISPLAY ON VIDEO
FFA3 D5       ØØ94Ø         PUSH    DE
FFA4 C5       ØØ95Ø         PUSH    BC
FFA5 21ØAFF   ØØ96Ø         LD      HL,SUM
FFA8 Ø616     ØØ97Ø         LD      B,22    ;22 CHARS FOR DISPLAY
FFAA 7E       ØØ98Ø PRINT   LD      A,(HL)
FFAB FE2Ø     ØØ99Ø         CP      2ØH
FFAD CAB7FF   Ø1ØØØ         JP      Z,INCHL ;ALREADY ASCII
FFBØ FEØD     Ø1Ø1Ø         CP      ØDH
FFB2 CAB7FF   Ø1Ø2Ø         JP      Z,INCHL ;ALREADY ASCII
FFB5 C63Ø     Ø1Ø3Ø         ADD     A,3ØH   ;CONVERT TO ASCII
FFB7 23       Ø1Ø4Ø INCHL   INC     HL
FFB8 CD33ØØ   Ø1Ø5Ø         CALL    33H
FFBB 1ØED     Ø1Ø6Ø         DJNZ    PRINT
FFBD C1       Ø1Ø7Ø         POP     BC
FFBE D1       Ø1ØØØ         POP     DE
FFBF E1       Ø1Ø9Ø         POP     HL
FFCØ C9       Ø11ØØ         RET
FF2Ø          Ø111Ø         END     ENTRY
ØØØØØ TOTAL ERRORS
32921  TEXT AREA BYTES LEFT

BUFFER FFØØ ØØ14Ø   ØØ41Ø ØØ49Ø
CHECK  FF5D ØØ56Ø   ØØ6ØØ
CLEAR  FF4Ø ØØ44Ø   ØØ46Ø
DSPLAY FFA2 ØØ93Ø   ØØ61Ø
ENTRY  FF2Ø ØØ32Ø   Ø111Ø
INCHL  FFB7 Ø1Ø4Ø   Ø1ØØØ Ø1Ø2Ø
LOOP   FF4E ØØ5ØØ   ØØ54Ø
NUMBER FF1A ØØ26Ø   ØØ38Ø ØØ75Ø
OFFSET FF56 ØØ53Ø   ØØ52Ø
PLUS1  FF6F ØØ63Ø   ØØ35Ø ØØ4ØØ ØØ72Ø ØØ91Ø
PLUSN1 FF89 ØØ78Ø   ØØ87Ø
PLUSNO FF8Ø ØØ74Ø   ØØ36Ø ØØ37Ø
PRINT  FFAA ØØ98Ø   Ø1Ø6Ø
PUTSUM FF94 ØØ85Ø   ØØ83Ø
PUTZER FF79 ØØ7ØØ   ØØ67Ø
SPLUS1 FF23 ØØ33Ø   ØØ59Ø ØØ62Ø
SUM    FFØA ØØ15Ø   ØØ33Ø ØØ48Ø ØØ74Ø ØØ89Ø ØØ96Ø
```

National Computer Camp

National Computer Camp (NCC), which is believed to be the first computer camp in this country, is powering up for another series of computer camps for kids from ages nine to eighteen.

Campers at National Computer Camps learn to program the computer through a hands-on approach along with ample time on, and access to, the computer—two to three campers per computer. In the process, the campers come to understand the potential as well as the limitations involved in using computers.

NCC is well known for its skilled staff. The instructors are trained teachers in the field of education who love to work with kids. They specialize in teaching computers year-round in elementary and secondary schools and have been with NCC for several summers. The philosophy of the staff is to motivate campers by presenting material in exciting ways. Special guest speakers will include such heavyweights as David Ahl, Publisher and Chief Editor of Creative Computing, and Scott Adams, Mr. Adventure himself.

Campers will be housed in modern dormitories where dorm supervisors and counselors are always on duty and available to assist campers in every possible way. Two or three campers are assigned to each room. Campers will find spacious teaching facilities and computer workshop rooms as well as indoor recreation and game rooms, lounge and canteen area, modern gymnasium, swimming pool, tennis courts, and athletic fields.

1983 will be the sixth season of NCC, and for the first time, the camp will be held in three separate locations: Simsbury, CT; Atlanta, GA; and St. Louis, MO.

The sessions will be:

July 3—July 8
July 10—July 15
July 17—July 22
July 24—July 29
July 31—August 5

All five sessions are offered in Simsbury; Atlanta offers the last four; and St. Louis offers the last two. Campers may sign-up for one or more weeks at a camp. If you are interested in obtaining more information about the camps, send inquiries to:

National Computer Camps
P.O. Box 585
Orange, CT 06477
1-203-795-9667

Profile III+: Designing Codes

The small Computer Company
P.O. Box 2910
Fort Worth, TX 76113-2910

Profile III+ Section By Ivan Sygoda, Director, Pentacle

(ATTENTION ALL MODEL III SINGLE-DRIVE OWNERS WHO DON'T ALREADY OWN PROFILE III+: There's a special message for you somewhere in this column.)

You've already seen how remarkably flexible and powerful Profile III+ is as a data base management system. But you must also realize that since it is operating in a microcomputer environment, space is at a premium. Alphanumeric data eats up space voraciously, so every byte has to count.

You can save space and increase the efficiency and flexibility of your system by carefully designing sort and selection codes that describe the attributes of each record in your files. These codes can then be used for high-powered sorting and selection.

CODES OF CONDUCT

Here's a hypothetical example: Suppose you were setting up a press contact list, which is a file of newspapers, magazines, critics, and VIPs who need to be sent press releases about your organization's activities. Yet each person on the list must get different releases. Also, they need to receive this information at different times. A monthly magazine needs a much greater lead time than the local daily, for example.

SORTING IT ALL OUT

You need to be able to sort your list into various categories. For instance: 1) field of interest—music, theatre, or dance; 2) timing—monthlies, weeklies, dailies, radio/TV public service announcements; 3) priorities—you should consider having an "A" list and a "B" list since postage is so expensive. Only the "A" list would get first class mailings. Perhaps a subset of your "A" list needs to be sent photographs early, since most publications accept and print them if they are received in time.

To complicate matters even more, your categories may overlap. There may be both "A" and "B" list people among each type of publication. You could set up an entire field for each category:

1. Interest (Length = 7) e.g. MUSIC, THEATRE, DANCE
2. Timing (Length = 7) e.g. MONTHLY, DAILY, RADIO
3. Priority (Length = 1) e.g. A, B, P (for Photo)

However, you would have expended a total of 15 characters, and would have to go into Extended Selection to cover all three categories. The first smart step would be to reduce each category to a one-letter code:

1. M = Music, T = Theatre, D = Dance
2. M = Monthly, W = Weekly, D = Daily, etc.
3. A, B, P

Now you have it down to a more manageable three characters, but you've used three fields and the system is still unwieldy.

You can do it all in one three-character field if you standardize the position in the field of each element: 1) interest; 2) timing; 3) priority. "DWA" becomes the code for "dance, weekly, 'A' list." "MDP" means "music, daily, photo;" in other words, "send a photo to the music editor of the Times."

Since you've only used up one of your sort criteria, you can also target such categories as cities or states without using Extended Selection. There's another advantage, however. Profile III+'s "wild card" feature makes this system even more flexible. By substituting an " = " for any one of the code elements, you can include everyone in a certain category. For example, "D = A" means that everyone on the dance "A" list will get your release, whether he or she be the editor of a daily or a critic for a weekly.

VENN DOES IT END?

Setting up such a code can be a bit tricky because you have to think in a rigorous way about categorizing the attributes in your data base. Which categories are complementary?

A useful analytical tool for sorting out these questions is a Venn diagram. In a box called the Universe, one draws circles representing groups that share attributes. To use the above example, "D" represents the daily papers; "W" represents the weekly publications. They are mutually exclusive, and so they occupy the universe as in Figure 1:

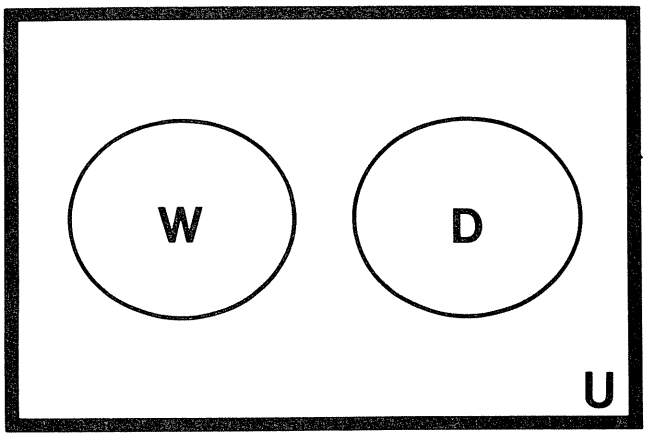


Figure 1.

W = Weekly
D = Daily
U = Universe

Some publications are important to you, others less so. Therefore, within each circle is a smaller, concentric circle, the "A" list. (See Figure 2.)

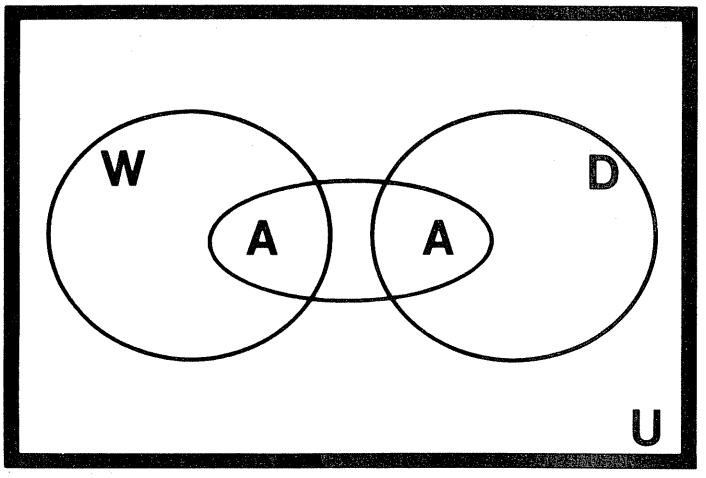


Figure 2.

A = A list

This figure illustrates why priority occupies a different position in the code than timing does. When sorting, weeklies and dailies are mutually exclusive, although "A" overlaps each. You may want a list of all the weeklies on the "A" list, but since the "A" list contains a number of dailies as well, it isn't useful for you to use the entire "A" list. In the same way, you don't want all weekly papers, because some may be on the "B" list.

This is not as complicated as it may seem at first glance. All it takes is a pencil, a piece of paper, and a few moments of reflection.

THE KEY TO ELEGANT LABELS

There's something useful that can be added to the above code. Profile III + cannot automatically skip a blank line in a label format. Some of our press list addresses will need a line for title or desk, etc., and others will not. An address label with an empty line is ugly, and these are people we are trying to impress. The solution is quite simple: Create as many address label formats as are needed for your application, and identify each one with a letter or number. For example, A = three-line address, B = four-line address. Then add a position to the coding system:

DWAA = Dance, Weekly, "A" list, 4-line address
DWBA = Dance, Weekly, "A" list, 3-line address
DWA or DWB (ENTER) = it doesn't matter; you're just printing a report.

KNOW WHEN TO STOP

Of course, this whole idea can be taken to extremes. Codes like WQZ4aXzz invite typos, confusion, and rebellion. Mnemonics should be used to advantage wherever possible. In the above example, we were lucky. (M)onthly, (W)eekly, and (D)aily worked out beautifully. If your categories are Peas, Pickles, Porridge and Pancakes, you'll have to think of something clever. You will.

PROFILE Editor's Note: This is Mr. Sygoda's fourth article in a series of 'how-to' PROFILE III + *articles. Other articles in the series will be published over the next few issues in this column. We hope that you enjoy this new feature, and we look forward to your comments and questions on PROFILE* III +.

Pentacle is a New York City-based, non-profit service organization specializing in administrative services for performing art groups.

THE SPECIAL NOTE: Customers have called to ask if Profile III + can be used on a one-drive system. Yes, it can. Profile III + has been changed to make it more convenient to use on one-drive systems. The program conveniently prompts you to switch diskettes for all operations. Contact your local Radio Shack store or dealer for a demonstration.

PROFILE PLUS FOR THE MODEL II: BRAND NEW EXTENSIONS

We are pleased to inform you that three new Profile Plus Extensions are now available from Radio Shack. These extensions provide a range of functions that will be useful to you in indexing, record purging, file reorganizing, and printing invoices and other forms.

PROSORT (26-4558)

The Prosort program organizes your data into almost any imaginable order for print, inquiry, and Scripsit selection operations. With Prosort, you have not one index but six. The Prosort inquiry index replaces the index built with selection 3 on the Profile Plus menu, "Build File Index." The other five are print indexes, although all six can be used for printing reports and mailing lists.

Prosort can also be used to select records for Scripsit merges and to purge and reorganize files with the Profile Plus extension program Archive (26-4557). Prosort indexes can be used to print forms, if you have the Profile Plus extension Profile Forms (26-4556).

During indexing, the program lets you sort records by up to five fields and select by up to 16 separate criteria. Prosort also lets you sort and select records from any segment in your data base, not just the first segment. Prosort fine-tunes your selections and sorts. For example, you can base new indexes on sections of a data base previously indexed.

Prosort sorts are not restricted by memory size. Given enough disk space, Prosort can search and sort files of any size, letting you do much more extensive sorts than you ever could before. If you have a hard disk system, you can now use the larger disk storage space for sorting and selection.

The program also includes two new inquiry functions—mass update and mass recalculation of math formulas in an indexed selection of records.

ARCHIVE (26-4557)

Profile Archive lets you empty your data base of inactive, outdated information. Only the data are deleted—the empty records remain to be filled again with new data:

If you have inactive accounts, you can move them into special archive files, freeing records for new information. Records to be removed can be printed out before deletion, sent to a new archive file, sent to the printer and to an archive file, or simply deleted.

Profile Archive lets you make a copy of the screen format and the structure of your active data base for the archive file. This lets you access the archived information normally. You can continue to add records to an archive file.

Profile Archive also lets you rewrite files so that they run more efficiently:

You can shorten files that are too long.

You can create subfiles of your main file.

You can write records into a new archive file in the indexed order.

You can add files or sections of files together.

Profile Archive works with Profile Prosort (26-4558) to purge and rewrite files.

PROFILE FORMS (26-4556)

Profile forms lets you eliminate repetitive typing of your company's standard invoices, bills, purchase orders, insurance forms and form letters.

Profile Forms are simply copies of your own standard forms, with one important difference: Using your Profile Plus data bases and Profile Forms, the computer (rather than a secretary or clerk) fills in the form. Although your clients will probably not notice a change, there will be no typing errors or erasures, the job will be run automatically and—if the workload has been a problem—it will be done much faster.

Profile Forms lets you print forms of up to 66 lines long and 14 inches wide for each record, instead of the Profile Plus report program's two lines per record.

You can also customize your forms with the underlining, trademarks, half-line spaces and condensed printing that had been available only for word-processing.

Computer Clubs

TRS-80 Color Computer Club (national membership)
c/o Donald DeHart
3632 Cheek Road
Durham, N.C. 27704

TRS-80 Users Group of Eastern Massachusetts
c/o Matthew W. Slate
42 Oak Hill Road
Sudbury, MA 01776
1-617-443-3327

West Mifflin Area TRS-80 Users Group
(meets at)
Community College of Allegheny County, South
c/o Alan Jakub
529 Mifflin Street
Duquesne, PA 15110
1-412-466-6437

32 Character Mode for Level I

Don Taylor
1017 East 2nd #A
Albany, OR 97321

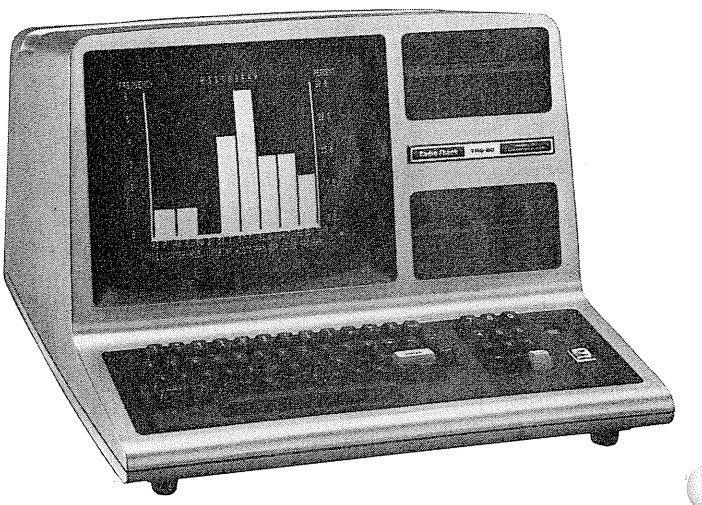
If you have Level I you may know that you cannot normally use the 32 character mode to get double width characters in BASIC. If you have a copy of TBUG, this can be easily overcome. Regular or double width characters depend on one bit being set in RAM, bit 3 at address 4090 Hex.

Once this bit is turned on, BASIC will not turn it back off, but will check it each time a character is printed. With this bit turned on all characters are twice as wide, but you only see every other one.

Level II checks that and adds a space after each character, but Level I does not. This means that listings of your programs will be hard to read in 32 character mode and that you should double each character in your print statements. For example, P."HHEELLLLOO." Printing numbers will be a bit more complicated, but should be possible without losing any digits.

Now for the trick to get that bit set. Load TBUG and use the M command to put 08 Hex into 4090 hex. If you jump to 01C9, you will be back in BASIC with a RAY prompt on the screen, the E and D are hidden due to skipping every other character.

This is easy enough, but you need to put that 08 in by hand every time. There is an easier way. After you put in the 08, put a C9 into 41FE and 01 into 41FF. Then punch a tape from 4090 to 4200 using the punch command. When you want 32 character mode just load the tape from BASIC with no need for TBUG. The 08 gets loaded and the 01C9 tells BASIC where to jump. A bit of helpful advice is to write the program in 64 character mode, where it is easier to read, save it on tape, load the 32 character fix, and reload the BASIC program.



The Ides of April Are Upon Us

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Almost everyone who itemizes deductions recalls wading at least once through stacks of receipts, cancelled checks, notes, and the miscellaneous bits of paper that constitute the playing pieces in the Filing Time game. Fortified by black coffee and armed with pencil, paper, calculator, and eraser, they've plunged in, sorting and resorting, adding and re-adding until completing Form 1040 A, and most importantly, Schedule A.

We cannot tell you what you can or cannot deduct, or what the permissible acceptable limits to certain deductions may be. But as a VisiCalc® program user, if you haven't done so already, it is still not too late to put the program to work to help yourself breeze through Schedule A. And, if not breeze through, at least make it a great deal easier.

SORTING YOUR DEDUCTIONS

The first step in filling out Schedule A is to sort each deductible item into the appropriate category. We have set up the sheet shown in Figure 1 to do that automatically as each deductible item is entered.

	A	B	C	D	E
1				SCHED A LINE #...1	
2	PAID TO		AMOUNT	CODE	1.ØØ
3	----------		----------	----------	----------
4	HEALTH INSURANCE		976.ØØ	1.ØØ	976.ØØ
5	LARKIN AMBULANCE		78.5Ø	6.2Ø	Ø.ØØ
6	BAY MEDSERV PC		276.78	6.ØØ	Ø.ØØ
7	GENERAL HOSPITAL		193.87	6.1Ø	Ø.ØØ
8	IBTD INSURANCE CO		-175.ØØ	26.ØØ	Ø.ØØ
9	TOWN OF HINGHAM		1Ø29.87	12.ØØ	Ø.ØØ
10	MASTERCARD SVC CHG		132.98	18.ØØ	Ø.ØØ
11	MUTUAL TRUST CO		62Ø7.33	17.ØØ	Ø.ØØ
12	COMMUNITY CHURCH		85Ø.ØØ	21.ØØ	Ø.ØØ
13	STAIE OF VERMONT		1Ø23.3Ø	11.ØØ	Ø.ØØ
14	MOT VEH SALES TAX		41Ø.ØØ	13.1Ø	Ø.ØØ
15					Ø.ØØ
16	----------		----------	----------	----------
17	SUB TOTAL		11ØØ3.63		976.ØØ
18	==========		==========	==========	==========
19	1Ø4Ø L31	34567.ØØ			
20	CAS. LOSS	299.ØØ			
21	CARRY OVER	132.ØØ			
22	SALES TAX	1Ø37.ØØ		1	2
23	STATUS	2	ZERO BRKT	23ØØ	34ØØ
24	----------			----------	----------
25	SCHEDULE A:				

Figure 1.

If you use the VisiCalc program as a checkbook, the entries under PAID TO can be transferred by using a DIF file. If you do not have @CHOOSE, add the series 1 . . . 5 in D22 . . . H22.

	D	E	F	G	H	R	Y	Z
1	SCHED A LINE #...1		2	6A	6B	18	3ØB	31
2	CODE	1.ØØ	2.ØØ	6.ØØ	6.1Ø	18.ØØ	3Ø.1Ø	31.ØØ
3	----------	----------	----------	----------	----------	----------	----------	----------
4	1.ØØ	976.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
5	6.2Ø	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
6	6.ØØ	Ø.ØØ	Ø.ØØ	276.78	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
7	6.1Ø	Ø.ØØ	Ø.ØØ	Ø.ØØ	193.87	Ø.ØØ	Ø.ØØ	Ø.ØØ
8	26.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
9	12.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
10	18.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	132.98	Ø.ØØ	Ø.ØØ
11	17.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
12	21.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
13	11.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
14	13.1Ø	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
15		Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ	Ø.ØØ
16	----------	----------	----------	----------	----------	----------	----------	----------
17		976.ØØ	Ø.ØØ	276.78	193.87	132.98	Ø.ØØ	Ø.ØØ
18	==========	==========	==========	==========	==========	==========	==========	==========
19								
20								
21								
22		1	2	3	4	5		
23		23ØØ	34ØØ	17ØØ	23ØØ	34ØØ		
24	----------	----------	----------	----------	----------	----------		

Figure 2.

This figure shows a portion of the sheet containing some of the columns into which the deductible items are sorted. If you do not have @IF, use)E4:@INT(D4/E2)@INT(E2/D4)*C4 and replicate it down the column with the value references as RNNRR. As long as none of the codes are zeroes, the expression will work.*

Since Schedule A uses numbered lines, we can code each item entered under PAID TO according to the line on which it should appear. The only difference between the codes we use and those on Schedule A is that we have used completely numeric codes for any line that is coded alphanumerically on the Schedule. For example, Line 6a of Schedule A (for doctors, dentists, nurses, etc.) becomes 6 on our sheet; 6b (hospitals) is 6.1; and 6c (transportation) is 6.2. Given those codes, the expenses entered in column C under AMOUNT can be sorted into the columns at the right using @IF.

To set up your own sheet, begin by entering:

```
/GOR
/GF$
```

to calculate across rows and format the sheet to dollars and cents.

On row 1 of Figure 2 are labels identifying those lines of Schedule A that require no calculations. On row 2, directly beneath the labels, are the codes used in the sort. Enter those rows exactly as shown in the list below:

```
>E2:1                    >P2:+O2+1
>F2:2                    >Q2:17
>G2:6                    >R2:+Q2+1
>H2:+G2+.1               >S2:+R2+1
>I2:+H2+.1               >T2:21
>J2:+I2+.1               >U2:+T2+.1
>K2:11                   >V2:22
>L2:+K2+1                >W2:26
>M2:+L2+1                >X2:3Ø
>N2:13.1                 >Y2:+X2+.1
>O2:+M2+1                >Z2:31
```

Now enter the labels and amounts shown in Figure 1 under PAID TO, AMOUNT, and CODE in rows 4 . . . 14.

The entry at C8 is negative, indicating that it is income, not a deduction. We've assumed that a casualty loss has been incurred and that $175 of the loss has been paid by insurance. Although we must later change the sign of any reimbursement, it should be entered as a negative here to indicate the true nature of the entry.

The general form of the expression required to perform the sort is:

```
@IF (COL HEADING = CODE, AMOUNT, Ø)
```

On our sheet that is entered as:

```
>E4:@IF(D4=E2,C4,Ø)
```

That compares the code in column D with the code in row 2 and, if they are equal, brings the amount in column C into E4. If the two codes are not equal, a zero is entered at E4.

Replicate the expression down the column. Enter:

```
>E4:/R:E5...E15:RNR
```

Now add the column with @SUM, entering:

```
>E17:@SUM(E4...E16)
```

Notice that we have included the line of dashes in the range to be added, so that additional rows can be inserted above row 16 and still be included in the range.

Your sheet should now include a column beginning with 976.00, followed by a series of zeroes and ending with 976.00.

The next step is to replicate that column across the sheet. The term "NRN", containing the value references to replications of the @IF portion of the command will have to be repeated 12 times to fill out the sheet. Enter:

```
>E4:/RE5...E17:F4...Z4:NRNRR
```

Now, if you scroll the sheet horizontally, the middle term of the @IF expressions, referring to the code, changes. Scroll vertically and the middle term remains the same.

FILLING IN THE DATA

Once your deductions are sorted and added, there are several items that must be entered on the sheet and that are taken either from Form 1040 itself or from other records. Those values are shown on our sheet in rows 19 . . . 23. The first is the amount shown on Line 31 of Form 1040. We have entered $34567.00 at B19, next to the label 1040 L31. At B20, B21, and B22, we have entered a casualty loss of $299.99, a charitable contribution carry over of $132.00, and a sales tax of $1037.00 (the latter is from the tax tables referred to on Schedule A).

Sales taxes can be treated two ways: Taken from tables found in the instructions accompanying Form 1040 or on an item by item basis. As we have constructed the sheet, it provides for both approaches, because it includes the entry at B22 and a column coded in row 2 as 13 (at M2). However, although we have provided for both approaches, only one of the figures may be brought down to the part of the sheet shown in Figure 3.

On row 23, labelled STATUS, are the so-called "zero-bracket" amounts found on line 40 of Schedule A.

The sums calculated on row 17 must be brought down to the section of the sheet that begins at A25 with the label SCHEDULE A:. On this part of the sheet we have reproduced, in order, each line of Schedule A with labels identifying the lines and the codes that head the column into which deductions have been sorted. Enter the labels in A27 . . . A60 and C27 . . . C45, as shown in Figure 3.

Now split the screen and set a horizontal title line at A2. Enter:

```
>A1:>A6:/WH>A2:/TH>A18
```

The upper window now displays rows 1, 2, 16, 17, and 18. If you scroll the upper window horizontally, you can read the sums at the foot of each column and the two lines at the top of the sheet that identify the codes and the lines on Schedule A to which the codes correspond.

To enter the amounts in the various columns in the appropriate locations below, you must first change windows. Enter:

```
>A18:;>B29
```

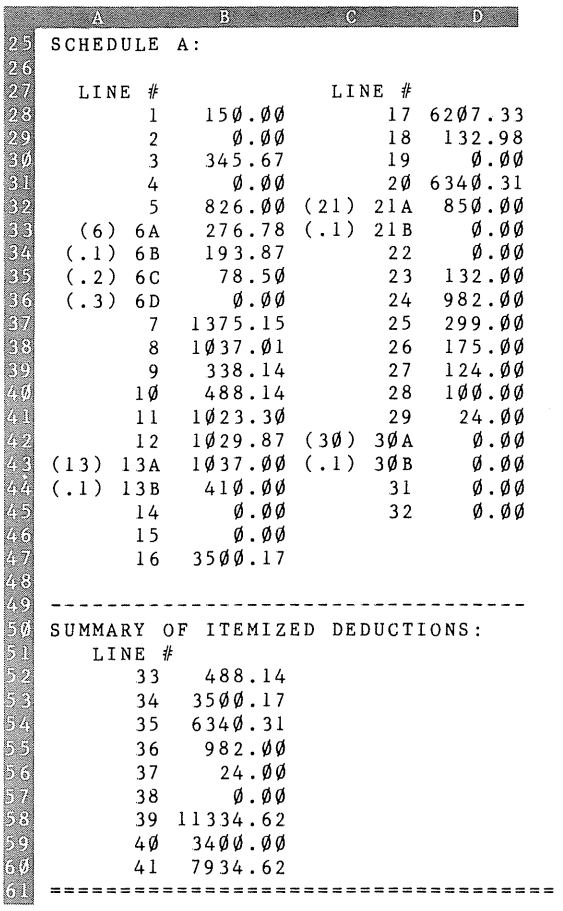
To bring each value down to the summary section calls for the use of the same command sequence, which in general terms is

```
>Coordinate 1: + : → Coordinate 2 (R)
```

(The symbol→ means "scroll to.") Notice that you cannot use the GO TO COORDINATE (>) command after having entered the + sign, since the VisiCalc program will read the symbol as a comparison operator. That is, once you have crossed the window boundary by using the semicolon, you will have to scroll across row 17 to locate the right column total.

The value needed at B29 is expense for medicine and drugs, which is in the column coded 2, and added at F17. Enter:

```
>B29:+F17
```



	A	B	C	D
25	SCHEDULE A:			
26				
27	LINE #		LINE #	
28	1	150.00	17	6207.33
29	2	0.00	18	132.98
30	3	345.67	19	0.00
31	4	0.00	20	6340.31
32	5	826.00	(21) 21A	850.00
33	(6) 6A	276.78	(.1) 21B	0.00
34	(.1) 6B	193.87	22	0.00
35	(.2) 6C	78.50	23	132.00
36	(.3) 6D	0.00	24	982.00
37	7	1375.15	25	299.00
38	8	1037.01	26	175.00
39	9	338.14	27	124.00
40	10	488.14	28	100.00
41	11	1023.30	29	24.00
42	12	1029.87	(30) 30A	0.00
43	(13) 13A	1037.00	(.1) 30B	0.00
44	(.1) 13B	410.00	31	0.00
45	14	0.00	32	0.00
46	15	0.00		
47	16	3500.17		
48				
49	----------			
50	SUMMARY OF ITEMIZED DEDUCTIONS:			
51	LINE #			
52	33	488.14		
53	34	3500.17		
54	35	6340.31		
55	36	982.00		
56	37	24.00		
57	38	0.00		
58	39	11334.62		
59	40	3400.00		
60	41	7934.62		
61	==========			

Figure 3.

After completing this portion of the sheet you are ready to fill out Schedule A manually. If you do not have @CHOOSE use this expression: `>B59 LOOKUP(23,D22 . . . G22)`.

which can be entered as shown or fetched from row 17 with the general command sequence shown above. The following list shows the locations of each of the values from the sort.

```
>B29:+F17        >B44:+N17        >D33:+U17
>B33:+G17        >B45:+O17        >D34:+V17
>B34:+H17        >B46:+P17        >D38:-W17
>B35:+I17        >D28:+Q17        >D42:+X17
>B36:+J17        >D29:+R17        >D43:+Y17
>B41:+K17        >D30:+S17        >D44:+Z17
>B42:+L17        >D32:+T17
```

Notice that the entry at D38 changes the sign of the sum as W17. Changing the sign is necessary, because we want to display all values exactly as they should be entered on each line of Schedule A.

After completing those entries, return to a single window with /W1. The title boundary that you created with /TH will no longer exist, so if you wish to retain it, you will have to return to A2 and re-enter the command.

There are still three uncalculated itemized deductions that must be entered on the sheet. Since the general sales tax may be taken from the tax tables or from documented actual taxes paid, the entry at B43 chooses the larger. Enter:

```
>B43:@MAX(B22,M17)
```

The casualty loss and charitable contribution carry over are included in the form with the entries:

```
>D35:+B21
>D37:+B20
```

CALCULATED VALUES ON SCHEDULE A

Several of the lines on Schedule A require calculations, of course, and rather than duplicate the instructions for performing them, we suggest that you refer directly to the form for the details. In the expressions that follow, we have identified both the general categories into which the necessary expressions are grouped, the lines on Schedule A to which the expressions refer, and the cells on the sheet into which they should be entered.

Lines 1-10 of Schedule A cover medical and dental expenses and require several calculations.

```
SCHEDULE A:      EXPRESSION
LINE 1           >B28:@MIN(E17*.5,150)
LINE 3           >B30:+B19*.01
LINE 4           >B31:@MAX(B28-B30,0)
LINE 5           >B32:+E17-B28
LINE 7           >B37:@SUM(B31...B36)
LINE 8           >B38:+B19*.03
LINE 9           >B39:@MAX(-B38+B37,0)
LINE 10          >B40:+B39+B28
```

Taxes other than Federal are summarized on Line 16:

```
SCHEDULE A:      EXPRESSION
LINE 16          >B47:@SUM(B41...B46)
```

Interest expense is totalled on Line 20:

```
SCHEDULE A:      EXPRESSION
LINE 20          >D31:@SUM(D28...D30)
```

And contributions on Line 24:

```
SCHEDULE A:      EXPRESSION
LINE 24          >D36:@SUM(D34...D35)
```

Casualty losses, like medical expenses, require several calculations. Because we have changed the sign of the insurance reimbursement, we use the @MAX function:

```
SCHEDULE A:      EXPRESSION
LINE 27          >D39:@MAX(D37-D38,0)
LINE 28          >D40:@MIN(100,D39)
LINE 29          >D41:+D39-D40
```

Finally, miscellaneous deductions are totalled on Line 32:

```
SCHEDULE A:      EXPRESSION
LINE 32          >D45:@SUM(D42...D44)
```

SUMMARIZING THE DEDUCTIONS

At the bottom of Schedule A is the Summary of Itemized Deductions, the lines and expressions for which are:

```
SCHEDULE A:      EXPRESSION
LINE 33          >B52:+B40
LINE 34          >B53:+B47
LINE 35          >B54:+D31
LINE 36          >B55:+D36
LINE 37          >B56:+D41
LINE 38          >B57:+D45
LINE 39          >B58:@SUM(B52...B57)
LINE 40          >B59:@CHOOSE(B23,D23...G23)
LINE 41          >B60:+B58-B59
```

Now it should be possible for you to return to the top of your sheet and begin entering your actual itemized deductions. Should you need more lines for data entry than we have provided, they may be inserted simply enough above row 16 and replicated across the sheet.

We should also point out that if you use the VisiCalc program as a checkbook register, then depending on how you have laid out the sheets for that purpose, you may only have to create a DIF file that can be inserted in the upper left of the sheet you have created to accompany this article.

Indeed . . . the general approach used to identify the categories into which your deductions are sorted can be applied to any problem in which it is desirable to categorize entries. You may not itemize deductions, but if, for example, you use the VisiCalc program as a checkbook register or for a double entry general ledger, you can automatically sort entries by category, simply by devising a coding system of your own.

Model I Programming Hints

Ronny Ong
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One highly underrated feature of Level II BASIC is the variable pointer (VARPTR). Listing #1 demonstrates a very interesting technique with VARPTR.

```
2Ø25 PH$=""
     : FOR LI = Ø TO 15
2Ø3Ø PH = VARPTR (PH$)
2Ø4Ø POKE PH, 64
2Ø5Ø POKE PH + 1, 64 * (LI-INT(LI/4) * 4)
2Ø6Ø POKE PH + 2, LI / 4 + 6Ø
2Ø7Ø V$(LI) = PH$
2Ø8Ø NEXT LI
```

Listing 1

These lines are designed to replace their corresponding lines in the "Drawing Board" program on pages 329-331 of Getting Started with TRS-80 BASIC (26-2107 $6.95 and worth it). The original routine in "Drawing Board" for saving the display into a string array is the one often used in BASIC graphics editors: a PEEK of video memory, character by character. It's often overlooked that this memory is still RAM and subject to more manipulation than PEEKs and POKEs of display characters.

I won't go over how VARPTR works; the manual's explanation is as clear as I could make it anyway. Listing #1 saves a considerable amount of time over the original routine because by twisting the RAM that ROM uses to think straight, we can force ROM to do our bidding, such as read 64-character lines at a time. Here are a few quick remarks about the routine's workings. Line 2040 defines the length of PH$, a temporary string variable, as one video line. 2050 tells BASIC that PH$ is stored in an area between decimal memory addresses 15360 and 16383. 2060 helps this along. This type of algorithm is difficult to fully detail in less than several pages, so for those who can "dig it" now, get to work and use VARPTR! It's more powerful than you think. For those still a little befuddled, Getting Started with TRS-80 BASIC chose not to cover VARPTR, but there are other books that can get you started into the realm of clever (and sometimes sneaky) programming. In the meantime, enjoy a speedy picture save.

Lastly, I would like to point out some characteristics of the IF-THEN statements. BASIC stores an automatic invisible colon (:) before an ELSE statement so those people who've been putting colons in themselves and wondering why they run out of memory so quick have something to think about. BASIC evaluates the expression(s) between IF and THEN as −1 (true) or 0 (false), performs any Boolean operations (AND, OR, NOT), and follows the THEN instructions if −1 is the final result. Knowing this, A=X=Y is a legal statement. That is, A=−1 if X=Y. In fact, A=X=Y=Z=B=C=D=E is perfectly allowable in Level II BASIC.

I hope these hints I've given can be of some use to fellow TRS-80 users. I feel the sharing of programming ideas encourages quality software and you can't have too much of that.

General Purpose Random Number Generator

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With the routine shown in listing 1, I have been able to generate a pseudo-random number using the LSB of the TRS-80 Color Computer's real time clock. With this routine I can remain in machine language, improving significantly on program execution time.

ADDRESS	HEX	DEC	ADDRESS	HEX	DEC
1	B6	182	12	8Ø	128
2	Ø1	1	13	23	35
3	13	19	14	Ø5	5
4	84	132	15	BØ	176
5	ØF	15	16	Ø1	1
6	81	129	17	13	19
7	ØØ	Ø	18	2Ø	32
8	27	39	19	FØ	24Ø
9	F7	247	2Ø	1F	31
1Ø	B1	177	21	89	137
11	3E	62	22	4F	79

Listing 1.

The maximum value of the random number is stored in $3E80 (16000 DEC.). To change the address of this value, change the 16-bit value at 11, 12.

The generated random number is in accumulator D. (MSB=0(ACC. A), LSB=NO.(ACC.B))

Listing 2 is provided so that Listing 1 may be tried out by your readers.

ADDRESS	HEX	DEC	ADDRESS	HEX	DEC
16ØØ1	AD	173	16Ø23	84	132
16ØØ2	9F	159	16Ø24	ØF	15
16ØØ3	AØ	16Ø	16Ø25	81	129
16ØØ4	ØØ	Ø	16Ø26	ØØ	Ø
16ØØ5	27	39	16Ø27	27	39
16ØØ6	FA	25Ø	16Ø28	F7	247
16ØØ7	81	129	16Ø29	B1	177
16ØØ8	3Ø	48	16Ø3Ø	3E	62
16ØØ9	23	35	16Ø31	8Ø	128
16Ø1Ø	F6	246	16Ø32	23	35
16Ø11	81	129	16Ø33	Ø5	5
16Ø12	39	57	16Ø34	BØ	176
16Ø13	22	34	16Ø35	Ø1	1
16Ø14	F2	242	16Ø36	13	19
16Ø15	8Ø	128	16Ø37	2Ø	32
16Ø16	3Ø	48	16Ø38	FØ	24Ø
16Ø17	B7	183	16Ø39	1F	31
16Ø18	3E	62	16Ø4Ø	89	137
16Ø19	8Ø	128	16Ø41	4F	79
16Ø2Ø	B6	182	16Ø42	7E	126
16Ø21	Ø1	1	16Ø43	B4	18Ø
16Ø22	13	19	16Ø44	F4	244

Listing 2.

The Corporate Earnings Estimator

Editor's Note: With more than 45,000 subscribers, Dow Jones News/Retrieval is the leading provider of on-line business and financial information. Dow Jones News/Retrieval is sold at Radio Shack stores nationwide and in Canada.

Ever wonder—while gazing upon a scroll of humbling stock quotes—what the Big Boys think? Ever wonder whether the top Wall Street analysts are bullish or bearish on the stocks you are watching? Ever wonder, in short, whether they know something you do not?

They do, of course, but not as much as they used to—if you have access to Dow Jones News/Retrieval. On News/Retrieval can be found the Corporate Earnings Estimator, which makes available to the average investor, for the first time ever, the consensus stock price earnings forecasts by 50 of the leading U.S. brokerage firms.

With the Estimator, News/Retrieval has added a view of the future to its historic and current stock performance information on companies.

Before the service was offered by News/Retrieval, only major corporations and institutions were able to make decisions with complete, up-to-date stock price estimates that were as accurate as possible. The Corporate Earnings Estimator makes that information yours.

The Estimator gives an instant look at the projected earnings of 2400 of the most widely followed companies. On a single page, the Corporate Earnings Estimator provides a consensus of where analysts in the research community think the company is going—and where they thought it was going as far back as six months previously.

Specifically, the Estimator provides:

- —The mean estimate of a company's earnings per share for the current fiscal year;
- —The high and low earnings per share estimates for that company over that time period;
- —The number of analysts surveyed;
- —The consensus price/earnings ration estimate based on predicted earnings for the next fiscal year;
- —The trend of opinion of the company's earnings performance as reflected in the mean estimates from one week, 13 weeks, and 26 weeks ago; and,
- —The same information as above but for the COMING fiscal year.

"We receive virtually all of the research published in the United States and we have a staff that goes through it every day," says Leonard Zachs, founder of Zachs Investment Research, Inc., which provides the service to News/Retrieval. Once a week the Zachs firm sends a tape to Dow Jones, where it is put on line in the Corporate Earnings Estimator format.

Dr. Zachs, who holds a Ph.D. from M.I.T., founded the company in Chicago in 1977 to assist institutional investors in using quantitative technology in their investment research. Before founding the company, Dr. Zachs was vice-president of A.G. Becker and Company, Inc., which produced quantitative research, performance measurement services, and econometric analyses.

According to Dr. Zachs, the Estimator's main attributes are speed and currency. Other services are providing information that is as many as three months old, he says. Information in the Corporate Earnings Estimator, however, is updated daily and reported weekly.

"You get all of the estimates in a statistical, summarized form. The mean, the high, the low," says Dr. Zachs. Investment results, he claims, will be improved, "because most decisions are made on incomplete information."

The Estimator has become popular among News/Retrieval users. Says Peter Sohn, who works with the New York-based money management firm, Tweedy, Browne, Inc.: "It comes in as a second opinion. The information on the estimator gives you kind of a tip-off sometimes to something that someone sees, and the other ones don't see.

"You get diversity, and you get more information, and it's accessible for the little guy."

Mr. Sohn says he checks three to five companies "at a pop," usually at five to 10-minute intervals daily. "Both News/Retrieval and the Estimator have achieved that ultimate distinction of becoming indispensable."

Dr. Zachs would have users believe that the Corporate Earnings Estimator is even more than that. He would have them believe it is the crystal ball through which Wall Street's future can be glimpsed.

News/Retrieval editors stress that they cannot confirm the validity of the claim, but Dr. Zachs points to a University of Chicago study suggesting that changes in earnings-per-share estimates lead changes in stock prices.

Produced by Professor Donald Kiem in cooperation with Dr. Zachs, it states: "In this study we show that over the last three years, changes in the consensus estimate available on Dow Jones (News/Retrieval) have led stock prices by three to six months.

"This relationship, if it continues," the study goes on to state, "suggests that by watching changes in Dow Jones (News/Retrieval) consensus estimates, one could possibly improve performance.

"Our conclusion is that serious investors should utilize estimate changes as one input to their investment decision process," the Chicago study reads.

HOW TO USE THE CORPORATE EARNINGS ESTIMATOR

To enter the Corporate Earnings Estimator data base after logging on to News/Retrieval, type two slashes and EARN with no spaces among the slashes or letters, then press the ⟨ENTER⟩ key.
Example: //EARN ⟨ENTER⟩

Then type the desired company stock symbol and press the ⟨ENTER⟩ key. Below is the way a display screen would look when seeking information in the Corporate Earnings Estimator about Dow Jones and Company, Inc. (stock symbol:DJ)

```
CORPORATE EARNINGS ESTIMATOR
ZACKS INVESTMENT RESEARCH INC,
CHICAGO,ILL.

THIS WEEKLY DATABASE PROVIDES
CONSENSUS FORECASTS OF EARNINGS
PER SHARE FOR 2,400 COMPANIES
BASED ON ESTIMATES PROVIDED BY
1,000 RESEARCH ANALYSTS AT MORE
THAN 50 MAJOR BROKERAGE FIRMS
FOR CONSISTENCY, ESTIMATES ARE
CONVERTED TO PRIMARY EARNINGS
BEFORE EXTRAORDINARY ITEMS.
------------------------------
PLEASE ENTER DESIRED STOCK
SYMBOL AND PRESS RETURN  DJ
```

```
DOW JONES & CO.
--FISCAL YEAR ENDS  12/83

EARNINGS PER SHARE ESTIMATES
--MEAN      3.34
--HIGH      3.50
--LOW       3.04
NUMBER OF ANALYSTS  8
P/E RATIO (ESTIMATED EPS) 14.54

PAST EARN PR SH ESTIMATES
(MEAN)
--WEEK AGO    3.34
--13 WEEKS AGO  3.39
--26 WEEKS AGO  3.30
```

```
DOW JONES & CO.
--FISCAL YEAR ENDS 12/82

EARNINGS PER SHARE ESTIMATES
--MEAN      2.8D
--HIGH      2.9D
--LOW       2.6D
NUMBER OF ANALYSTS  8
P/E RATIO (ESTIMATED EPS)
17.32

PAST EARN PR SH ESTIMATES
(MEAN)
--WEEK AGO AGO 2.8D
--13 WEEKS AGO     2.86
--26 WEEKS AGO     2.86

------------------------------
PRESS RETURN FOR NEXT PAGE
```

DOW JONES NEWS/RETRIEVAL®

Non-Reset of the Random Number Generator for the Color Computer

Marc A. Shannon
P.O. Box 1133
Greenville, NC 27834

I am excited about your newsletter. I always look forward to reading each issue so I can learn new tricks-of-the-trade. I also have something to contribute.

I was always disappointed when using my Color Computer that every time I loaded a program, the random number generator was reset. Now, that problem is no more. I found that by having the following line at the beginning of a program, my games are more fun.

```
XXX  ZZ=RND(TIMER)
```

(where XXX is the line number)

Pocket Hints

Marvin Edward Wilborne, III
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Danville, VA 24540

I have had my Pocket Computer for about a month, and I have discovered a few interesting things.

The first thing is the ability to store keywords in alphanumeric variables. This can be done by storing the keywords (BEEP, RUN, LIST, etc . . .) in the reserve mode by using the definable keys. For example, suppose you defined the key 'A' as the keyboard 'PRINT'; then in the RUN mode or PRO mode you could say A$ = "⟨SHFT⟩⟨A⟩". Now if you print A$ in a program the output will be the word PRINT. But, if you type A$ ENTER in the DEF, RUN, PRO or RESERVE mode the Pocket Computer will only print the first character or P. A$ contains the word print; however, the word PRINT occupies only 1 byte or step, instead of the usual 6 (including the space after PRINT).

The second feature is the ability to exclude a close quote after a literal string or a GOTO statement as long as the close quote would have been the last character in the line. For example, Line 30:

```
3Ø: PRINT " THIS IS A TEST
```

Line 30 is a valid line; you do not need to use an extra step (for the close quote) on the end of the line. Other examples include:

```
1Ø INPUT A
     : PRINT "NUMBER
```

The following lines will NOT work.

```
1Ø PRINT" THIS IS A TEST
     : GOSUB 4ØØ
```

The PC cannot find the close quote so it uses the entire line to print.

This feature may help in shortening programs and getting those few extra steps needed in long programs.

Day of the Week or Monthly Calendar–4K Color Computer Edition

George Quellhorst
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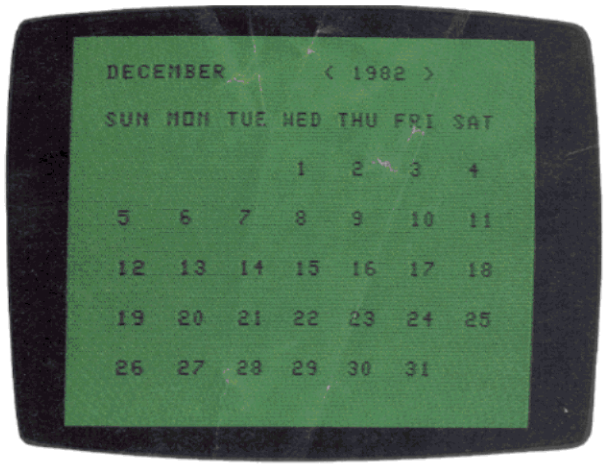
My son and I converted the Model I Calendar program by Dave Goldman, which appeared in your March 1982 issue, to run on a 4K Color Computer. We have had our computer only four weeks and, to us at least, it was quite a challenge. We also made the following additions. By pressing ⟨F⟩ the calendar will scroll forward from one month to the next. By pressing ⟨B⟩ it will scroll backward one month at a time.

```
1 REM LEVEL 1 CALENDAR BY DAVE GOLDMAN,MICROCOMPUTER
    NEWS ISSUE MARCH 1982.
2 REM CONVERTED TO RUN ON 4K COLOR COMPUTER BY GEORGE
    J. QUELLHORST AND SON (12)
3 REM WITH THE FOLLOWING ADDITIONS, PRESS "F" AND THE
    CALENDAR WILL SCROLL FORWARD TO THE NEXT MONTH.
4 REM PRESS "B" AND THE CALENDAR WILL SCROLL BACKWARD
    TO THE PREVIOUS MONTH.
5 REM AFTER DAY OF WEEK IS DISPLAYED PROGRAM WILL GO
    BACK TO THE BEGINNING BY PRESSING ANY KEY
6 REM WE HAVE HAD OUR COLOR COMPUTER EXACTLY ONE
    MONTH.
10 DIM A(12)
20 A(1) = 31
    : A(2) = 28
    : A(3) = 31
    : A(4) = 30
    : A(5) = 31
    : A(6) = 30
30 A(7) = 31
    : A(8) = 31
    : A(9) = 30
    : A(10) = 31
    : A(11) = 30
    : A(12) = 31
40 D = 1
    : C = 2
50 CLS
60 PRINT "DAY OF WEEK (D) OR CALENDAR (C)"
    : INPUT Q$
70 IF Q$ = "C" THEN INPUT "MM,YY"; M, Y
    : D = 1
    : GOSUB 300
    : GOTO 100
80 IF Q$ = "D" THEN INPUT "MM,DD,YY";M, D, Y
    : GOSUB 300
    : GOTO 450
90 GOTO 40
100 CLS
110 L = A(M)
    : IF (M = 2) * ((INT(Y / 4)) * 4 = Y) THEN L =
    29
120 P = T
130 K = 158
140 RESTORE
    : FOR I = 1 TO M
    : READ A$
    : NEXT I
150 PRINT@ 97," SUN MON TUE WED THU FRI SAT ";
160 PRINT@ 34, A$;"       <" 1900 + Y">";
170 J = K + (T * 4)
180 FOR I = 1 TO L
190 IF T > 7 THEN T = 1
    : J = J + 36
200 PRINT@ J,I;
210 T = T + 1
    : J = J + 4
220 NEXT I
230 GOTO 490
240 DATA JANUARY, FEBRUARY, MARCH, APRIL, MAY
250 DATA JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER
260 DATA NOVEMBER, DECEMBER
270 DATA SUNDAY, MONDAY, TUESDAY, WEDNESDAY,
    THURSDAY, FRIDAY, SATURDAY
300 IF (D > A(M)) + (D < 1) THEN 50
305 A = INT(Y / 12)
310 B = Y - A * 12
320 C = INT(B / 4)
330 T = A + B + C + D
340 ON M GOTO 400, 370, 370, 410, 390, 360, 410, 380,
    350, 400, 370, 350
350 T = T + 1
360 T = T + 1
370 T = T + 1
380 T = T + 1
390 T = T + 1
400 T = T + 1
410 IF T > 7 THEN T = T - 7
420 IF T > 7 THEN 410
430 IF Y / 4 = INT(Y / 4) AND M > 2 THEN T = T + 1
440 RETURN
450 RESTORE
    : FOR I =1 TO M
    : READ A$
    : NEXT I
460 FOR I = M + 1 TO 12 + T
    : READ B$
    : NEXT I
470 CLS
480 PRINT@ 224, A$; D; 1900 + Y "IS A " B$;
490 P$ = INKEY$
500 IF P$ = "" THEN 490
```




```
505 IF Q$ = "D" THEN GOTO 40
510 IF P$ = "F" THEN M = M + 1
    : IF M > 12 THEN Y = Y + 1
    : M = 1
520 IF P$ = "B" THEN M = M - 1
    : IF M < 1  THEN Y = Y - 1
    : M = 12
530 IF P$ = "F" OR P$ = "B" THEN GOSUB 300
    : GOTO 100
540 GOTO 490
```

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COLLEGE PARK 5309 Old National Hwy., (404) 761-3055
COLUMBUS Columbus Square Mall, 3050 Macon Rd., (404) 568-7200
DORAVILLE 5697 Buford Hwy., (404) 458-2691
SAVANNAH Chatham Plaza, 7805 Abercorn St., (912) 355-6074

IDAHO

BOISE 691 S. Capitol Blvd., (208) 344-5450

ILLINOIS

AURORA 890 North Lake St., (312) 844-2224
CHICAGO 4355 S. Archer Ave., (312) 376-7617; CNA Plaza, 309 S. Wabash, (312) 922-0536; 72 West Adams, (312) 236-7262; 524 N. Michigan Ave., (312) 822-0533; 101 W. Washington St. at Clark, (312) 782-7207
ELMWOOD PARK 7212 W. Grand Ave., (312) 452-7500
FAIRVIEW HEIGHTS #4 Market Place, (618) 398-6410
HOMEWOOD/GLENWOOD 329 Glenwood Lansing, (312) 758-0440
JOLIET 2415 W. Jefferson St., (815) 744-7080
LaGRANGE One S. LaGrange Rd., (312) 482-3484
LIBERTYVILLE 1350 S. Milwaukee Ave., (312) 367-8230
LOMBARD 4 Yorktown Center, (312) 629-5350
NILES 8349 Golf Rd., (312) 470-0670
OAK LAWN 4815 W. 95th St., (312) 425-9130
PEORIA 4125 N. Sheridan Rd., (309) 685-7056
ROCKFORD North Town S/C, 3600 N. Main St., (815) 282-1001
SCHAUMBURG 651 Mall Dr., (312) 884-8600
SPRINGFIELD Sherwood Plaza, 2478 Wabash, (217) 787-3066

INDIANA

EVANSVILLE 431 Diamond Ave., (812) 426-1715
FT. WAYNE 747 Northcrest S/C, (219) 482-9547
GRIFFITH 208 W. Ridge Rd., (219) 838-3000
INDIANAPOLIS 6242 E. 82nd St., Castleton Plz., (317) 849-6896; Speedway Plaza, 6129 B Crawfordsville, (317) 244-2221; 10013 E. Washington St., (317) 898-4887; Two W. Washington St., (317) 236-9991
TERRE HAUTE 3460 U.S. Hwy. 41 S., (812) 234-3212

IOWA

CEDAR RAPIDS 111 First Ave., S.E. (Downtown), (319) 362-7399
DAVENPORT 616 E. Kimberly Rd., (319) 386-3457
DES MOINES 7660 Hickman Rd., Sherwood Forest S/M, (515) 270-0193

KANSAS

OVERLAND PARK 8619 W. 95th, (913) 642-1301
TOPEKA White Lakes Plaza, West Tower, 3715 Plaza Dr., (913) 267-6420
WICHITA 2732 Blvd. Plaza S/C, (316) 681-1212

KENTUCKY

FLORENCE 7727 Mall Rd., (606) 371-2811
LEXINGTON 2909 Richmond Rd., (606) 269-7321
LOUISVILLE 2900 Taylorsville Rd., (502) 459-9901; Louisville Galleria, (502) 589-1013

LOUISIANA

BATON ROUGE 7007 Florida Blvd., (504) 928-5260
HOUMA 2348 W. Park Ave. (Hwy. 24), (504) 873-7713
LAFAYETTE University Square at Congress Blvd., (318) 235-6177
METAIRIE 3750 Veterans Hwy., (504) 454-3681
NEW ORLEANS 327 St. Charles Ave., (504) 523-6408
SHREVEPORT 1545 Line Ave., (318) 221-5125

MAINE

BANGOR Maine Square, (207) 945-6491

MARYLAND

BALTIMORE 7942 Belair Rd., Putty Hill Plaza, (301) 882-9583; 115 N. Charles St. at Lexington, (301) 539-7251
BETHESDA 7900 Wisconsin Ave., (301) 656-0892
CATONSVILLE One Mile West S/C, 6600 B Balt. Nat'l. Pike, (301) 788-3277
FREDERICK Shoppers World, Rt. 40W, (301) 695-8440
NEW CARROLLTON-LANHAM 7949 Annapolis Rd., (301) 459-8030
PASADENA 8120 Ritchie Hwy., (301) 544-2352
ROCKVILLE Congressional Plaza, 1673 Rockville Pike, (301) 984-0424
SALISBURY Shoppers World S/C, Rt. 50, (301) 546-9223
TEMPLE HILLS 4520 St. Barnabas Rd., (301) 899-0740
TOWSON-LUTHERVILLE Yorktown S/C York Rd. at Ridgley Rd., (301) 561-2001

MASSACHUSETTS

BOSTON 730 Commonwealth Ave., (617) 739-1704; 111 Summer St., (617) 542-0361
BRAINTREE South Shore Plaza, 250 Granite St., (617) 848-9290
BROCKTON 675 Belmont, (617) 583-2270
BURLINGTON Crossroads Plaza, Rt. 3 S., (617) 229-2850
CAMBRIDGE Harvard Square, 28 Boylston St., (617) 354-7694
CHESTNUT HILL 200 Boylston St., (617) 969-2031
NATICK 1400 Worcester Rd., (617) 875-8721
SAUGUS 343 Broadway, (617) 233-4985
SPRINGFIELD 1985 Main St., Northgate Plz., (413) 732-4745
WORCESTER Lincoln Plaza, (617) 852-8844

MICHIGAN

ANN ARBOR 2515 Jackson Rd., (313) 761-6266
BIRMINGHAM 3620 W. Maple Rd., (313) 647-2151
DEARBORN Westborn Shop. Ctr., 23161 Michigan Ave., (313) 274-6161
DETROIT DWNTN 1559 Woodward Ave., (313) 961-6855
FLINT G3298 Miller Rd., Yorkshire Plaza, (313) 732-2530
GRAND RAPIDS 3142 28th St. SE., (616) 957-2040
KALAMAZOO 25 Kalamazoo Center, (616) 343-0780
LANSING 2519 S. Cedar St., (517) 372-1120
PLAINFIELD North Kent Mall, (616) 364-7558
LIVONIA 33470 W. 7 Mile Rd., (313) 476-6800
ROSEVILLE 31873 Gratiot Ave., (313) 296-6210
SOUTHFIELD 17651 West 12 Mile Rd., (313) 569-1027
TROY Oakland Plaza, 322 John R. Rd., (313) 585-3900

MINNESOTA

BLOOMINGTON 10566 France Ave. S., (612) 884-1641
GOLDEN VALLEY Golden Valley S/C, 8016 Olson Memorial Hwy., (612) 542-8471
ST. PAUL 6th & Wabasha, (612) 291-7230

MISSISSIPPI

JACKSON 979 Ellis Ave., (601) 352-5001

MISSOURI

DES-PERES 11960 Manchester Rd., (314) 965-5911
FLORISSANT 47 Florissant Oaks S/C, (314) 921-7722
INDEPENDENCE 1325 S. Noland Rd., (816) 254-3701
KANSAS CITY 4025 N. Oak Trafficway, (816) 455-3381
ST. ANN 10472 St. Charles Rock Rd., (314) 428-1400
SPRINGFIELD 2684 S. Glenstone, (417) 883-4320

NEBRASKA

OMAHA 3006 Dodge St., (402) 346-4003

NEVADA

LAS VEGAS Commercial Center, 953 E. Sahara #31-B, (702) 731-3956
RENO 3328 Kietzke Lane, (702) 826-6327

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STATEN ISLAND 2409 Richmond Ave., (212) 698-3100
SYRACUSE 2544 Erie Blvd., (315) 446-3017; Hotel Syracuse, 510 S. Warren St., (315) 471-6663
UTICA Riverside Mall, (315) 735-1933

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GREENSBORO 3718 High Point Rd., (919) 294-5529
RALEIGH Townridge Sq., Hwy. 70 W., (919) 781-9380
WINSTON-SALEM 629 Peters Creek Pkwy., (919) 722-0030

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SALEM Salem Plaza, 403 Center, (503) 588-7095

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BALA CYNWYD 67 E. City Line Ave., (215) 668-9950
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HARRISBURG Union Deposit Mall, Union Deposit Rd. #17, (717) 564-6753
LANCASTER Park City Plaza, US 30, (717) 393-5817
MONROEVILLE 3828 Wm. Penn. Hwy., (412) 823-3400
MONTGOMERYVILLE Airport Sq., Rt. 309, (215) 362-1200
PHILADELPHIA 7542 Castor Ave., (215) 342-2217; 1002 Chestnut St., (215) 923-3080; 1801 Market St., 10 Penn Center, (215) 568-0901
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SCRANTON 206 Meadow Ave., (717) 348-1801
WYOMISSING Berkshire Mall West, 1101 Woodland Rd., (215) 372-8610

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MEMPHIS 4665 American Way, (901) 795-4963; 1997 Union Ave., (901) 278-7935
NASHVILLE 2115 Franklin Pike, (615) 298-5484; Rivergate Plaza (615) 859-3414

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ARLINGTON 2500 E. Randol Mill, Suite 113, (817) 274-3127
AUSTIN 8764 E. Research Blvd., (512) 459-4238; Southwood Mall, 1501 Ben White Blvd., (512) 447-0371
BROWNSVILLE 1639 Price Rd. (Hwy. 77), (512) 544-6800
BEAUMONT 5330 Eastex Frwy., (713) 898-7000
COLLEGE STATION 2414 Texas Ave., South, (713) 764-8171
CORPUS CHRISTI 1711 S. Staple St., (512) 887-8901
DALLAS 15340 Dallas Pkwy., Suite 1100, (214) 934-0275; 2930 W. Northwest Hwy. (214) 350-4144; 1517 Main St., (214) 760-8601; 2588 Royal Ln., (214) 484-9947
EL PASO 9515 Gateway West, (915) 594-8211
FT. WORTH 15 One Tandy Center, (817) 335-7198; 2801 Alta Mere, (817) 738-0251
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TUKWILA 15425 53rd Ave. S., (206) 248-3710
YAKIMA 1111 N. First St., (509) 248-9667

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