NOVEMBER/DECEMBER 1981
ISSUE NUMBER 40

PRICE $3.00

THE ORIGINAL MAGAZINE FOR TRS-80™* OWNERS

H&E COMPUTRONICS INC.

*TRS-80 ™ IS A TRADEMARK OF TANDY CORPORATION

Cover Photo by Harry Peterson

Hayes Stack™

Microcomputer Component Systems

A beautiful match, the Smartmodem and the TRS-80. *Your TRS-80 can talk with other computers*, over the telephone lines. And with no acoustic losses or distortions. *Access time-sharing systems and information utilities* such as the Source,* CompuServe‡ and MicroNet.

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Brawny – because it does so many things. *Auto-dial and auto-answer features built in.* With the Smartmodem, your TRS-80 can *automatically* dial the telephone, answer the telephone, receive and transmit, and hang up the telephone. Completely unattended.

*Pulse dialing or Touch-Tone.*** The Smartmodem can be connected to any telephone system in the U.S. because it allows pulse-dialing, Touch-Tone dialing or a combination of the two. FCC approved.

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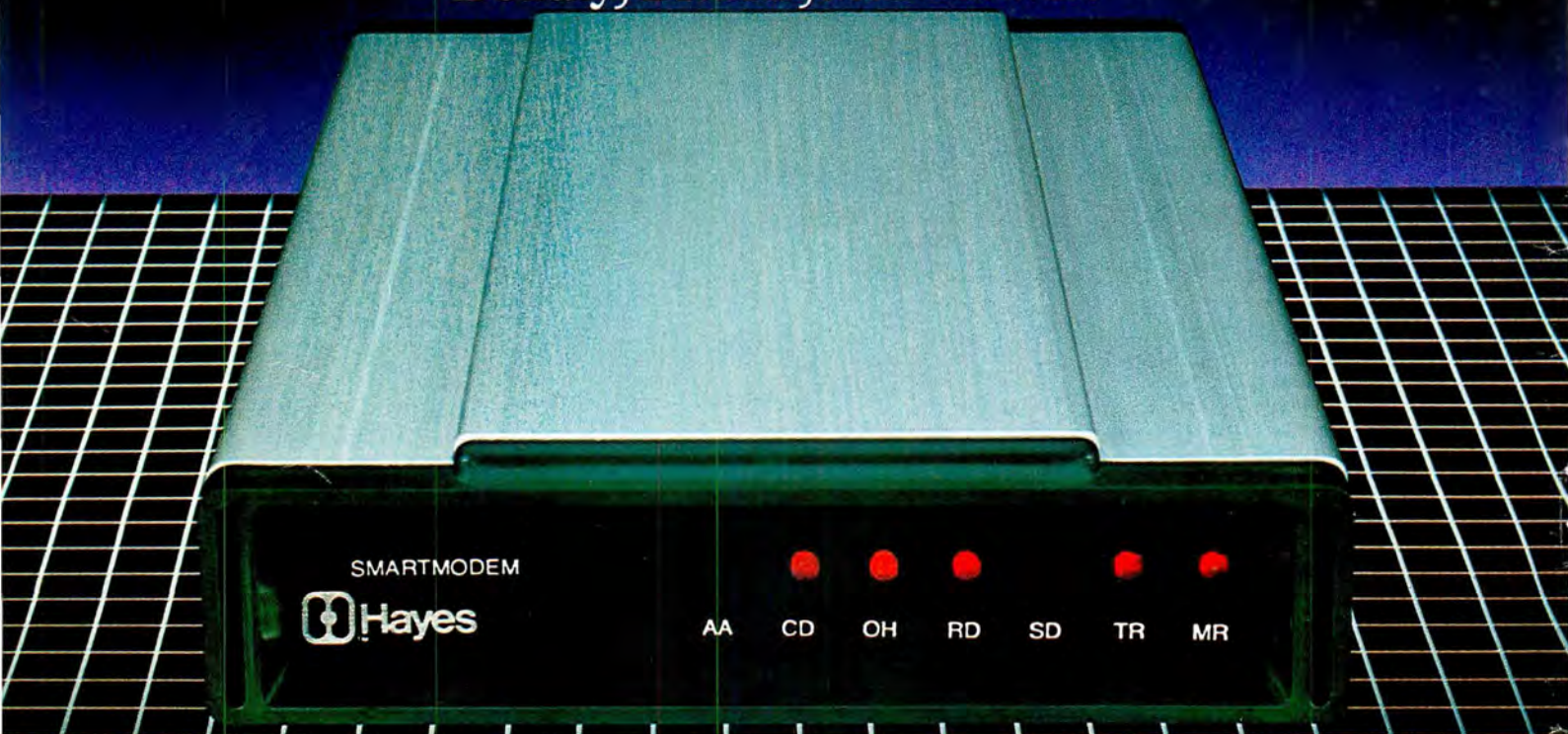

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BITS AND PIECES

Howard Y. Gosman

Issue Number 40

Even though the masthead says "November-December 1981", this is still issue number 40 of *Computronics.* Because of extensive comments from readers and advertisers, we have decided to try to have the magazine in your hands by the first day of the month of the cover date. Rather than putting out two issues in one month, we are accomplshing this by changing the cover date, and "November-December 1981" is thus the transitional month. In terms of your subscription, this issue still counts as one month, but the ending date of your subscription will now be one month later than before.

This change will place us approximately on the same schedule as other computer magazines, and, as I mentioned above, the magazine ought to be in your hands by the first day of the month.

Diagnostic is Here

Our cover photograph this month is an artist's conception of a "sick" computer whose problems need to be diagnosed by a program such as the new System Diagnostic for the Models I and III (actually different programs for each computer) from Howe Software. We have seen and sold many different kinds of diagnostic programs in the past, but none is as complete and thorough as this one. It is a program similar to those used by repair technicians, designed to test every component of your TRS-80 for proper functioning. There are

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The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is published by H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, New York 10977. *The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is not sponsored, nor in any way officially sanctioned by Radio Shack, a division of Tandy Corporation.

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

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

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THE ULTIMATE TEST . . .
THE ROCK OF STALINGRAD

You, your microcomputer, and the German Sixth Army against the fanatical Russian Defenders of Stalingrad. You must use the elements of fifteen Infantry and Armored Divisions to breach the 6 x 18 sector map to wrest mastery of the city and possession of the River Volga from the Red Army. Can you successfully drive the Russians from the city and change the course of history? Or will you too dash the Sixth Army to pieces on ***The Rock of Stalingrad?***

At your disposal are thirty-nine elite, undefeated Regiments with all their supporting Engineers and Artillery. Your advance will be resisted at every step by the thirty Brigades which are the remnants of the Russian Sixty-second Army which have desperately dug in at every woods, house and factory. Stalin's order is explicit: "Any officer who retreats without orders will be shot." No retreat orders have been issued to the ***The Rock of Stalingrad.***

Requires 32K – Price: $29.99

Other fine games from BENCHMARK SOFTWARE

RUTTER

When sailors first left the European Continent to explore the new world, they sailed into unknown waters with no map or guide. The few who returned home brought with them a priceless record, the Rutter, which told everything they needed to repeat their voyage: which compass heading to follow, where reefs were sighted, where storms were encountered, and where to find gold and trade. You are about to embark on such a voyage with a fleet of five ships. On your voyage you will encounter natural phenomena such as gales, reefs, and St. Elmo's Fire. You will also encounter acts of man such as pirates and enemy ships which sink your ships, and changing economic conditions in Europe which can turn your cargo in your holds into fabulous wealth or excess ballast. When you return with treasure or valuable rutters your fame and fortune will increase. But first you must find your way through 100 locations of uncharted seas, and then return . . .

Requires 16K – Price: $24.99

ENCHANTED FOREST

"You are at the edge of the forest, paths lead to the northwest, south, and west. A weather beaten sign beside the western path says 'Entrance to the Enchanted Forest! Only fools take this path! Consider yourself warned!"

The time of decision has come. You know there are only dead ends to the northwest. You were repulsed by the attack of the fire breathing hellhound to the south. You muster your courage, take a deep breath, and plunge westward into the forbidden forest . . .

"You fool! You were warned not to come this way! Now you are completely lost! ! !"

Only those who master the Enchanted Forest can win this provocative 71 room adventure game. But mastering the forest is not enough! Can you conquer the nine foot zombie and the other fiends which wait on the other side of the forest? And what are you going to do about that fire breathing hellhound?*

** 54 location version is avaliable for 16K users.*

16K Version – Price: $19.99 *32K Version – Price: $24.99*

Specify tape or disk (disk must have 32K), Computer type, memory size, and number of disk drives.

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THE CRYSTAL BALL

(News and Rumors of Interest to TRS-80™

1. A Florida company is currently developing a version of the **TRS-80 Model III** in which one of the two built-in floppy disks is replaced by a **5 megabyte hard disk drive.** This will be an extremely attractive business computer, which will have many times the storage capacity of the maximum-sized Model II. The floppy disk is still an important part of the system. It will be used for loading programs from other sources into the computer, and for backup storage of files from the hard disk. By our calculations, it will take at least 27 floppy diskettes to back up the entire capacity of the hard disk. We don't yet know what the projected price of this machine will be.

2. The biggest news in personal computing concerns the giant *AT&T* being allowed (by a New Jersey U. S. District Court) to enter the computer field through a separate subsidiary, striking down a 1956 decree by which AT&T agreed not to enter the unregulated telecommunications market. Right on the heels of the decision was an announcement by CBS, Inc. that it is close to a joint venture agreement with the Bell System to test interactive (two way) home computer information delivered (naturally) over the telephone lines! CBS owns a broadcast and publishing empire and would have complete control over the home computer data base. An in-depth study by International Resource Development, Inc., a Connecticut research firm, said that subscribers will pay an average of $78 monthly per household for home-delivered computerized data by 1990! IRD said that AT&T will also be a major supplier of videotex terminals and had previously forecast CBS's entrance into the electronic publishing arena.

3. What's happened to *Apple Computer?* That's what financial experts around the nation are asking. Apple stock (a new issue) was snapped up at $22 and quickly shot to a high of $36 per share. It has now slipped to less than half that! There are some theories, however. Among them are high level management problems, the less-than-successful Apple III, increased competition from abroad, and the newly introduced IBM personal computer, which insiders say will hit Apple the hardest. (IBM plans to offer 24-48 service on a "swap out" basis for an annual fee of 10% to 15% of the purchase price.) One analyst said that what Apple needs are new products. Is there an Apple IV or V on the horizon?

4. **Radio Shack** has lost the co-designer of the TRS-80 Model I. Steven Leininger left Radio Shack to start his own consulting business. (Don French, whom Leininger worked with on the Model I hardware and software, left RS about two years ago.) Leininger had worked in product development for five years while at Tandy. Rumors are that he was dissatisfied with Tandy management.

In other Radio Shack news, Tandy has teamed up with Datapoint Corporation to allow its Model II to be used on Datapoint's ARCnet, a small business computer network. A new eight-inch hard disk drive with 8.4 megabytes of storage will be introduced before the end of the year for the Model II. Tandy has

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8 USEFUL PRODUCTS

NEW PRODUCT

Photograph not available at time of printing.

❶ PRINTSWITCH

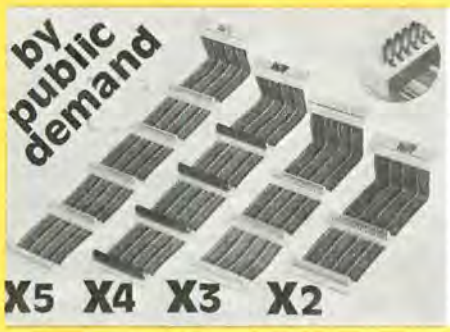
•Printer selector switch module allows two printers to be connected to a single TRS-80 system. Printer to be used is selected by switch.
•**THE PROBLEM** of plugging and unplugging printer cables in order to select one printer or the other is eliminated by PRINTSWITCH.
•Small, unobtrusive design keeps your system *uncluttered. Conveniently* located switch allows instant access to either of your printers.
•Will work with any two similar or dissimilar parallel printers or printing systems including: dot matrix, daisy wheel, plotters, TRS-80 converted selectrics, etc.
•**BUSINESS SYSTEMS** benefit from the ability to readily select one of two printers. For example a high speed dot matrix printer can be used for data, program listings and first drafts and a slower correspondence quality printer utilized to generate letters, reports, etc.
•**SIMPLE TO CONNECT.** Plugs directly into the parallel printer port of your TRS-80 and provides an edge connector for each of your two printer cables.
•**PRINTSWITCH** comes completely assembled, tested, and ready to use with connector and instructions. *Printswitch A* is for model I and III, PRINTSWITCH B is for model II. Please specify when ordering. PRINTS—SWITCH A or B.... **ONLY $59.00**

❷ PRINTER EXTENDER CABLE

•Adds 4 ft. to your existing printer cable. Our extension connects between your Expansion Interface and your present printer calbe.
•High quality cable and gold plated contacts ensure reliable connection. **ONLY $27.50**

❸ TIMEDATE 80

•Complete, self contained "true" real time clock/calendar, TIME-DATE 80 continues to keep accurate time and date when the computer is turned off or experiences a power failure.
•**SET IT ONCE,** and *it's* two replaceable "AAA" batteries (not included) keep TIMEDATE 80 running in excess of 3 years.
•The instant power is applied to the TRS-80, TIMEDATE 80 provides accurate MO/DATE/YR, DAY of WEEK, HR:MIN:SEC and AM/PM information.
•**REPLACES** the computer's internal clock. If power fails and then restores, only TIMEDATE 80 will update the system with current TIME and DATE information, an impossibility with the computer's internal clock.
•**QUARTZ CRYSTAL** based, TIMEDATE 80 is accurate to within a few seconds per month.
•**PLUGS DIRECTLY** into the TRS-80 keyboard and gives the "TIME$" function even without an Expansion Interface. In disk systems, it plugs into the Expansion Interface. An optional "Y" connector provides for further expansion.
•TIMEDATE 80's small size keeps the computer table tidy. If you have an Expansion Interface, TIMEDATE 80 literally "DISAPPEARS" by slipping into the empty space in the bottom of the interface.
•Two sets of software, on cassette, come with TIMEDATE 80. "TIME-SET" is a step by step set of simple instructions for setting TIMEDATE 80. "TIME$" is a set of poke routines which patches any Disk Operating System to Level II TIME$ to read TIMEDATE 80 and is easily incorporated into any user software. "TIME$" will always print the time and date when LISTING a program—great for keeping track of revisions!
•**INVALUABLE** for providing accurate date and time information in business applications such as payrolls, receipts, etc.
•**FULLY ASSEMBLED** and tested, 90 day warranty, complete with instructions and software on cassette, **$95.00,** "Y" option, **add $12.00.**



❹ EXPANDABUS

•Connect all of your TRS-80 Model I devices simultaneously on the 40-pin TRS-80 expansion bus. End the hassle of plugging and unplugging your accessories.
•**ANY DEVICE** that normally plugs into the Model I TRS-80 keyboard edge connector can be plugged into EXPANDABUS.
•For those with an Expansion Interface, EXPANDABUS plugs into the Expansion Port connector (located on the left side panel, to the right of the printer port) or between the keyboard and expansion interface.
•**EXPANDABUS** is made of the highest quality materials. All god plated contacts and high grade ribbon cable ensure the most reliable connection possible.
•Protective covers are provided for each connector (as shown on X4 in photograph) that can be removed and replaced as needed.
•**FOUR STANDARD CONFIGURATIONS** will fill almost any requirement. We recommend that you order the next greater configuration above that which your application demands so that any future expansion will be provided for.
•Two or more EXPADABUS cables can be ganged where more than five connections are needed. Custom configurations are also available. Call us.
•**X2...$29 x3...$44 X4...$59 X5...$74**

❺ THE ALPHA GREEN SCREEN

IBM and all other mainframe houses use green screen monitors. The advantages of the green video screen are now widely known. Every TRS-80 user should enjoy the benefits that it provides.
•**THE ALPHA GREEN SCREEN** is the only CURVED screen MOLDED exactly to the picture tube shape. It is cut precisely to cover the exposed area of the tube.
•**THE FILTER MATERIAL** that we use is just the right shade and density. The result is a screen very pleasant to the eye.
•**IMAGE CONTRAST** is increased and screen legability improved.
•Eye fatigue is reduced by our eye-saving green color and the enhanced readability of text.
•Your system takes on a distinctively professional look.
•**THE ALPHA GREEN SCREEN** is the easiest and fastest to install, no fitting, taping, or gluing necessary. Can be removed instantly for cleaning.
•**SATISFACTION GUARANTEED**-try the ALPHA GREEN SCREEN for 14 days. If, for any reason you are not delighted with it, return it for a full and immediate refund.
•**THE ALPHA GREEN SCREEN ONLY $12.50** Please specify model

❻ ANALOG-80:

8 DIGITAL MULTIMETERS PLUGGED INTO YOUR TRS-80!!! Measure Temperature, Voltage, Current, Light, Pressure, etc. Very easy to use: for example, let's read input channel #4: 10 OUT 0,4 'Selects input #4 and also starts the conversion 20 A = INP(0) 'Puts the result in variable "A" Voila! Specifications: Input range: 0-5V to 0-500V. Each channel can be set to a different scale.
Resolution: 20mV (on 5V range). Accuracy: 8 bits (.5%). Port Address: jumper selectable. Plugs into keyboard bus or E/I (screen printer port). Assembled and tested. 90 day warranty. Complete with power supply, connector, manual. $139

❼ INTERFACER-80:

INTERFACER-80: the most powerful Sense/Control module.
- 8 industrial grade relays: single pole, double throw isolated contacts: 2 Amp. @ 125 Volts. TTL latched outputs are also accessible to drive external solid state relays.
- 8 convenient LEDs constantly display the relay states.
- Simple "OUT" commands (in basic) control the 8 relays.
- 8 optically-isolated inputs for easy direct interfacing to external switches, photocells, keypads, sensors, etc. Simple "INP" commands read the status of the 8 inputs. Selectable port address. Clean, compact enclosed design. Assembled, tested, 90 days warranty. Price includes power supply, cable, connector, superb user's manual. $159.

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End the daisy-chain mess once and for all. Fits all mini-drives: Percom, Aerocomp, Shugart, Micropolis, MTI, Vista, Pertec, Siemens, BASF. Easy to install: just remove the drive cover, plug in the "CHAIN BREAKER" and replace the cover. Voila!!!
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Get one for each drive... only ... $13.95

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continued from page 4

also reached an agreement to have the TRS-80 Model III manufactured in France by the French firm Matra.

5. **Beukers Labs** experience with its first two systems was so favorable that it decided to begin automating some of the office procedures. At that point, it put in place a third Tandy Radio Shack TRS-80 Model II, which is used as an information center for the office. Beukers created a data base upon which it can generate its catalogues and other printed information — in essence, it is an electronic filing cabinet. The third system is also used as a word processing machine. Over the last two years, the company has automated much of its operations through the use of the TRS-80 Model II. ■

continued from page 2

separate tests for the ROM, RAM, video display, keyboard, cassette recorder, line printer, disk drives, and the RS-232-C interface. While all of these tests are important, the most extensive are for the disk drives. The manual accompanying the program, which would make excellent reading for persons merely interested in understanding how the components of the TRS-80 work, contains many details about the disk drives and controller not covered in many books on the subject.

The program begins with a system inventory specification, where you indicate the items that are to be tested. It has both an individual testing mode, where you have to operate or monitor the tests, and a continuous mode, where you can run the program endlessly, with any diagnostic information written to the line printer. At $99.95 it is an expensive program, but you would actually save money buying one program like this rather than several smaller ones.

Practical Business Programs

This month we inaugurate what we hope will become a regular feature entitled "Practical Business Programs". This month's installment is a depreciation program by Steven M. Zimmerman, Ph.D. of the University of South Alabama College of Business and Management Studies and Leo M. Conrad of Imagineering Concepts. We hope that you will enjoy this series. Let us know what you think.

Complaints

In our "Letters to the Editor" section this month, Keith Greffe of Brockville, Ontario raises several points that I would not like to leave unanswered. It would be best if you read his letter first, before my reply which follows.

Mr. Greffe has many different complaints, but the main ones seem to be that our magazine is expensive and that it is not as much business-oriented as we have promised in the past. Let us deal with the expense issue first, since this is important in these inflationary times.

continued on page 12

Disk Storage: It's No Place to Compromise.

A dependable disk system means everything to the high-performance operation of your computer. At Percom, we know this. And we do something about it.

For example, the connectors on our TFD drive systems are gold plated.

Why? Because solder-plated contacts oxidize, forming an insidious insulation that can cause erratic operation. And then total failure.

Gold-plated connectors are just one way we make better drive systems than the competition.

Now #1 for the Model III

Quality Percom TFD drives provide more features, cost less. Add-on drives start at only $439.00. Complete First-Drive Systems start at only $749.95. Features: **"Flippy" Capability** — Record your programs and data on either side of a diskette. **Greater Storage Capacity** — Store 180 Kbytes — formatted — on one side of a 40-track TFD drive. Store over twice as much on a TFD 80-track drive. **Think Megabytes** — Your TFD drive controller will handle up to four drives. You can access almost 1.5 million bytes of on-line program and data files. **Either Add-in or Add-On** — Your TFD First Drive System can be **either** internal (add-in) or external (add-on). In either case, you get a complete system including the disk controller, drive, power supplies and disk-operating software. **BASIC-Language DOS** — Included on diskette with each First Drive System is Percom's OS-80/III™. This easy-to-use disk-operating system loads into 7 Kbytes of RAM and then frees the drive for other use. With OS-80™ programs, you can have full, read-write interchangeability between Model I and Model III diskettes. **Or Model III TRSDOS*** — TFD 40-track drives work with Tandy's Model III TRSDOS, without modification. For 80-track operation, TRSDOS can be easily modified with diskette patches supplied.

Still #1 for the Model I

Besides greater storage capacities, more quality control measures and lower prices, all Percom Model I drives are rated for double-density operation.

Plug a DOUBLER™ in your Expansion Interface and enjoy the same double-density disk storge capacity as Model III owners. Included with each DOUBLER is a TRSDOS compatible double-density disk-operating system. DOUBLEZAP programs are available for upgrading other popular DOSs for DOUBLER operation. And our double-density version of OS-80™ costs just $49.95.

Of course you don't **have** to upgrade your Model I for double-density operation to use Percom disk drives. But it's nice to know you can.

Percom TFD drives for the TRS-80* Model I are available in 40-, 77- and 80-track versions, in 1-, 2- and 3-drive configurations. Prices start at $399.00.

System requirements: Model III TFD drives work with a 16-Kbyte system (min) and Model III BASIC. The initial drive must be a first-drive system. An optional interconnecting cable is available for expanding with external drives #3 and #4. Model I TFD drives work with a 16-Kbyte system (min) equipped with an Expansion Interface, Level II BASIC and DOS software, and an interconnecting cable. Two- and four-drive interconnecting cables are available from Percom.

Yes . . . I'd like to know more about the best for my TRS-80 computer. Send me free literature about quality Percom products.

☐ Model I ☐ Model III

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LETTERS TO THE EDITOR

Hardware Problems

Following up your letter attempting to help me with the TRS-80 reboot problem, I am glad to say that we have found the culprit in the form of a defective IC on the Percom Data Separator board. We put the TRS-80 through all of the tests without it and it came out clean but would not load systems or forms as quickly as with the separator. We installed the suspect board, and in time it crashed, though it would load properly. We replaced the board with a new one, and all seems to be well.

I called Percom about this, and they had never had this happen before, so we are sending it back to them for observation. I had never seen a leaky IC before either, but this thing had a splatter on the board and a stringy line down from the IC to the board underneath, where it had sprotzled all over the board. I don't know how often this happens, but it is a new one on me.

I discussed this with a man who operates a game arcade, keeping things running, and who is also a TRS-80 nut. He said that he fixed his by hardwiring the RS-232 board to the EI. I realize that this would be a touchy job, not for the amateur, but he may have a good idea there. Another idea is brush plating the board edge terminals with gold. I am looking into this, and if it has possibilities I may be able to come up with a kit to do the job. Brush plating is nothing new, but I've never done it with any of the precious metals.

I had been thinking that I might unload this critter, but now that it's working I think I'll hang onto it!

Bob Forman
The Forman Company, Inc.
Box 68
Monmouth, IL 61462

Brush plating the contacts with gold works very well on a blank board (before components have been mounted), with one proviso: you must clean the copper plating extremely thoroughly. Otherwise, the gold will not adhere properly.

However, *the voltages and/or currents used in the electroplating process can be extremely destructive to integrated circuit components that are mounted on the board. Therefore, unless the operator is very knowledgeable and takes special precautions, the technique should* **not** *be used on finished circuit boards.*

Learning Assembly Language

Having followed with great interest the columns on assembly language, having bought other books covering the subject, and after maybe a hundred trials at assembly language code, with their inherent hardness and joyful successes, I finally discovered that the main key for going fast and long was the use of a MACRO ASSEMBLER. I had two possibilities: the Microsoft Fortran package and the Disk Editor/Assembler, which in fact are both exactly the same packages, the only difference being that one of them includes a Fortran Compiler.

Unfortunately, after several trials, after many hours spent to discover the usefulness of such a tool, I was finally compelled to give it up according to the *absolute hermeticity* of this package and the accompanying manual.

My prayer is: would it be possible to review extensively and with examples the use of such a tool? I really wish you will understand how powerful it may be only to have to write and fully debug ONCE those particular routines for outputs to video, to line printer, to move one part of memory from here to there, briefly to be able to

continued on page 10

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continued from page 8

write an assembly program which only does what its name says and then LINK it together with those external routines without having to rewrite each time the same things and without having to change the ORG pseudo address whenever you wish to add to your program!

Thank you for your rwaction, and in the meantime, complimens for your efforts in the powerful review which we await each month since the beginning.

Herve Hanuise
55 Nouveau Monde
B 7400 - Soignies
Belgium

We will consider this idea for a future review, but we do not encourage everyone to get a macro assembler. These programs are always difficult to understand and rarely well enough documented for the average user. They are really meant for professional programmers.

Complaints

I had no intention of renewing my subscription to your magazine, because I think it is overpriced and fails to live up to your promise of keeping it "business oriented." Fortunately, you do publish the occasional business oriented program; therefore I request renewal of subscription, hoping that you will improve in the near future.

The following are my complaints with your magazine:

(1) I currently have subscriptions to *Byte* and *80 Microcomputing*. Both of these magazines contain approximately 300 pages per month, of which approximately 200 pages contain useful user oriented information.

(2) Subscriptions to the above magazines are $21.00 and $20.00 per year respectively. Your subscription rate is $36.00 per year (for Canadian subscriptions; all dollars are Canadian currency). Is this fair?

(3) Your magazine contains on the average 40 pages per issue, of which 30 pages contains useful information. Is this a fair comparison?

(4) Your editorials keep telling us, your readers, that you are emphasizing your efforts on "business applications", yet you insist on publishing programs like "Spiro", "Satellite", "Cointoss", "Gravity", "Engine", "Rustler's Roundup", "Digital Clock", and "W4UCH" — all of which are in the July 1981 issue. I may be missing something, but I fail to see how these programs could possibly be used for business applications. The space that these programs take up in your magazine could have been used by a "real" business-type application. Is this false advertising?

(5) The format of your magazine has changed at least five times that I know of. My first six issues are reprints. Why not settle down to one format and leave it at that?

The above comments are things that have been disturbing me since I subscribed to your magazine. I'm sorry that this is coming to you all in one letter, but I felt that I must let you know. I have waited in anticipation with each upcoming issue to receive new programs and ideas I may apply to my system, but lately you seem to be running out of ideas. Can I help? I have a few business programs that I have developed which may help.

I am very impressed with "New Script". I am currently using "Script" in applications under a VM/4341 system at the office (similar to the VM/370).

I would appreciate a reply to my above-mentioned complaints, stating what you intend to do about keeping to your promise of "business" applications. If we want

continued on page 12

Not all Spelling Checkers are the same.

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LEAVE WORD "AS IS":         HIT <ENTER> KEY
DISPLAY WORD IN CONTEXT:    ?
ADD WORD TO DICTIONARY:     +
EXIT:                       !

WORD:          (Your error)
RESPONSE:
```

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MICROPROOF'S FULL 50,000 WORD VOCABULARY saves you time and allows you greater confidence in the lists of potential errors that MICROPROOF identifies. The mini-dictionary programs, with their 10,000 and 20,000 word vocabularies, have many correctly spelled words omitted from their vocabularies. Consequentially, they identify as potential "errors" many words that are actually spelled correctly; five to ten times as many such words as does MICROPROOF. So, when you use MICROPROOF you will have far fewer extra words to evaluate, a major time savings. There will be less need to look up words in order to verify that they are in fact spelled correctly. The extra 30,000 words in MICROPROOF's vocabulary assures you confidence in the error lists that MICROPROOF generates.

There are other proofreading programs available to choose from. Since MICROPROOF became available in December of 1980, a number of companies have announced programs with small dictionaries. It took us almost two years to develop MICROPROOF. During that time we were able to compress our full 50,000 word dictionary into a manageable size (fits on one single density 5¼ inch disk). And we were able to design a proofing program which operates remarkably fast. The chart below illustrates the comparative advantages of MICROPROOF.

ADVANTAGES OF MICROPROOF

	MICROPROOF DICTIONARY SOFTWARE	OTHERS (Mini-Dictionaries)
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continued from page 10

games, we can buy game manuals that are available in stores. How about something new!

Keith D. Greffe
787 Colonel Curry Drive
Brockville, Ontario
Canada K6V 6G5

Please see Howard Gosman's remarks in this month's "Bits and Pieces" section for a reply to Mr. Greffe's complaints.

* * * * *

H & E Computronics welcomes letters on any subject. If you wish a personal reply, please enclose a self-adressed, stamped envelope.

H & E Computronics also welcomes readers to submit programs, articles, or reviews for publication. Please address correspondence to:

The Editor
H & E Computronics
50 North Pascack Road
Spring Valley, New York 10977

Please submit programs on media (cassettes or diskettes). Also please indicate the system it was prepared on and include any necessary instructions. ■

continued from page 6

In replying, the most important point I would like to make is that this has been a *reader-supported* magazine much more than any other publication in the field. As you can see from the back issues, we have not had very much advertising until recently. Almost all of our income has come from subscriptions. Other magazines may be larger, but they are financed through advertising and other means rather than through subscriptions. It obviously costs more to print a 300-page magazine than either the cover price or the subscription price. But our magazine is growing, and I think that most readers feel that our recent format changes have been for the good.

Nearly every item that is published in *Computronics* is submitted by the readers. We have tried to focus upon business applications, and we are starting what we hope will be a regular series this month on practical business programs; but the reason that we have not published more business programs is that we have not received them. At times, Mr. Greffe seems to imply that we *write* the magazine. We do not; our readers do, and what we publish each month is a representative sampling of what our readers submit. We do not want to become a magazine devoted only to one area of microcomputing, even as important an area as business applications. That is why we publish, each month, features in different areas of interest. Probably nobody will be interested in all these areas, but someone will be interested in each one of them. We have regular features consisting of reviews of software and hardware, material for beginners, information about specific computers such as the Model III or the Color Computer, questions and answers, assembly language, *BASIC* programs of all different kinds, and even games, fiction, and other foolishness. When we publish large programs that take considerable space, they are usually always devoted to serious practical applications. Small programs, such as "Spiro", may be about anything, but I think that most TRS-80 users would admire the elegance of programming and the beauty of the visual displays created by that small example.

All of the material that appears in *Computronics* is for the TRS-80 computers. All programs have been tested before publication (in spite of the occasional typographical errors), and we have tried as much as possible to make them compat ible between all of the Models 1, 2, and 3. Right now there is an absolute *mess* in the microcomputing field because of the incompatibilities between the different computers. I would estimate that 90 per cent of the programs published in other computer magazines would not run on the TRS-80 computers without extensive modifications (unless they were specifically written for a TRS-80). Viewed in this perspective, the TRS-80s represent an island of stability.

Finally, what I would say not just to Mr. Greffe, but to all of our readers, is that, if you have programs that you have developed which you feel carry out useful business (or whatever) tasks, by all means submit them to our editors for consideration. This magazine can only publish what it receives. ■

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PROGRAM PREVIEWS

A. A. Wicks

This Month: TYPING TUTOR and MORSE CODE TRAINER

This must be Education Month, as we find ourselves reviewing two instructional type programs — one on Morse Code skill training, and one on touch typing. I can recall some years ago, as a teen-ager, my ambition was to be a ship's radio officer (realized later), and, although I already knew the Morse Code, good typing ability was necessary in order to get the better communications jobs. The two skills then went together, and anyone even today aspiring to copy the code at the higher speeds would be wise to also learn touch typing. Each of the programs to be reviewed will help considerably in either or both fields. On the other hand, if your aspiration is merely to learn to type well, or to improve your keystroking speed, you are thinking wisely, because being able to type program listings quickly, easily, and accurately is very desirable. Also, using your computer for word processing can be a pleasure if you can type well. So let's look at the Typing Tutor first.

The assumption is made with the Typing Tutor program that you will be practicing on your TRS-80 computer. This is not to say that such practice will preclude you from transferring the skill you acquire to a manual or electric typewriter, once learned. There just isn't that much difference between the two keyboards. In fact, the "ENTER" key on the computer is about the same as the carriage return-line space key on an electric typewriter — and almost in the same place in most instances. There are some other very minor differences too; for instance, many typists use the lower case "l" for the figure "one." That is partly an inheritance, as until fairly recently many typewriters did not have the figure 1 on the keyboard. But more modern machines do have all of the figures, and there is no reason not to use the correct figure on the the computer of course, and certainly also on the typewriter.

If you should never use the typing abilities that you will undoubtedly learn in using the program for any other purpose than on your computer, you are still far ahead — for your word processing, your correspondence, entering program listings, and a multitude of jobs that can be literally "at your fingertips." And let us assume that you never really develop any great speed (accuracy is more important than speed, anyway), then you will save many, many hours of checking your work for errors, because they just won't be there! Convinced that you should learn touch typing now? Then consider the following comments regarding this program.

Typing Tutor is produced by Microsoft Consumer Products, and was written by Dick Ainsworth and Al Baker, and coded by Leah O'Connor — all members of The Image Producers, Inc., Northbrook, Illinois. The program starts out by permitting you a choice of learning Letters, Numbers and Symbols. The obvious starting point should be Letters, but *if you know the* keyboard and have some typing ability already, you may wish to concentrate of one of the other choices. After making your decision, the program prompts further for a reply to Typing Tutor or Practice Paragraph. Continuing, beginners start with the first choice, which will teach you the key positions, correct finger positions, and practice on the letters.

As you gain speed and accuracy with this choice, an evaluation is occurring, based upon your errors and response time, and as you progress more new letters are automatically added to your assignment on the video display. For this mode, a diagram of the keyboard is available in the manual to guide you to the correct finger positions and use. Reference to this chart may be made at any time, of course, but for beginners it is mandatory, and should be checked to insure correct finger positions. But don't look at the keys while you are typing! This is urgently mentioned in the manual, and personally endorsed. Better to make some errors, than to become dependent upon looking at your fingers and the keys while you type.

Practice letters will appear on the screen, and you will respond by typing the letter indicated. Your progress will be rapid, be assured. Recalling my own learning experience at touch typing, this program appears to be better than full classroom instruction, with the added advantage of progressing at your own pace — when you feel like practicing (that could be a drawback, unfortunately). When your reaction time to any letter is equivalent to 20 words per minute (wpm), that letter is added to a "fast" list of letters held in computer memory, and a new key is added. Microsoft calls this TRM, for Time Response Monitoring. The scan on this function occurs 20 times per second, thus it also monitors the time it takes for you to look at the keys if you decide to do a little cheating on yourself!

New keys are added in a sequence that emphasizes single-finger multiple-key use. That is, for instance, the index finger of the right hand is used for J, M, U, Y, H, and N (plus some figures and symbols), and the instruction introduces new keys in this type of sequence.

When you have completed ten lessons, Typing

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Has all the things that other word processing programs should have. Easy to use, written all in machine code. / It permits the inserting and deleting by characters, words, sentences, and paragraphs / Page scrolling up and down / Search ahead of the cursor or behind the cursor for any character / The cursor can be moved up, down, left and right / You can seek top of file and bottom of file / Block move of text, block delete of text/ Search and replace or search delete / Unlimited insert (to the limit of your machines memory) / Permits use with lower case /

Has things that other programs should have, but don't. Upper and lower case output to your printer (if your printer accepts lower case) without having your computer modified. ON UPPER CASE ONLY MACHINES: This program marks the capital letters so you can see which letters are CAPITALS and which are not. / Will change all upper characters text to lower case or all lower case to upper, A SINGLE COMMAND / Will capitalize the first letter of all sentences and all proper noun I's, WITH A SNGLE COMMAND / LOADS ANY ELECTRIC PENCIL FILE / ASCII SAVED FILES. EDTASM FILES or BASIC PROGRAMS SAVED ASCII / Permits installing special control characters in your text for your printers special features, like double wide or condensed print / Definable screen length and definable print length to 255 characters wide / Screen editing that is not final till your command. This means that you can edit your file on the screen and if you don't like how it reads you can cancel and leave it the way it was / You can append files (which means that you can put one file to the end of another file) / No lost characters at the end of the line, even for the fastest typist / A directory of all your files is available to the user without leaving the program / Saving programs to disk easy enough for the non-computer user / To save memory, not all the program modules are in memory at one time but are called from the disk as needed / You can set tab positions like on a typewriter / 10 CUSTOM COMMAND KEYS for the experienced user there is a command file that permits many special functions that are all user defined (not enough space for better explanation in ad, send for complete overview) / Program has HELP file that is a short review of the commands that are available /

Standard Printer Module. This printer module is provided for the user as a standard feature. Optional special printer routines for custom printer will be available in the near future. In this original release, it has the following printer drivers and will support the following printing devices: RS232, TRS232 and PARALLEL printer ports. You have the following format commands: Justifies Text, Centers Text, Centers Title, Line Spacing, Line Length from 3-255 characters and Set Margins / Also send any ASCII code to any printer from the text / Save formatted text to the disk for spooling later / Information for customer to load his own special printer driver / Printing can be stopped and started by the user at any time and then restarted where you left off / You can print entire file or just print to bottom of the page /

Communication Package. RS232 COMMUNICATION TERMINAL PROGRAM permits you to communicate with other computers. Transfer files from one machine to another. Permits dumping memory across the phone lines. Receive files from other TRS-80's and "Shake Hands" with larger computers. This is the complete system called LAZY WRITER. There is no package written for the TRS-80* that is as comprehensive. This package is available for the TRS-80* MOD I, 32K or larger with at least a single disk drive. List price is from

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A key that remembers the cursor position.

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Printing chaining feature. This permits having more than one file on disk and create one printed letter, contract, or book without having to reset the printer commands.

Mandatory space command. This is necessary when you are writing letters or papers that have certain words that are not to be broken-up. eg.:John P. Andhouser. This name can be made to be unbreakable to justify routines in the program.

Disk catalog. Now you can load your disk directory into memory and create a file of this information.

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Tutor will provide a progress report, typically:

YOUR ACCURACY IS 80 PERCENT AT 27 WORDS PER MINUTE.

This reflects your average accuracy and speed for the ten lessons.

Progressing further, the program now allows you to practice by changing response time requirements, or take practice paragraphs. If you are a touch typist already, you may wish to start with practice paragraphs. At any time that you select Practice Paragraph, the paragraph appears on several lines with space between, and your keyed input appears below each line. The groups that are provided in the paragraph are randomly selected, and include a good smattering of programming-type words, such as "DEFSTR." This is going to speed up your keystroking when you encounter these words in a program listing that you may wish to type. At your request, some paragraphs will contain a mixture of numbers and words; the former can be very tricky when spotted among words.

It is most interesting to have your practice paragraph response analyzed, and may turn out to be encouraging or discouraging. In any event, your progress (or lack of it) will be evident. The analysis will state, for example, "YOU MISSED 3 KEYSTROKES ON THE FOLLOWING LETTERS. K R P. YOU WERE SLOWER ON THESE KEYS. K P. YOUR ACCURACY IS 97 PERCENT. YOUR RATE IS 45 WORDS PER MINUTE."

On a test in a school environment, such a detailed report might not be available from the instructor until the next day, or next week. The advantages of having such an instant report are quite evident.

Experienced typists are surprised when they try some of the tests, and I was, too. I did quite well on the practice paragraphs, but when I went back to basics, and tried typing the four-letter mixed letter groups, my speed and accuracy dropped radically. On consideration, however, this should be expected — a typist will be used to typing standard dictionary words, and the keystroking of some of these such as "the," "and," etc. will be almost automatic. But when reverting to the mixed letters, the thinking process must be reformed — just as it would be if you were typing a foreign language with which you were not familiar. Therefore, it is very desirable that even good typists should practice on these groups, because in typing program material you are really working with a coded language.

The manual that accompanies the program was written by Dottie Hall, and is a first-class five by seven inch document, comprising 20 pages of typeset information. The typeface is very clear and open, and Bold headings are used for sectional division. The writing style is instructional in form, wastes no words, but gets the information across in an explicit and lucid manner. It is a credit to the writing that the whole program function can be visualized without even running the program. The drawing of the keyboard is only one-inch high and three-inches wide. A beginner will make frequent references to it, and I would have liked to have seen it as a full-page side-viewing illustration for their benefit. For those of programming bent, a section of the manual called, "What's Inside," discusses the program, and encourages the reader to look at the listing of the program to understand how it is constructed. Even though small by some standards, this manual gets a 10 rating (10 being best), *on all* points of evaluation. The manual, together with the program cassette is packaged in an attractive lithographed box sealed in plastic-wrap.

The only unsatisfactory aspect of this program is that it does not support lower case. The screen presentations and all of the user's inputs are in upper case. If the lower case option had been provided, it would have increased the value of the learning aspect by exercising the ability to use the shift key for more than typing special characters.

Will the program serve the purpose for which it is intended? Indeed it will, if, as with all instruction, you dedicate time to following the instruction. One half-hour a day will surely have you typing accurately and at a comfortable speed within a few weeks. But practice must be consistent. The cost of the program is very modest too, and this is one program that may be used by many members of a family, for school or business training. If only such a method had been available when I was learning to type! There would have be none of Miss Peacock's droning cadence, "A S D F J K L ;" — but then I wouldn't have had the chance to swap mash notes with Ivy-Marie, either.

TYPING TUTOR - Microsoft Consumer Products. Model I 16K Level II BASIC. Available through H & E Computronics, Inc. - Cassette or Disk (distributed on cassette) - $14.95

* * * * *

In this day of satellite communications, computer communications, facsimile, etc., does anyone wish to learn the Morse Code? Is the Morse Code even used to any extent? The same answer applies to both questions: a resolute "Yes!" The code may appear to be a primitive method of electronic communication compared to other exotic methods, but its very primitiveness is what creates its value. When the high technology methods fail, when conditions do not permit voice use, code communication can continue to be used, utilizing extremely low power (how about halfway across the world with only one watt?). When all else fails in a disaster situation, radio code

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communications can be maintained.

But who wishes to learn it, anyway? Well, probably the largest group are prospective amateur radio operators (hams), because it is a Federal government examination requirement in order to obtain a license to operate a radio transmitter on the amateur frequency assignments. Potentially, these license holders are the disaster communicators, when needed.

The Morse Code Trainer program was written by Chet Wilson, who must have given considerable thought to the best method of having the computer act in the role of instructor.

Before using this program, you must first know the Morse code equivalent of each letter, figure and punctuation symbol. In fact, you must have some capability at recognizing these characters at almost five words per minute (wpm), because that is the lowest speed at which practice starts. By chance, this is also the speed of the lowest level Federal Communications Commission examination — but being able to copy exactly that speed would probably not suffice, when you consider such factors as nervousness and distractions. As with all dexterous skills, a little upper leeway is almost always needed. Nevertheless, this starting speed is valuable as a beginning point for anyone.

The arrangement for using the program requires that the plug going to the AUX jack of the tape recorder be removed and inserted into the input jack of an amplifier. The Radio Shack Mini-amplifier is recommended in the manual and is is a good choice. The amplifier has all the volume necessary to fill a large room. An alternate way is also described allowing you to use the cassette recorder amplifier, but this is a little more complicated. Once these preliminaries are made, the code characters will be heard as they are produced by the program and computer.

You have several choices for practice. Your initial choice will be the speed at which you wish to have the code sent. You may select within a range of 5 to 15 wpm. Next, you choose Low or High pitch. This is a personal choice. Although I did not bother to check the exact frequency of these tones by instrument, Low appears to be about 1000 Hz and High about 2000 Hz. The next two choices determine whether you use Practice Mode or Test Mode. You will use both, but will probably start with Practice, because that is your reason for using the program. (If you do not make a choice within about one minute, a tone sounds to remind you to continue.) In this mode, you may further select the type of practice you desire: Random Numbers, Random Punctuation, Random Letters, Random Sentences — or, Your Own Message.

Let's assume you have selected Random Letters. You merely type "2" (the Menu Choice number), and the practice starts. That is one thing that is very convenient with this program — you never need to press "ENTER" (except for Your Own Message, but then only if it is less than 54 characters). Just press the numeral of your choice and the action commences. To continue, the random letters of five groups of five letters each are displayed, and an arrow points to each letter as it is sent in Morse. As the character is sent, the letter disappears. The random sentences, other choices, and your own sentences are all operated in this way.

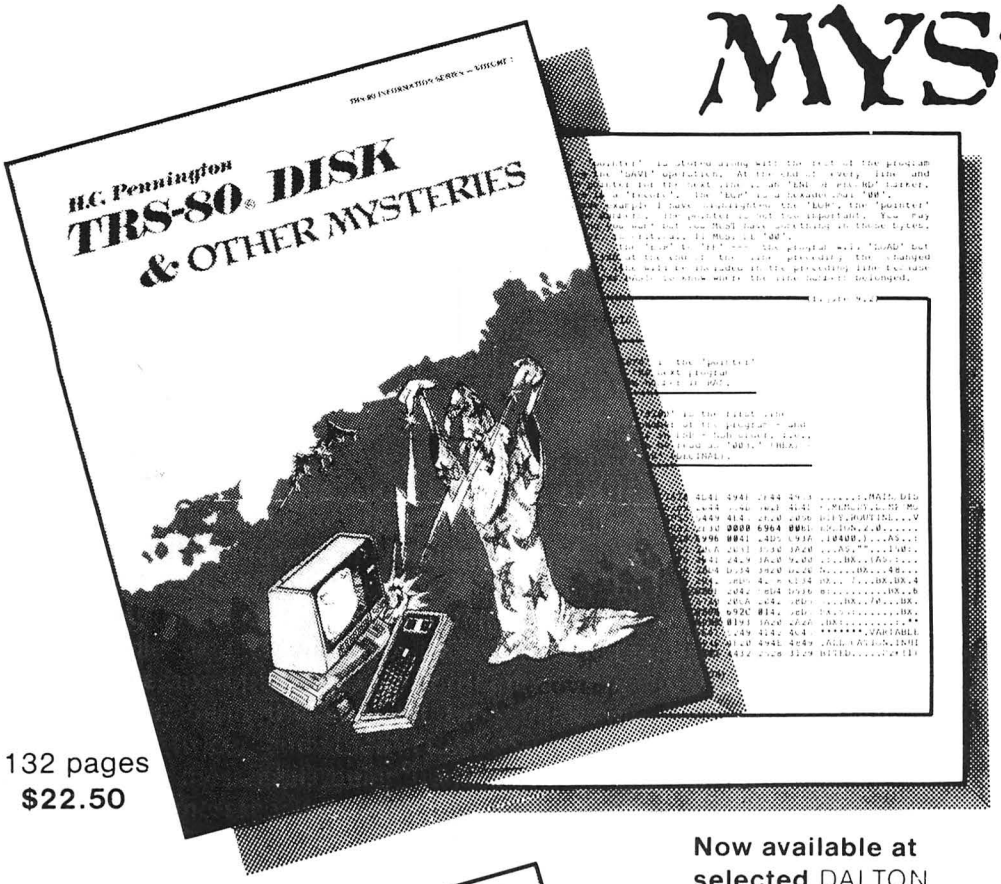
The Test Mode allows the same types of choice, but the random selections are not shown on the video display. Instead, the code is sent, and you must write it down on a piece of paper (or type it, if you want touch-typing practice!). Then, upon completion you are requested to type on the computer keyboard what you have copied. The computer then automatically scores your effort. At this point — and this is a very nice feature — the correct message appears, with your answer alongside. The correct message is sent by the computer, once again with the arrow pointing to each letter as it is sent. If you copy the message or letters with 100% accuracy, you are rewarded with a zooming low to high tone, and the word, "PERFECT!"

The program is available on cassette tape or disk. The first tape that I received was defective. It would load with every indication of being a "good load," flashing asterisk and a solid sound on the speaker. But then, the input just stopped, short of completion — resulting in CLOAD hangup, even though the recorder continued to run. The program is on both sides of the tape; both were the same. A note to DYNACOMP brough a prompt reply, another cassette, and a disk copy. This cassette loaded without any problems whatsoever. The disk program also loaded properly. DYNACOMP assures me that all tapes are checked for correct loading before they are placed in stock. This being the case, the first tape could have been affected in transit.

Next problem. The program begins by displaying a logo, and the word "HELLO." The arrow points, and the code comes out of the speaker as "HE AA AA O." Was my code getting rusty, or was this some vagary of the displayed word? I continued to check the program, and was disturbed to note that whenever the letter "L" was used it was sent in Morse as AA. (Actually not as just shown, because the double-A was sent as a character of its own, without space between the A's — which is the Morse code character for German A-umlaut.) It was necessary then to study the BASIC listing of the program to determine how the characters were being created, in order to discover a *GOSUB* that wasn't there. Although it is usually not a practice in presenting these reviews to "get inside" a program, I feel that for those who may have already purchased this program and may have the same release, the

'.. this is not only a worthwhile book but a great book. My advice is to get it and USE it!' - **William Barden Jr.**

OTHER MYSTERIES



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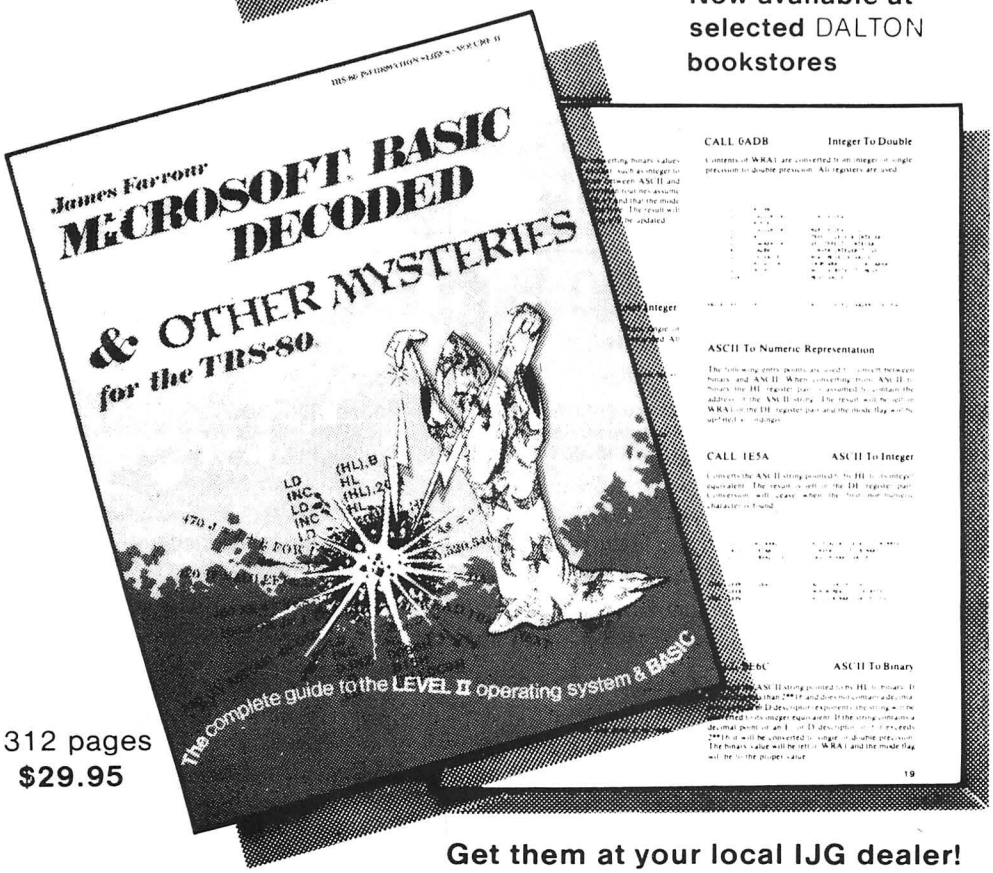

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following should be noted. In Line 1500 the last GOSUB should read: GOSUB 1850. (Not 8800.) This error was present on both the cassette and disk versions that I received, and on both copies on each. It is small but significant errors such as this that give me concern in programs offered to users, and is certainly not the first time that I have found this type of error in commercial products. This particular item could be a real problem to a naive beginner in the code, and might result in a later mental block with the letter "L." Perhaps DYNACOMP should issue an Errata sheet with each copy.

The code as sent is quite satisfactory at speeds between 5 and 10 wpm. Actually, there is nothing wrong between 10 and 15 as far as the form of the characters is concerned. Consider the following, however.

The transmission speed of code may be increased in one or both of two ways. The actual length of the dots and dashes may be shortened (not much to work on with the dots), and/or the spacing between dots, dashes and word groups may be shortened. From a technical aspect, all character ratios should remain the same. It is obvious though, that for learning purposes it would be nice to send characters at, say, a 10 wpm "rate," but spaced so that the actual transmission speed was only four or five wpm. Then, as proficiency grew, just shorten up the spacing, and lo! It sounds the same but now we're copying 10 wpm. What this is all leading to, is to say that the program author has taken this commendable approach, on all speeds above, it seems, about 8 wpm. Therefore, at 15 wpm his characters appear to be at about a 20 or 22 wpm "rate."

Unfortunately, the TRS-80 does not react well to this at speeds of about 11 to 15 wpm. The dots are clipped, making them seem almost as just short audio "clicks," and the dashes sound truncated. If the "make-break" aspects of the program were operating an external keying relay or code oscillator, this problem would possibly be resolved.

Actual code transmission times are reasonably accurate. At 5 wpm, five five-letter groups were sent in 51 seconds. Sixty seconds would be exactly 5 wpm, but these were random letters. The test word "paris" would probably indicate nearly 100% accuracy. Similarly, at 10 wpm, the time was 57 seconds. One cannot quarrel with these accuracies.

The two and one-half pages of typewritten instruction are quite adequate, the only discrepancy mentions the maximum code speed for the program as 11 wpm, whereas up to 15 wpm is obtainable.

My overall evaluation of this program is that it would be helpful to anyone working alone in trying to get their code speed up to about 11 or 12 wpm. Because of the previously mentioned deficiency, I feel it might handicap one beyond that. The scope of practice is excellent, and all that anyone should need. The cost of the program is very reasonable, being little more than the cost of a couple of code practice training cassettes, which are soon memorized. As with Typing Tutor, you can work at your own pace, and study as time and interest permits. If your needs fit this profile, you will not be disappointed in this program.

Morse Code Trainer - DYNACOMP, Inc., Rochester, N.Y. TRS-80 Model I Level II and Model III. 16K Cassette, 32K Disk ■

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GRAFF-PAC: A PROGRAM FOR STRING PACKING

Neil Fishman and Jeff Platzman

GRAFF-PAC is a program designed primarily for string packing, but it can be used for other purposes, as will be discussed later in the article.

First, it is neccessary to know that all of the BASIC keywords are stored as one number instead of the separate words (a list of keywords and their decimal equivalents are shown in figure 2).

What the program does is change a value from what it is now to what you want it to be. For example, the numerical value for the command "PRINT" is 178. In a program, if we wanted to change it to the command "DATA", we would find where it is in the memory, and change the number from 178 for "PRINT" to 136 for "DATA". Not only would this change it to look like "DATA", but the program would also treat it as a "DATA" command (which it now is).

GRAFF-PAC makes this process much simpler and faster. GRAFF-PAC displays a program eight bytes at a time, and permits the user to modify any memory address within the program with a constant display of what is going on.

The first thing that the program does is to check if you have a disk drive hooked up to the computer. If you do, you will get a question of which DOS you are using. After answering this question, the computer will display the first byte of the program. Now hit "X" and start writing your own program. For the first time you use the program, type in the short program that is listed:

```
10 CLS:PRINT""/////////""
20 REM THIS IS A TEST PROGRAM
30 END
```

After having typed this in, type "GOTO 20000". This will automatically put you into the GRAFF-PAC program.

The first thing you will see will be this:

```
26810     206       UNPRINTABLE-
26811     104       H
26812     10        UNPRINTABLE-
26813     0         UNPRINTABLE-
26814     132       .
26815     58        :
26816     178       .
26817     34        ""
```

NOTE : The periods represent the graphic character formed by printing the CHR$ code of the number in the center column.

The number in the first column varies depending on whether or not you have a disk drive, and if you do, which DOS is being used.

The numbers in the first column are the memory locations where the program is stored. The second column consists of the numerical values that are stored, and the third column is the CHR$ code, (If the character is a video control character such as CHR$(23) or CHR$(28), it will be shown as -UNPRINTABLE-. The same is also true for space compression codes such as CHR$(225).) If, in the third column, you see a graphic character, and it was not "packed" into a string, it is a BASIC command that corresponds with the numerical value in figure 2.

To "pack" a string, you must first set up a "dummy" string in your program, using the same amount of "/"s as the amount of graphics characters you wish to "pack" in the string. For example if you wanted to "pack" five CHR$(###) into a string, the "dummy" string must contain five slashes.

To actually change the "dummy" string, first move the arrow next to the line you wish to modify. Then type "M" and proceed to enter the number in three digit form. After this is done, an "M" will appear to the left of the arrow, showing that you are in the modification mode. If the number you wish to enter contains less than three digits, it must be preceeded by the appropriate number of zeros to make it a three digit number. Any time during the modification mode, if you make a mistake, unless on the third digit, type "X" and you will leave the modification mode without having changed anything (if you hit the "X" at any other time, you will end the GRAFF-PAC program and return to the BASIC command mode). Should you make a mistake on the third digit, you must then re-modify that line.

After a string has been "packed", DO NOT EDIT the line that it is contained in. The reason for this is that once the line is edited, the words which are now representing graphics characters will be printed themselves instead of the graphics characters during a run (the words will always be printed during a listing of the program). For example, before line 10 is edited, a CHR$(191) will be printed, but after the line is edited, "USING" will be printed. If you must do any editing, use GRAFF-PAC to find the error and change it that way.

```
10 PRINT""USING""
```

While using GRAFF-PAC on a tape based system, loading another program on while GRAFF-PAC is in the

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memory is impossible. The program, or at least the graphics, must be created using any line under 20000. While using a disk system, it is possible to "MERGE" a program with GRAFF-PAC.

GRAFF-PAC saves space while creating complicated graphic displays. This gives a programmer more room for detail in a program instead of using three times more memory for slower CHR$ functions.

```
20000 REM  <<<<< GRAFFPAC >>>>>
20010 REM          BY NEIL FISHMAN & JEFF PLATZMAN
                        62 PARKER BLVD.
                     MONSEY, NEW YORK 10952
20020 CLEAR 75: IF PEEK(16396)=201 A=17129 :GOTO 20050
20030 CLS: INPUT"TRS-DOS      (1)
NEWDOS       (2)
NEWDOS/80    (3)
WHICH DOS ARE YOU WORKING IN";A: IF A<1 OR A>3 GOTO 20030
20040 IF A=1 THEN A=27172 ELSE IF A=2 A=26810
ELSE IF A=3 A=27206
20050 B=A: G=0: H=0: L=0
20060 CLS: PRINT @ 512, STRING$(64,140);:
PRINT @ 576," '-'=BACK ONE GROUP",
" '+' OR ';' FORWARD ONE GROUP  "
20070 PRINT @ 640," '";CHR$(94);"'=AHEAD FIVE GROUPS","  '";
CHR$(93);"'=BACK FIVE GROUPS"
20080 PRINT @ 704," '";CHR$(91);
"'=CURSOR UP ONE BYTE","  '"CHR$(92);
"'=CURSOR DOWN ONE BYTE "
20090 PRINT @ 768," 'X'=EXIT PROGRAM/EDITING","  'M'=GOTO
EDIT MODE":PRINTTAB(9)"<ENTER>=CHANGE TO LAST NUMERICAL VALUE"
20100 PRINT @ 0,"";: C=0: C$="": B$="": E$="": F$="":
F=0: FOR I=B TO B+7
20110    K=PEEK(I): IF K>191 OR K<32 GOTO 20120 ELSE PRINT"  ";
I,K,CHR$(K),,;:GOTO 20130
20120    PRINT"  ";I,K,"<UNPRINTABLE>",,;
20130 NEXT
20140 PRINT @ 512, STRING$(64,140);
20150 A$=INKEY$
20160    IF A$="-" AND B>A THEN B=B-8: GOTO 20060
20170    IF A$="+" OR A$=";" THEN B=B+8: GOTO 20060
20180    IF A$=CHR$(8) AND B>40+A THEN B=B-40: GOTO 20060
20190    IF A$=CHR$(9) THEN B=B+40: GOTO 20060
20200    IF A$=">" AND G>0 THEN G=G-64: H=H-1
20210    IF A$=CHR$(10) AND G<=384 THEN G=G+64: H=H+1
20220    IF A$="X" GOTO 20360
20230    IF A$="M" GOTO 20280
20240    IF A$=CHR$(13) THEN POKE C,M: GOTO 20100
20250    POKE 15361+G,94: IF G<>L POKE 15361+L,32: L=G
20260    C=H+B
20270    PRINT @ 832,"";: GOTO 20150
20280 POKE 15360+G,77: FOR I=1 TO 3
20290 E$=INKEY$: IF E$="" GOTO 20290
20300    IF E$="X" THEN 20100
20310    IF ASC(E$)<48 OR ASC(E$)>57 GOTO 20290
20320    F$=F$+E$: PRINT @ G+32,CHR$(30);
20330    PRINT @ G+17,F$,CHR$(30);
20340 NEXT: F=VAL(F$): M=VAL(F$): IF F>250 GOTO 20280
20350 POKE C,F: POKE 15360+G,32: GOTO 20100
20360 END
```

FIGURE 1

DECIMAL	CHARACTER	DECIMAL	CHARACTER
0	NULL	48	0
1	BREAK	49	1
2	STX	50	2
3	ETX	51	3
4	EOT	52	4
5	ENQ	53	5
6	ACK	54	6
7	BEL	55	7
8	BACKSPACE	56	8
9	HT	57	9
10	LINEFEED	58	:
11	VT	59	;
12	FF	60	<
13	CARRIAGE RET.	61	=
14	CURSOR ON	62	>
15	CURSOR OFF	63	?
16	DLE	64	@
17	DC1	65	A
18	DC2	66	B
19	DC3	67	C
20	DC4	68	D
21	NAK	69	E
22	SYN	70	F
23	32 C/L	71	G
24	CAN	72	H
25	EM	73	I
26	SUB	74	J
27	ESC	75	K
28	CURSOR HOME	76	L
29	BOL	77	M
30	EREOL	78	N
31	EREOF	79	O
32	SPACE	80	P
33	!	81	Q
34	"	82	R
35	#	83	S
36	$	84	T
37	%	85	U
38	&	86	V
39	'	87	W
40	(	88	X
41	)	89	Y
42	*	90	Z
43	+	91	UP ARROW
44	,	92	DOWN ARROW
45	-	93	LEFT ARROW
46	.	94	RIGHT ARROW
47	/	95	

DECIMAL CODE	FUNCTION
0-7	NONE
8	BACKSPACE AND ERASE CURRENT CHARACTER
9	NONE
10	LINE FEED WITH CARRIAGE RETURN
11	MOVE CARRIAGE TO TOP OF FORM (PAGE)

continued on page 40

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*Data source: Epson MX-80 Operation Manual

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BEGINNER'S CORNER

Sherry M. Taylor

PERIPHERALS AND PARAPHERNALIA FOR THE TRS-80 (PART II)

Here we are, dear friends and neighbors, for another gathering of the BEGINNERS' CORNER. I hope that the past month has brought you many exciting discoveries about your TRS-80, it certainly has for me.

I have just begun a part-time job working with a Model II TRS-80 that has 4 disk drives. It has given me new knowledge and the opportunity to be paid for doing something that I love to do. My boss suggests that I pay HIM for the use of his computer since I thought it was so much fun. I explained that if I paid him, I'd be playing STAR TREK. Since that wouldn't get HIS work done, he's paying ME!

Last month, we discussed printers: The different types and the terms used to talk about them. You should have a working knowledge that will help you ask the right questions of your salesperson. This time we are going to cover disk drives.

Most of us beginners start out with cassette recorders for memory storage. We also start out with the unreliability and slow speed of cassettes. The Model I is equiped with 500 baud. The Model III has both 500 and 1500 baud. (Baud is a technical term used for the speed of data transfer. It is used interchangably for "bits per second.") In simpler terms, the Model I cassete transfers data at 500 bits per second. The Model III cassette at 1500 bits per second. At first that may sound mighty fast, but compared to the transfer rate of a disk drive of 100,000 bits per second (for the Model I), the cassette is relatively S-L-O-W! The transfer rate for the Model III disk drive is 150,000 bits per second, and for the Model II a whopping 500,000 bits per second!

Disk drives are fancy recorders in that they also sport a read/record head. Cassette recorders transfer data to a thin strip of mylar (plastic) coated with iron oxide. (Iron oxide because it can be magnetized.) Disk drives transfer data to a thin sheet of mylar cut in a circle. This circle is permanently sealed inside a protective sleeve rather like a 45 rpm record in its paper shield. The read/record head moves from the outer edge to the center while the disk spins inside its sleeve (at 300 rpm), just as the needle follows the grooves on a record spinning on the turntable. (Just in case you are wondering, there is an oval hole in the sleeve so that the read/record head can touch the magnetic surface.)

The grooves on a record form a tight spiral. (That is why the needle slowly moves from the outer edge to the center as the record plays.) On the diskette, the areas of magnetism form concentric circles. These "circles" are called "tracks."

It used to be that there was only 1 type of disk drives to be had. But with the fast-paced competition among computer companies, you now have several types to choose from. This not only gives you more choices, but also more decisions. You now have to know just what you want.

The "flippy" drive: This sounds rather strange, but it is a real gadget. This type of drive allows the use of both sides of a diskette with a single read/record head simply by turning the diskette over. (Like playing the "flip" side of STRANGERS IN THE NIGHT.) This gives you more storage on a single disk, but be sure you label the disk properly. You don't want to play STRANGERS IN THE NIGHT when you really wanted HEARTBREAK HOTEL. Also, you will need a disk head cleaning kit even more with this type of drive. Dirt, dust and minute particles of coating are more of a problem with this type of drive. You will also have to use diskettes that carry certification for BOTH sides. These are more expensive.

The "double sided" drive. (This sounds like a two-faced friend.) This term refers to the number of read/record heads. Double-sided drives have two read/record heads allowing read/record operations on both sides of the diskette. A double-sided drive appears as two separate drives to the computer. You will need diskettes certified on both sides for this one, also. "Single-sided" drives have one read/record head and therefore read/record on only ONE side of the diskette.

"Track density" is specified in TRACKS PER INCH. It refers to the number of tracks per radial inch, that is, measured from the outside edge toward the center. Typically 48 tracks per inch will give you 40 usable tracks. Ninety-six (96) tracks per inch will give you 80 usable tracks. To get the 80 tracks, less space is given between the tracks (or "circles.")

"Double density" refers to recording density in BITS per inch. For double density, the 1's and 0's are packed more closely togther. Typically, single density will record 2,938 bits per inch. Double density will record 5,876 bits per inch. That's a lot a data! You can also get disk drives with a combination of high track density and double density recording. Therefore, there are such animals as 80 track, double density disk drives. That's even MORE data on a diskette!!

Diskettes are fairly more reliable than cassette tapes, but please remember that they are more fragile. They do not come in hard plastic boxes. The rules that apply to the care of cassettes also apply to diskettes. Do not place diskettes near a magnetic field. These are

DYNACOMP

Quality software for:*

ATARI — **TRS-80 (Level II)****
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CARD GAMES

BRIDGE 2.0 (Available for all computers) — **Price: $17.95 Cassette/$21.95 Diskette**
An all-inclusive version of this most popular of card games. This program both BIDS and PLAYS either contract or duplicate bridge. Depending on the contract, your computer opponents will either play the offense OR defense. If you bid too high, the computer will double your contract! BRIDGE 2.0 provides challenging entertainment for advanced players and is an excellent learning tool for the bridge novice. See the software review in 80 Software Critique.

HEARTS 1.5 (Available for all computers) — **Price: $15.95 Cassette/$19.95 Diskette**
An exciting and entertaining computer version of this popular card game. Hearts is a trick-oriented game in which the purpose is not to take any hearts or the queen of spades. Play against two computer opponents who are armed with hard-to-beat playing strategies. HEARTS 1.5 is an ideal game for introducing the uninitiated (your spouse) to computers. See the software review in 80 Software Critique.

POKER PARTY (Available for all computers) — **Price: $17.95 Cassette/$21.95 Diskette**
POKER PARTY is a draw poker simulation based on the book, POKER, by Oswald Jacoby. This is the most comprehensive version available for microcomputers. The party consists of yourself and six other (computer) players. Each of these players (you will get to know them) has a different personality in the form of a varying propensity to bluff or fold under pressure. Practice with POKER PARTY before going to that expensive game tonight! Apple Cassette and diskette versions require a 32 K (or larger) Apple II.

CRIBBAGE 2.0 (TRS-80 only) — **Price: $14.95 Cassette/$18.95 Diskette**
This is simply the best cribbage game available. It is an excellent program for the cribbage player in search of a worthy opponent as well as for the novice wishing to improve his game. The graphics are superb and assembly language routines provide rapid execution. See the software review in 80 Software Critique.

EDUCATION

TEACHER'S PET I (Available for all computers) — **Price: $11.95 Cassette/$15.95 Diskette**
This is the first of DYNACOMP's educational packages. Primarily intended for pre-school to grade 3, TEACHER'S PET provides the young student with counting practice, letter/word recognition and three levels of math skill exercises.

MORSE CODE TRAINER (TRS-80 only) — **Price: $12.95 Cassette/$16.95 Diskette**
MORSE CODE TRAINER is designed to develop and improve your speed and accuracy in deciphering Morse Code. As such, MCT is an ideal software package for FCC test practice. The code sound is obtained through the earphone jack of any standard cassette recorder. You may choose the pitch of the tones as well as the word rate. Also, various modes of operation are available including number, punctuation and alphabet tests, as well as the keying of your own message. A very effective way to learn code!

THOUGHT PROVOKERS

FLIGHT SIMULATOR (Available for all computers) — **Price: $17.95 Cassette/$21.95 Diskette**
A realistic and extensive mathematical simulation of take off, flight and landing. The program utilizes aerodynamic equations and the characteristics of a real airfoil. You can practice instrument approaches and navigation using radials and compass headings. The more advanced flyer can also perform loops, half-rolls and similar aerobatic maneuvers. Although this program does not employ graphics, it is exciting and very addictive. See the software review in COMPUTRONICS.

VALDEZ (Available for all computers) — **Price: $15.95 Cassette $19.95 Diskette**
VALDEZ is a computer simulation of supertanker navigation in the Prince William Sound Valdez Narrows region of Alaska. Included in this simulation is a realistic and extensive 256 × 256 element map, portions of which may be viewed using the ship's alphanumeric radar display. The motion of the ship itself is accurately modelled mathematically. The simulation also contains a model for the tidal patterns in the region, as well as other traffic (outgoing tankers and drifting icebergs). Chart your course from the Gulf of Alaska to Valdez Harbor! See the software review in 80 Software Critique.

NOMINOES JIGSAW (Atari, Apple and TRS-80 only) — **Price: $16.95 Cassette/$20.95 Diskette**
A jigsaw puzzle on your computer! Complete the puzzle by selecting your pieces from a table consisting of 60 different shapes. NOMINOES JIGSAW is a virtuoso programming effort. The graphics are superlative and the puzzle will challenge you with its three levels of difficulty. Scoring is based upon the number of guesses taken and by the difficulty of the board set-up. The NOMINOES JIGSAW is available for TRS-80 color computer.

CHESS MASTER (North Star and TRS-80 only) — **Price: $19.95 Cassette/$23.95 Diskette**
This complete and very powerful program provides five levels of play. It includes castling, en passant captures and the promotion of pawns. Additionally, the board may be preset before the start of play, permitting the examination of "book" plays. To maximize execution speed, the program is written in assembly language (by SOFTWARE SPECIALISTS of California). Full graphics are employed in the TRS-80 version, and two widths of alphanumeric display are provided to accommodate North Star users.

STARTREK 3.2 (Available for all computers) — **Price: $11.95 Cassette $15.95 Diskette**
This is the classic Startrek simulation, but with several new features. For example, the Klingons now shoot at the Enterprise without warning while also attacking starbases in other quadrants. The Klingons also attack with both light and heavy cruisers and move when shot at! The situation is hectic when the Enterprise is besieged by three heavy cruisers and a starbase S.O.S. is received! The Klingons get even! See the software reviews in A.N.A.L.O.G., 80 Software Critique and Game Merchandising.

GAMES PACK I (Available for all computers) — **Price: $10.95 Cassette $14.95 Diskette**
GAMES PACK I contains the classic computer games of BLACKJACK, LUNAR LANDER, CRAPS, HORSERACE, SWITCH and more. These games have been combined into one large program for ease in loading. They are individually accessed by a convenient menu. This collection is worth the price just for the DYNACOMP version of BLACKJACK.

GAMES PACK II (Available for all computers) — **Price: $10.95 Cassette $14.95 Diskette**
GAMES PACK II includes the games CRAZY EIGHTS, TOTTO, ACEY DUCEY, TIPE, WUMPUS and others. As with GAMES PACK I, all the games are loaded as one program and are called from a menu. You will particularly enjoy DYNACOMP's version of CRAZY EIGHTS.

Why pay $7.95 or more per program when you can buy a DYNACOMP collection for just $10.95?

STATISTICS and ENGINEERING

DIGITAL FILTER (Available for all computers) — **Price: $29.95 Cassette $33.95 Diskette**
DIGITAL FILTER is a comprehensive data processing program which permits the user to design his own filter function or choose from a menu of filter forms. The filter forms are subsequently converted into non-recursive convolution coefficients which permit rapid data processing. In the explicit design mode the shape of the frequency transfer function is specified by directly entering points along the desired filter curve. In the menu mode, ideal low pass, high pass and bandpass filters may be approximated to varying degrees according to the number of points used in the calculation. These filters may optionally also be smoothed with a Hanning function. In addition, multi-stage Butterworth filters may be selected. Features of DIGITAL FILTER include plotting of the data before and after filtering, as well as display of the chosen filter functions. Also included are convenient data storage, retrieval and editing procedures.

FOURIER ANALYZER (Available for all computers) — **Price: $16.95 Cassette $20.95 Diskette**
Use this program to examine the frequency spectra of limited duration signals. The program features automatic scaling and plotting of the input data and results. Practical applications include the analysis of complicated patterns in such fields as electronics, communications and business.

TFA (Transfer Function Analyzer) — **Price: $19.95 Cassette $23.95 Diskette**
This is a special software package which may be used to evaluate the transfer functions of systems such as hi fi amplifiers and filters by examining their response to pulsed inputs. TFA is a major modification of FOURIER ANALYZER and contains an engineering-oriented decibel versus log frequency plot as well as data editing features. Whereas FOURIER ANALYZER is designed for educational and scientific use, TFA is an engineering tool. Available for all computers.

HARMONIC ANALYZER (Available for all computers) — **Price: $34.95 Cassette $38.95 Diskette**
HARMONIC ANALYZER was designed for the spectrum analysis of repetitive waveforms. Features include data file generation, editing and storage/retrieval as well as data and spectrum plotting. One particularly unique facility is that the input data need not be equally spaced or in order. The original data is sorted and a cubic spline interpolation is used to create the data file required by the FFT algorithm.

FOURIER ANALYZER, TFA and HARMONIC ANALYZER may be purchased together for a combined price of $44.95 (three cassettes) and $56.95 (three diskettes).

REGRESSION I (Available for all computers) — **Price: $19.95 Cassette/$23.95 Diskette**
REGRESSION I is a unique and exceptionally versatile one-dimensional least squares "polynomial" curve fitting program. Features include very high accuracy, an automatic degree determination option, an extensive internal library of fitting functions, data editing, automatic data and curve plotting, a statistical analysis (eg. standard deviation, correlation coefficient etc.) and much more. In addition, new fits may be tried without reentering the data. REGRESSION I is certainly the cornerstone program in any data analysis software library.

REGRESSION II (PARAFIT) (Available for all computers) — **Price: $19.95 Cassette $23.95 Diskette**
PARAFIT is designed to handle those cases in which the parameters are imbedded (possibly nonlinearly) in the fitting function. The user simply inserts the functional form, including the parameters (A(1), A(2), etc.) as one or more BASIC statement lines. Data and results may be manipulated and plotted as with REGRESSION I. Use REGRESSION I for polynomial fitting and PARAFIT for those complicated functions.

MULTILINEAR REGRESSION (MLR) (Available for all computers) — **Price: $24.95 Cassette/$28.95 Diskette**
MLR is a professional software package for analyzing data sets containing two or more linearly independent variables. Besides performing the basic regression calculation, this program also provides easy to use data entry, storage, retrieval and editing functions. In addition, the user may interrogate the solution by supplying values for the independent variables. The number of variables and data size is limited only by the available memory.

REGRESSION I, II and MULTILINEAR REGRESSION may be purchased together for $49.95 (three cassettes) or $61.95 (three diskettes).

ANOVA (Available for all computers) — **Price: $39.95 Cassette $43.95 Diskette**
In the past the ANOVA (analysis of variance) procedure has been limited to the large mainframe computers. Now DYNACOMP has brought the power of this method to small systems. For those conversant with ANOVA, the DYNACOMP software package includes the 1 way, 2 way and N way procedures. Also provided are the Yates 2^{K-P} factorial designs. For those unfamiliar with ANOVA, do not worry. The accompanying documentation was written in a tutorial fashion (by a professor in the subject) and serves as an excellent introduction to the subject. Accompanying ANOVA is a support program for building the data base. Included are several convenient features including data editing, deleting and appending.

BASIC SCIENTIFIC SUBROUTINES, Volume I (Not available for Atari)
DYNACOMP is the exclusive distributor for the software keyed to the popular text *BASIC Scientific Subroutines, Volume I* by F. Ruckdeschel (see the BYTE McGraw Hill advertisement in BYTE magazine, January 1981). These subroutines have been assembled according to chapter. Included with each collection is a menu program which selects and demonstrates each subroutine.

Collection #1 — Chapters 2 and 3 — Data and function plotting, complex variables
Collection #2 — Chapter 4 — Matrix and vector operations
Collection #3 — Chapters 5 and 6 — Random number generators, series approximations

Price per collection — $14.95 Cassette $18.95 Diskette
All three collections are available for $39.95 (three cassettes) and $49.95 (three diskettes).

Because the text is a vital part of the documentation, *BASIC Scientific Subroutines, Volume I* is available from DYNACOMP for $19.95 plus 75¢ postage and handling.

ROOTS (Available for all computers) — **Price $10.95 Cassette $14.95 Diskette**
In a nutshell, ROOTS simultaneously determines all the zeroes of a polynomial having real coefficients. There is no limit on the degree of the polynomial, and because the procedure is iterative, the accuracy is generally very good. No initial guesses are required as input, and the calculated roots are substituted back into the polynomial and the residuals displayed.

UTILITIES

GRAFIX (TRS-80 only) — **Price: $14.95 Cassette $18.95 Diskette**
This unique program allows you to easily create graphics directly from the keyboard. You "draw" your figure using the program's extensive cursor controls. Once the figure is made, it is automatically appended to your BASIC program as a string variable. Draw a "happy face", call it HS and then print it from your program using PRINT HS. This is a very easy way to create and save graphics.

TIDY (TRS-80 only) — **Price: $10.95 Cassette $14.95 Diskette**
TIDY is an assembly language program which allows you to renumber the lines in your BASIC programs. TIDY also removes unnecessary spaces and REM statements. The result is a compacted BASIC program which uses much less memory space and executes significantly faster. Once loaded, TIDY remains in memory, you may load any number of BASIC programs without having to reload TIDY.

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***TRS-80 diskettes are not supplied with DOS or BASIC. All DYNACOMP programs for TRS-80 will run on model III with the exception of TIDY, GRAPHICS, CRIBBAGE 2.0.*

created around motors and power supplies. Don't leave them where the temperature is prone to rise to high levels. DON'T ever leave them in a hot car! You'll have a melt down! (Even though you may look strange in the grocery store carrying diskettes, look strange. Better to look strange than to lose valuable data!)

Keep diskettes away from the jam-covered hands of your 2 year old. (Or your spouse if he/she eats jam.) Do not stack things on top of the diskettes. Keep pressure to the sides at a minimum. DON'T use diskettes as a frisbee. And last, but not least, keep them out of the hands of would-be computer operators who do not know what they are doing. Many valuable files have been lost this way. (Believe me, I know. I had a file of 575 customers CRASH for that very reason.)

The obvious necessity of BACKUP copies of your valuable files cannot be over emphasized. A backup copy placed in a safe place away from trouble can save you a lot of hard work and frustration. In my work situation, I have 3 backup copies just in case something happens to my working master. I don't want to type all 600 customer names all over again. It gets boring!

Next to the printer, the disk drives are the most popular addition to a computer system, be it hobby oriented or business oriented. (Yes, there are business applications that have been run quite well on cassette systems. But as the business grows, you quickly outgrow cassettes.)

Going to disk also presents the aspect of learning new commands that are supplied by TRSDOS (pronounced "Triss-doss"). "DOS" stands for Disk Operating System. Something has to guide the use of that equipment and it is not included in your Level II ROM. With TRSDOS (or the other DOS's that are available), you get nifty commands like the following (note: FORMS, FREE, and HELP apply only to the Models 2 and 3):

ATTRIB: to change a file password.

CLOCK: turn on the clock display

COPY: copy a file or files to another diskette without copying all the files (as in BACKUP.)

DEBUG: start debug monitor for machine-language programming or fixing.

DIR: list the diskette directory (or contents page.)

FORMS: set printer line widths and lines per page.

FREE: display disk allocation map. Shows you how much of the disk is used track by track.

HELP: Explanation of a TRSDOS command. HELP BACKUP will give you the syntax format, definition and explanation. HELP SYNTAX will explain the HELP descriptions. (A nice command when you can't remember.)

KILL: Delete a file or group of files.

BACKUP: make an exact duplicate of a diskette.

FORMAT: erase and prepare a diskette to accept data.

There are many more. For an inspiring hour of reading, locate a Disk System Owner's Manual and just drift through it. You will be amazed at the power you will have when you go disk.

Not only do you get the commands of TRSDOS, but all those words you have been using, but got L3 errors for, will be usable. Like, KILL, OPEN, CLOSE, CMD, DEF FN (define function), NAME (renumber the current program), MERGE, GET and PUT. All of these come to you complements of Disk BASIC, a great enhancement to the Level II language we all know and love. More power to the user!

Well, so much for our discussion of disk drives. If you have any questions, remember, you can write to me. If I don't know the answer, I'll track it down and get back to you. (Please include a SASE.)

* * * * *

Now for our Dictionary of Computerese:

kilobit: one thousand bits

kilomegabit: one thousand million bits

kludge: a slang word of endearment for your pet TRS-80 computer.

stopper: (rubber device that keeps water in the bathtub?) The highest memory location in any given system.

Next month we will go on to a discussion of other peripherals that are available for the TRS-80. So tune in again, next month, same time, same station, and have a very happy Thanksgiving holiday.

Sherry M. Taylor
322 So. 21st Street
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■

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PET COMPUTERS moving up to LSI-11 Pet business system priced to sell. PET 2001-16N Computer $800; 2040 Dual Floppy 340K (holds more data than 6 TRS-80 disks) $1,100. Digital cassettes (2) $60 each. System complete with Text Editor, disk sort, database software, real estate software and more $2,100. Call **PAUL** (313)971-8447

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SAVINGS ACCOUNT

Jay R. Newirth

This program will maintain a perpetual record of your savings account data by saving the data either on cassette or disk. Each version is detailed below. The program has five main options as follows:

<1> Post Transactions
<2> List Transactions on Video
<3> Write DATA to Disk or Cassette
<4> Read DATA from Disk or Cassette
<5> Exit the program

Option <1> has is further broken down into five other options:

<1> Transfer to Checking Account
<2> Transfer from Checking Account
<3> Deposit to Savings Account
<4> Withdrawal from Savings Account
<5> Interest Paid on Savings Account

Options <1> and <2> are for those persons who have a checking/savings account where you can transfer money from one account to the other.

DISK VERSION

The Disk Version will automatically save all data in a file named "SAVINGS/DAT" and will save the file automatically on drive 0. If you wish to change the file name and/or the drive number, change the following lines:

```
LINE #112Ø      OPEN"O",1,"YOUR FILENAME:DN"
LINE #133Ø      OPEN"I",1,"YOUR FILENAME:DN"
```

If you think you will post more than 100 transactions, you will have to change the DIMension statement contained in line #80 and the CLEAR statement in line #70 as follows:

```
LINE #8Ø  DIM D$(N),A$(N),CR(N),DB(N),BF(N)
```

where N= number of transactions

```
LINE #7Ø CLEAR XXXX
```

where XXXX = aprx. 3000 bytes/100 records

CASSETTE VERSION

It is important to remember to load the data tape into the computer before you add new transaction, otherwise you run the possibility of "writing over" old data with new data and thus ruining your data tape. If you follow the instruction prompts, you should have no real problems.

```
1Ø ' SAVING ACCOUNT PROGRAM - CASSETTE VERSION
2Ø ' WRITTEN BY JAY R. NEWIRTH , 1/78 (REV. 4/81)
3Ø ' 32Ø8 BONNIE ROAD....BALTIMORE, MARYLAND.....212Ø8
4Ø '
5Ø '
6Ø CLS
7Ø CLEAR 3ØØØ
8Ø DIM D$(1ØØ), A$(1ØØ), TR$(1ØØ), CR(1ØØ), DB(1ØØ), BF(1ØØ)
9Ø GOSUB 145Ø
1ØØ '
11Ø '....PRINT MAIN MENU
12Ø '
13Ø CLS
14Ø PRINT @ 2Ø, "** SAVINGS ACCOUNT PROGRAM **"
15Ø PRINT
16Ø PRINT "SELECT OPTION"
17Ø PRINT STRING$(13, 131)
18Ø PRINT "<1> POST TRANSACTIONS"
19Ø PRINT "<2> LIST TRANSACTIONS (VIDEO)"
2ØØ PRINT "<3> WRITE DATA TO CASSETTE"
21Ø PRINT "<4> READ DATA FROM CASSETTE"
22Ø PRINT "<5> EXIT PROGRAM"
23Ø '
24Ø '....ENTER SELECTION
25Ø '
26Ø PRINT @ 7Ø4, "ENTER YOUR CHOICE....."
27Ø I$=INKEY$
28Ø IF I$ = "" THEN 27Ø
29Ø X=VAL(I$)
3ØØ IF X < 1 OR X > 5 THEN 27Ø
31Ø ON X GOTO 34Ø, 92Ø, 1Ø5Ø, 125Ø, 154Ø
32Ø '.....POSTING TRANSACTIONS SECTION
33Ø '
34Ø IF P1 = Ø THEN I=1 : GOTO 37Ø
35Ø I=P1+1
36Ø GOTO 39Ø
37Ø CLS
38Ø INPUT "ENTER YOUR INITIAL BALANCE: ";BF(Ø)
39Ø CLS
4ØØ PRINT "POSTING TRANSACTIONS"
41Ø PRINT STRING$(64, 131);
42Ø PRINT "TRANSACTION #" I
43Ø INPUT "ENTER TRANSACTION DATE <MM/DD/YY>: ";D$(I)
44Ø PRINT
45Ø PRINT "SELECT OPTION"
46Ø PRINT STRING$(13, 131)
47Ø PRINT "<1> TRANSFER TO CKACCT"
48Ø PRINT "<2> TRANSFER FROM CKACCT"
49Ø PRINT "<3> DEPOSIT"
5ØØ PRINT "<4> WITHDRAWAL"
51Ø PRINT "<5> INTEREST PAID"
52Ø I$=INKEY$
53Ø IF I$ = "" THEN 52Ø
54Ø X=VAL(I$)
55Ø IF X < 1 OR X > 5 THEN 52Ø
```

```
560 ON X GOTO 600, 620, 640, 660, 680
570 '
580 '....ASSIGN TRANSACTION NAME DEPENDING ON SELECTION
590 '
600 A$(I)="TRNSF. TO CKACT."
610 GOTO 700
620 A$(I)="TRNSF. FROM CKACT."
630 GOTO 730
640 A$(I)="DEPOSIT"
650 GOTO 730
660 A$(I)="WITHDRAWAL"
670 GOTO 700
680 A$(I)="INTEREST PAID"
690 GOTO 730
700 PRINT
710 INPUT "ENTER DEBIT AMOUNT";DB(I)
720 GOTO 780
730 PRINT
740 INPUT "ENTER CREDIT AMOUNT";CR(I)
750 '
760 '......CALCULATE NEW BALANCE
770 '
780 BF(I)=BF(I-1)+CR(I)-DB(I)
790 PRINT @ 896, "TYPE <C> TO CONTINUE  OR  <Q> TO QUIT";
800 I$=INKEY$
810 IF I$ = "" THEN 800
820 IF I$ = "C" THEN 850
830 IF I$ = "Q" THEN 870
840 GOTO 800
850 I=I+1
860 GOTO 390
870 P1=I
880 GOTO 130
890 '
900 '....VIDEO LISTING OF TRANSACTIONS
910 '
920 CLS
930 PRINT Y$;
940 PRINT STRING$(64, 45);
950 PRINT USING W$; "INITIAL BALANCE";BF(0);
960 FOR I=1 TO P1
970 PRINT USING V$; D$(I); A$(I); CR(I); DB(I); BF(I);
980 IF I/10 = INT(I/10) THEN 1490
990 NEXT
1000 PRINT @ 960, "PRESS <ENTER> TO RETURN TO MAIN MENU";
1010 IF INKEY$ <> CHR$(13) THEN 1010 ELSE 130
1020 '
1030 '...TRANSFERRING DATA TO CASSETTE
1040 '
1050 CLS
1060 PRINT "SAVING DATA TO CASSETTE"
1070 PRINT STRING$(64, 131);
1080 PRINT "PREPARE CASSETTE RECORDER.....REWIND TAPE TO
STARTING POINT.....PRESS 'RECORD/PLAY' BUTTONS."
1090 PRINT "PRESS <ENTER> WHEN READY."
1100 IF INKEY$ <> CHR$(13) THEN 1100
1110 PRINT
1120 PRINT TAB(20) "====TRANSFERRING DATA===="
1130 PRINT#-1, P1, BF(0)
1140 FOR I=1 TO P1
1150 PRINT#-1, D$(I),;A$(I), CR(I), DB(I), BF(I)
```

```
116Ø NEXT
117Ø PRINT
118Ø PRINT TAB(2Ø) "====TRANSFER COMPLETE===="
119Ø FOR X%=1 TO 15ØØ
12ØØ NEXT
121Ø GOTO 13Ø
122Ø '
123Ø '...TRANSFERRING DATA FROM CASSETTE
124Ø '
125Ø CLS
126Ø PRINT "READING DATA FROM CASSETTE"
127Ø PRINT STRING$(64, 131);
128Ø PRINT "PREPARE CASSETTE RECORDER.....REWIND TAPE TO
STARTING POINT.....PRESS 'PLAY' BUTTON."
129Ø PRINT "PRESS <ENTER> WHEN READY."
13ØØ IF INKEY$ <> CHR$(13) THEN 13ØØ
131Ø PRINT
132Ø PRINT TAB(2Ø) "====TRANSFERRING DATA===="
133Ø INPUT#-1, P1, BF(Ø)
134Ø FOR I=1 TO P1
135Ø INPUT#-1, D$(I), A$(I), CR(I), DB(I), BF(I)
136Ø NEXT
137Ø PRINT
138Ø PRINT TAB(2Ø) "====TRANSFER COMPLETE===="
139Ø FOR X%=1 TO 15ØØ
14ØØ NEXT
141Ø GOTO 13Ø
142Ø '
143Ø '....VARIOUS SUBROUTINES LOCATED HERE
144Ø '
145Ø Y$="  DATE     TRANSACTION TYPE       CREDIT       DEBIT
BALANCE"
146Ø V$="%      %   %              %  $$####.##   $$####.##
$$####.##"
147Ø W$="          %              %
$$####.##"
148Ø RETURN
149Ø IF P1 = I THEN 1ØØØ ELSE 15ØØ
15ØØ PRINT @ 96Ø, "PRESS <ENTER> TO CONTINUE LISTING";
151Ø IF INKEY$ <> CHR$(13) THEN 151Ø
152Ø PRINT @ 128, CHR$(31)"";
153Ø GOTO 99Ø
154Ø CLS
155Ø END

1Ø ' SAVING ACCOUNT PROGRAM - DISK VERSION
2Ø ' WRITTEN BY JAY R. NEWIRTH , 1/78 (REV. 4/81)
3Ø ' 32Ø8 BONNIE ROAD....BALTIMORE, MARYLAND.....212Ø8
4Ø '
5Ø '
6Ø CLS
7Ø CLEAR 3ØØØ
8Ø DIM D$(1ØØ), A$(1ØØ), TR$(1ØØ), CR(1ØØ), DB(1ØØ), BF(1ØØ)
9Ø GOSUB 147Ø
1ØØ '
11Ø '....PRINT MAIN MENU
12Ø '
13Ø CLS
14Ø PRINT @ 2Ø, "** SAVINGS ACCOUNT PROGRAM **"
15Ø PRINT
16Ø PRINT "SELECT OPTION"
```

```
170 PRINT STRING$(13, 131)
180 PRINT "<1> POST TRANSACTIONS"
190 PRINT "<2> LIST TRANSACTIONS (VIDEO)"
200 PRINT "<3> WRITE DATA TO DISK"
210 PRINT "<4> READ DATA FROM DISK"
220 PRINT "<5> EXIT PROGRAM"
230 '
240 '....ENTER SELECTION
250 '
260 PRINT @ 704, "ENTER YOUR CHOICE....."
270 I$=INKEY$
280 IF I$ = "" THEN 270
290 X=VAL(I$)
300 IF X < 1 OR X > 5 THEN 270
310 ON X GOTO 340, 920, 1050, 1240, 1560
320 '.....POSTING TRANSACTIONS SECTION
330 '
340 IF P1 = 0 THEN I=1 : GOTO 370
350 I=P1+1
360 GOTO 390
370 CLS
380 INPUT "ENTER YOUR INITIAL BALANCE: ";BF(0)
390 CLS
400 PRINT "POSTING TRANSACTIONS"
410 PRINT STRING$(64, 131);
420 PRINT "TRANSACTION #" I
430 INPUT "ENTER TRANSACTION DATE <MM/DD/YY>: ";D$(I)
440 PRINT
450 PRINT "SELECT OPTION"
460 PRINT STRING$(13, 131)
470 PRINT "<1> TRANSFER TO CKACCT"
480 PRINT "<2> TRANSFER FROM CKACCT"
490 PRINT "<3> DEPOSIT"
500 PRINT "<4> WITHDRAWAL"
510 PRINT "<5> INTEREST PAID"
520 I$=INKEY$
530 IF I$ = "" THEN 520
540 X=VAL(I$)
550 IF X < 1 OR X > 5 THEN 520
560 ON X GOTO 600, 620, 640, 660, 680
570 '
580 '....ASSIGN TRANSACTION NAME DEPENDING ON SELECTION
590 '
600 A$(I)="TRNSF. TO CKACT."
610 GOTO 700
620 A$(I)="TRNSF. FROM CKACT."
630 GOTO 730
640 A$(I)="DEPOSIT"
650 GOTO 730
660 A$(I)="WITHDRAWAL"
670 GOTO 700
680 A$(I)="INTEREST PAID"
690 GOTO 730
700 PRINT
710 INPUT "ENTER DEBIT AMOUNT";DB(I)
720 GOTO 780
730 PRINT
740 INPUT "ENTER CREDIT AMOUNT";CR(I)
750 '
760 '......CALCULATE NEW BALANCE
770 '
```

'THE SYSTEM'

New TRS-80 Model III

Model III, 48K 2 Siemans Disk Drive system, **$1799.00,** (plus shipping and handling) includes Dos Plus III operating system.

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Internal Drive #1—Includes Micro Mainframes Controller board, Dual Drive Power Supply (for 2 internal disk drives), Mounting Hardware (for 2 internal disk drives), 40 Track Siemans Disk Drive, **$629.95**

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The finest Auto Answer/Dial Modem on the market! This is a direct connect modem for your model I or III. Does not require an RS232-C interface in your computer! Season Special, ~~$299.95~~ **$249.95**

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This package includes three of the most useful programs available for the serious TRS-80 user, by Mike Friedman.

1) **Spooler:** Very fast, allows page parameters and perferation skip over automatically. you can even switch DOS's without interupting printing!

2) **Erase:** Super Purge utility with multiple modes of operation. Allows you to display DIR and position cursor over file to be killed, and then a key stroke and it's gone! You will never use 'KILL' again!

3) **Map:** Places a sector map (LUMP map for NEWDOS/80) of your disk on the screen. Shows free, used and locked out grans.

ENTIRE PACKAGE ONLY. (Specify Mod I or III), **$49.95**

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This Model III Utility, written by Dick Balcom, allows you to load system tapes into your computer at either 500 or 1500 Baud and then copy them onto a new tape at either 500 or 1500 Baud. Includes 10 page instruction manual, **$9.95**

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A self-instruction booklet on copyrighting the computer software you write. Includes step by step instructions, sample forms, as well as discussions of copyrights, patents and trade secrets, your rights secured by copyrights, legal remedies upon infringements, material not copyrightable and MUCH MORE! Written by Attorneys. Published by National Attorneys Publications and distributed exclusively through B.T. Enterprises. IF YOU EVER WROTE A COMPUTER PROGRAM, YOU NEED THIS BOOK! **$11.95**

DOS PLUS OPERATING SYSTEM

A fast, easy to use, and bug-free operating system for the TRS-80 Model I and III. This system is a must for business and hobby users. Easy to use, supports Single and Double density in the Mod III, (Mod I with Doubler). Includes a $100 reward for an error if you can locate one. (See Micro Systems Software ad for details.)

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The Hottest Disk Operating System for the TRS-80 Model I and III. Version 2.0 with full single and double density support, allows the use of and combination of disk drives types and densities. Full Double density support when used with a Doubler. On the Model I, you can read and write Model III compatable data disks. On the Model III, you can write Model I single or double density data disks for use on the Model I. Includes: Expanded directories, dynamic basic merge and delete, selective variable clearing, enhanced basic editing, Enhanced chaining functions, Superzap utility, Disk enhanced editor assembler and disassembler, and much more. Special Price, **$139.95**

M-ZAL

This is the most powerful Editor Assembler for the TRS-80 ever written. Features a full screen editor, a menu driven asembler, and an interactive linker which allows the linking of /CMD and /RLD files. Files can be loaded to Disk or Tape! Assembly Language programers like Dick Balcom, and Pete Robert claim that this is the best Editor Assembler on the market! Special Price, **$129.95**

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We carry the full line of IJG 'Other Mysteries' books at discount prices. These books are a must for computer users.

TRS—80 Disk and Other Mysteries	~~$22.50~~	**$19.95**
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Don't throw away your worn MX-80 ribbon cassettes. We carry endless loop ribbons to replace the worn ribbon in your MX-80 ribbon cassette and save money. Installation takes about 3 minutes each. Special offer **$3.50/ea., $35.00/doz.**

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The CASOP utility by Paul Spoltore allows you to copy system tapes, find load locations, check for hidden messages, modify program blocks, relocate program blocks, and merge two tape programs together. A sort of 'SUPERZAP' for tape users, **$24.95.**

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```
78Ø BF(I)=BF(I-1)+CR(I)-DB(I)
79Ø PRINT @ 896, "TYPE <C> TO CONTINUE  OR  <Q> TO QUIT";
8ØØ I$=INKEY$
81Ø IF I$ = "" THEN 8ØØ
82Ø IF I$ = "C" THEN 85Ø
83Ø IF I$ = "Q" THEN 87Ø
84Ø GOTO 8ØØ
85Ø I=I+1
86Ø GOTO 39Ø
87Ø P1=I
88Ø GOTO 13Ø
89Ø '
9ØØ '....VIDEO LISTING OF TRANSACTIONS
91Ø '
92Ø CLS
93Ø PRINT Y$;
94Ø PRINT STRING$(64, 45);
95Ø PRINT USING W$; "INITIAL BALANCE";BF(Ø);
96Ø FOR I=1 TO P1
97Ø PRINT USING V$; D$(I); A$(I); CR(I); DB(I); BF(I);
98Ø IF I/1Ø = INT(I/1Ø) THEN 151Ø
99Ø NEXT
1ØØØ PRINT @ 96Ø, "PRESS <ENTER> TO RETURN TO MAIN MENU";
1Ø1Ø IF INKEY$ <> CHR$(13) THEN 1Ø1Ø ELSE 13Ø
1Ø2Ø '
1Ø3Ø '...TRANSFERRING DATA TO DISK
1Ø4Ø '
1Ø5Ø CLS
1Ø6Ø PRINT "SAVING DATA TO DISK"
1Ø7Ø PRINT STRING$(64, 131);
1Ø8Ø PRINT "PRESS <ENTER> WHEN READY."
1Ø9Ø IF INKEY$ <> CHR$(13) THEN 1Ø9Ø
11ØØ PRINT
111Ø PRINT TAB(2Ø) "====TRANSFERRING DATA===="
112Ø OPEN "O",1,"SAVINGS/DAT:Ø"
113Ø PRINT#1, P1, BF(Ø)
114Ø FOR I=1 TO P1
115Ø PRINT#1, D$(I);",";A$(I);",";CR(I); DB(I); BF(I);
116Ø NEXT
117Ø CLOSE
118Ø PRINT
119Ø PRINT TAB(2Ø) "====TRANSFER COMPLETE===="
12ØØ FOR X%=1 TO 15ØØ
121Ø NEXT
122Ø GOTO 13Ø
123Ø '
124Ø '...TRANSFERRING DATA FROM DISK
125Ø '
126Ø CLS
127Ø PRINT "READING DATA FROM DISK"
128Ø PRINT STRING$(64, 131);
129Ø PRINT "PRESS <ENTER> WHEN READY."
13ØØ IF INKEY$ <> CHR$(13) THEN 13ØØ
131Ø PRINT
132Ø PRINT TAB(2Ø) "====TRANSFERRING DATA===="
133Ø OPEN "I",1,"SAVINGS/DAT:Ø"
134Ø INPUT#1, P1, BF(Ø)
135Ø FOR I=1 TO P1
136Ø INPUT#1, D$(I), A$(I), CR(I), DB(I), BF(I)
137Ø NEXT
138Ø CLOSE
139Ø PRINT
14ØØ PRINT TAB(2Ø) "====TRANSFER COMPLETE===="
141Ø FOR X%=1 TO 15ØØ
142Ø NEXT
143Ø GOTO 13Ø
144Ø '
145Ø '....VARIOUS SUBROUTINES LOCATED HERE
146Ø '
147Ø Y$="  DATE     TRANSACTION TYPE       CREDIT       DEBIT
BALANCE"
148Ø V$="%      %   %              %  $$####.##   $$####.##
$$####.##"
149Ø W$="          %              %
$$####.##"
15ØØ RETURN
151Ø IF P1 = I THEN 1ØØØ ELSE 152Ø
152Ø PRINT @ 96Ø, "PRESS <ENTER> TO CONTINUE LISTING";
153Ø IF INKEY$ <> CHR$(13) THEN 153Ø
154Ø PRINT @ 128, CHR$(31)"";
155Ø GOTO 99Ø
156Ø CLS
157Ø END
```


Jay R. Newirth
3208 Bonnie Road
Baltimore, Maryland 21208

■

PRACTICAL BUSINESS PROGRAMS

S. M. Zimmerman, Ph.D. and L. M. Conrad

DEPRECIATION EXPENSE

With our present tax structure you, the business person, must take advantage of every deduction allowed by law. One important deduction is for depreciation of capital goods. Most of us often leave the task of selecting the depreciation method to our accountants due either to lack of knowledge or to lack of time to do the calculations necessary to do the job.

Accountants are busy individuals, especially during tax season. When it is necessary for the accountant to select the most economical method of depreciation for a client the accountant must consider both the time necessary to do the calculations as well as the tax saving to the client.

Your TRS-80 is a perfect tool to perform the calculations necessary for depreciation purposes with minimum cost, maximum speed and accuracy. Your accountant will not have to do the calculations for you. You will be able to make better business decisions and your costs for accounting services should be reduced.

Don't try to eliminate your accountant completely. The laws relative to when one or the other of the available depreciation procedures may be used are complex. Laws are constantly being changed and updated. This program can aid you in reducing the effort associated with alternative calculation procedures only. It is not a replacement for an accountant.

USES AND APPLICATIONS

Most of you will need this program before the next April 15th tax deadline. It can help you save money by aiding in the selection of the best depreciation method. We have used it in almost every business in which we are involved. Whenever capital investment is required, this program has a value.

THEORY AND APPLICATION

A capital investment is a business expense for an item that will yield economic benefits over a period of time (years). The I.R.S. requires you to capitalize expenses of the type defined above. Expenses for items which are rapidly used up may be charged as an expense at the time they occur.

Examples of current expenses are grease and oil for a taxi cab, fuel for a bus, a repair on a roof and floppy disks for your computer. Examples of capital expenses are the taxi cab, the bus, a new roof and a hard disk system for your computer. From the examples we gave we hope you can see some potential problems. Some questions may occur to you. For example you may ask when is work on a roof a repair and when is it a new roof?, or you may ask what is the difference between removable hard disks and small floppy disks?

We are not accountants nor I.R.S. agents. Only professionals trained in the field can give you good guidance to the proper answers to the above questions. Your accountant may disagree with the I.RS. in a particualar instance, this is why we have tax courts to settle issues of this type. Our program will be of no help in making decisions relative to when to capitalize and when to expense.

Once you have made the decision to capitalize a particular expense then our program is of value. There are a number of alternative legal methods of depreciation. Among these methods are the straight line approach, the declining balance procedure and the sum of the digits method. Calculations required to perform the straight line method are very simple and fast to complete.

The straight line method was the most popular method among those who had to do the calculations by hand or with a simple calculator. The trade-off was the cost of performing calculations for the declining balance procedure or the sum of the digits method versus the advantages of using these methods.

The advantage of the declining balance procedure and the sum of the digits method over the straight line approach is the business person gets the advantage of the depreciation expense earlier. Taxes are saved in the present at the expense of greater taxes in the future. The business person may either spend the saved tax money or he may reinvest the money to make more. Time value of money theory which is beyond the scope of this month's column may be used to quantify the advantage of the shift of taxes from the present to the future.

The shift of taxes to the future by the declining balance procedure and the sum of the digits method is made possible by allowing what is called accelerated depreciation expense early in the life of an asset. We have made a series of sample runs to illustrate this point.

All our sample runs assume an asset costing $3,000 is to be depreciated over 7 years to zero salvage value. A TRS-80 computer system with two floppy disks and a printer will cost about $3,000. We were told the I.R.S. would like to depreciate a computer over a seven year period and thus we have set up the example this way. We feel any computer will be obsolete in five years or

less but it is hard to fight city hall or Washington D.C.

Another reason for setting up the the depreciation over a seven year period is the full investment credit of 10% may be taken for our computer if the life is seven years or more. (We know the law is now being changed). Take care in reading this material: Tax laws change. What was true when we wrote this article may no longer be true when you read this article. Also note we are not accountants and our intrpretation of the laws may not agree with your accountant or the I.R.S.

Once you have decided on the depreciation life, identified the first cost and estimated salvage value etc. you are ready to use the program. We will detail the steps in the computer run later, but for now lets examine the results.

In run number one for the straight line method the annual depreciation expense was $428.57. This number did not change from year to year. The cumulative depreciation was the sum of the constant annual depreciation expense. The book value started out at $3,000 and decreased $428.57 per year. The ending book value is shown for each year.

In run number two we used declining balance depreciation. The first year's depreciation was $857.14 This number is exactly twice the value of the yearly straight line depreciation. You should note by answering the question on rate a (2) we therefore specified double declining balance. Again it will be necessary for you to check with your accountant to determine when it is legal to use a rate of 2 or 1.5 or 1.25 (the available options at this time). The higher the rate the longer you are able to put off tax payments.

The third run is for the sum of the digits method. The depreciation expense starts off at $750.00 and then decreases as in the case of the declining balance procedure. Examine the depreciation expense pattern for this alternative versus the delining balance procedure. It is a difficult choice to select from among these two alternatives.

PROGRAM OUTPUT

The objective of this program was to provide a print out of the depreciation expenses for a specified asset. It is expected the results will be used to both aid in the decision on which depreciation procedure to use and to eliminate the need for manual calculations when preparing tax reports. For those who allocate depreciation to the nearest month an allocation procedure was provided to aid in such allocation. One of our accountants used a six month rule. This procedure may be handled by our program.

PROGRAM INPUT

Required input includes identification of the asset, date of run, original cost of the asset including installation costs, salvage value, expected life of the asset, and the technique of depreciation to be used.

RUNNING THE PROGRAM

The first item of input is the year in which the asset was purchased. The program will count years for you if you input the starting year. If you simply wish a simple counter input a (1). We have answered this question as if you purchased the asset in 1980 for the examples included in this column.

YEAR OF EXPENSE?-

The next item of input is the first cost of the asset. We remind you the I.R.S. has specific rules on what must be included in the first cost of an item. In some cases setup and installation costs must be included. In other cases some of these expenses may be expensed. Again an accountant can advise you on what is legal and acceptable. We have assumed you purchased a TRS-80 business computer system with floppy disks and a printer for exactly $3,000.

CAPITAL EXPENSE?-

One of the most difficult items to estimate is the salvage value of your asset. What will you be able to sell your computer for after its legal life has been completed? With the way things have been changing in the micro-computer field this is an impossible question. You must answer it. For our example we have assumed your computer will have no value at the end of its life, i.e., a zero salvage.

In business if your estimate of salvage value is too low the difference between the actual salvage and the book value (the undepreciated value of the computer at that time) must be counted as income.

SALVAGE VALUE?-

The next bit of information needed is the life estimate of the asset. We used years for the computer example. As already noted above we believe the real life of a computer to be less than 7 years. The 7 years was selected upon the advice of our accountant and the fact we wanted a full investment credit of 10% for the investment.

LIFE?-

In our program you have the choice of using any one of the three depreciation methods noted above. We have selected every one of these in turn so as to illustrate the relative advantages of each of these methods. In the case of the declining balance method, at some point of time the program must switch to straight line depreciation. We have programed in an automatic switching arrangement where the computer checks to see if the depreciation as calculated by the declining balance method is greater than a straight line approach. When the value as obtained by the straight line approach becomes greater than the declining balance method the program automatically switches to straight line.

STRAIGHT LINE (1), DECLINING BALANCE (2)
OR SUM OF DIGITS (3) ?-

The next item asks for the month of purchase. We are unsure of the normal I.R.S. convention relative to the allocation of depreciation for the year of purchase. Some accountants seem to take a full year's depreciation the first year no matter when during the year the asset was purchased. Some use a six months convention, i.e., take a half years depreciation the first year. Our program can do either of the above and in addition it can allocate to the nearest month which we believe is also an acceptable alternative. Check the system your accountant prefers. For our example we have used the six months convention since we have no idea when during the year our example computer was purchased.

MONTH OF PURCHASE ?-

As usual in our programs we have given the user choice of alternative output medians. In this case you may select either your printer, the CRT or both. When using the CRT controls are built into the program to allow you to page through the output if the number of years are greater than can possible fit on the CRT at one time. In order to obtain the print out of the results we selected Hard Copy (1) in our sample runs.

HARD COPY (1), CRT(2), BOTH (3) ?-

When you select hard copy you will be asked for asset identificaton and the date of the run. The purpose of these questions is to provide identification of the print outs you will obtain. It is useless to have answers when you have forgotten the questions.

ASSET IDENTIFICATION ?-
DATE ?-

You will now obtain a print out of the depreciation schedule on both your printer and the CRT (when asking for hard copy only the CRT will not page but simply run until completed). When the regular depreciation run is complete you will be asked if you wish to have a monthly allocation run. We will assume you answered (Y).

DO YOU WISH MONTH ALLOCATION (Y/N) ?-

You will now obtain the monthly allocation run. In our example we used the six month's convention and thus obtained a six months allocation run.

```
10 REM DEPX
20 CLEAR 500
30 DIM DE(100),AL(100),W$(12)
40 W$(1)="YEAR OF EXPENSE": W$(6)="MONTH OF PURCHASE":
W$(7)="RATE"
50 W$(2)="CAPITAL EXPENSE"
60 W$(3)="SALVAGE VALUE"
70 W$(4)="LIFE"
80 W$(5)="STRAIGHT LINE (1), DECLINING BALANCE (2) OR SUM OF
DIGITS (3)"
90 W$(6)="MONTH OF PURCHASE"
100 W$(7)="RATE"
```

```
11Ø W$(8)="DEPRECIATION":W$(9)="CUMULATIVE":W$(1Ø)="BOOK
VALUE"
12Ø CLS
13Ø FOR I=1 TO 6
14Ø PRINT W$(I);
15Ø INPUT D(I): NEXT
16Ø IF D(5)=2 THEN PRINT W$(7): INPUT D(7)
17Ø S1=D(1)
18Ø S2=D(2)
19Ø INPUT "HARD COPY (1), CRT (2), BOTH (3)";D(8)
2ØØ IF D(8)<1Ø AND D(8)>3 THEN 13Ø
21Ø IF D(8)=1 OR D(8)=3 THEN W$(11)="ASSET IDENTIFICATION":
LPRINT" ": W$(12)="DATE :": PRINT W$(11): INPUT T$: PRINT
W$(12)," (XX/XX/XX)": INPUT DD$: LPRINT W$(11),T$: LPRINT "
": LPRINT W$(12),DD$
22Ø IF D(8)=1 OR D(8)=3 THEN FOR J=1 TO 7: LPRINT W$(J),D(J):
NEXT J
23Ø WW$="%  %      %          %   %        %    %         %"
24Ø SU=Ø
25Ø I=1
26Ø WX$="  #### #########.## #########.## #########.##"
27Ø PRINT USING WW$;W$(1),W$(8),W$(9),W$(1Ø)
28Ø IF D(8)=1 OR D(8)=3 THEN LPRINT USING
WW$;W$(1),W$(8),W$(9),W$(1Ø)
29Ø IF D(5)=1 THEN 54Ø
3ØØ IF D(5)=3 THEN 44Ø
31Ø DR=1/D(4)
32Ø DR=DR*D(7)
33Ø FOR I=1 TO D(4)
34Ø DX=DR*D(2)
35Ø SX=(D(2)-D(3))/(D(4)-I+1):IF D(3)>(D(2)-DX) THEN
DX=D(2)-D(3): SU=SU+DX: D(2)=D(2)-DX: DE(I)=DX: K%=I: GOSUB
68Ø: D(1)=D(1)+1: NEXT I: GOTO 57Ø
36Ø IF SX>DX THEN 54Ø
37Ø SU=SU+DX
38Ø D(2)=D(2)-DX
39Ø DE(I)=DX
4ØØ K%=I: GOSUB 68Ø
41Ø D(1)=D(1)+1
42Ø NEXT I
43Ø GOTO 54Ø
44Ø SD=(D(4)*(D(4)+1))/2
45Ø BV=D(2)
46Ø FOR I=1 TO D(4)
47Ø DX=((D(4)-(I-1))/SD)*(BV-D(3))
48Ø SU=SU+DX
49Ø D(2)=D(2)-DX
5ØØ K%=I
51Ø DE(I)=DX
52Ø GOSUB 68Ø
53Ø D(1)=D(1)+1: NEXT I: GOTO 57Ø
54Ø DX=(D(2)-D(3))/(D(4)-I+1)
55Ø FOR J=I TO D(4): SU=SU+DX: D(2)=D(2)-DX: DE(J)=DX: K%=J:
GOSUB 68Ø
56Ø D(1)=D(1)+1: NEXT J
57Ø INPUT "DO YOU WISH MONTHLY ALLOCATION (Y OR N)";Y$: IF
Y$="N" THEN END
58Ø IF Y$<>"Y" THEN 57Ø
59Ø IF D(8)=1 OR D(8)=3 THEN LPRINT" ": LPRINT "MONTHLY
ALLOCATION ": LPRINT " ": LPRINT USING
WW$;W$(1),W$(8),W$(9),W$(1Ø)
6ØØ P=(12-D(6))/12: P2=1-P: AL(1)=P*DE(1)
61Ø FOR I=1 TO D(4): AL(I+1)=DE(I)*P2+DE(I+1)*P: NEXT I :
D(1)=S1: D(2)=S2: SU=Ø
62Ø FOR I=1 TO D(4)+1: DX=AL(I): SU=SU+AL(I): D(2)=D(2)-AL(I)
63Ø K%=I
64Ø GOSUB 68Ø
65Ø D(1)=D(1)+1
66Ø NEXTI
67Ø END
68Ø PRINT USING WX$;D(1),DX,SU,D(2):X%=K%/15
69Ø X%=X%*15
7ØØ IF K%=X% THEN INPUT "HIT RETURN TO PAGE";G$
71Ø IF D(8)=1 OR D(8)=3 THEN LPRINT USING WX$;D(1),DX,SU,D(2)
72Ø RETURN
```

SUMMARY

This program will provide you with a means to simplify your calculations for budgeting, costing, and planning cash flow for your business. By taking advantage of all the benefits of projecting tax costs or expenses, you will be able to use the money to your advantage, not the I.R.S.

The use of these three different approaches to the expense of depreciation will also allow you to provide accurate and updated information to your accountant which should reduce some of the costs in that area also.

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12	MOVE CARRIAGE TO TOP OF FORM (PAGE)
13	LINE FEED WITH CARRIAGE RETURN
14	TURNS ON CURSOR
15	TURNS OFF CURSOR
16-22	NONE
23	CONVERTS TO 32 CHARACTERS/LINE MODE
24	BACKSPACE CURSOR
25	ADVANCE CURSOR
26	DOWNWARD LINEFEED
27	UPWARD LINEFEED
28	CURSOR HOME
29	MOVE CURSOR TO BEGINNING OF LINE
3Ø	ERASES TO END OF LINE
31	CLEARS TO END OF FRAME

continued on next page

FIGURE 2

CODE	KEYWORD	CODE	KEYWORD	161	ON	222	RND
129	FOR	19Ø	FN	162	OPEN	223	LOG
13Ø	RESET	191	USING	163	FIELD	224	EXP
131	SET	192	VARPTR	164	GET	225	COS
132	CLS	193	USR	165	PUT	226	SIN
131	CMD	194	ERL	166	CLOSE	227	TAN
134	RANDOM	195	ERR	167	LOAD	228	ATN
135	NEXT	196	STRING$	168	MERGE	229	PEEK
136	DATA	197	INSTR	169	NAME	23Ø	CVI
137	INPUT	198	POINT	17Ø	KILL	231	CVS
138	DIM	199	TIME$	171	LSET	232	CVD
139	READ	2ØØ	MEM	172	RSET	233	EOF
14Ø	LET	2Ø1	INKEY$	173	SAVE	234	LOC
141	GOTO	2Ø2	THEN	174	SYSTEM	235	LOF
142	RUN	2Ø3	NOT	175	LPRINT	236	MKI$
143	IF	2Ø4	STEP	176	DEF	237	MKS$
144	RESTORE	2Ø5	+	177	POKE	238	MKD$
145	GOSUB	2Ø6	-	178	PRINT	239	CINT
146	RETURN	2Ø7	*	179	CONT	24Ø	CSNG
147	REM	2Ø8	/	18Ø	LIST	241	CDBL
148	STOP	2Ø9	UP ARROW	181	LLIST	242	FIX
149	ELSE	21Ø	AND	182	DELETE	243	LEN
15Ø	TRON	211	OR	183	AUTO	244	STR$
151	TROFF	212	>	184	CLEAR	245	VAL
152	DEFSTR	213	=	185	CLOAD	246	ASC
153	DEFINT	214	<	186	CSAVE	247	CHR$
154	DEFSNG	215	SGN	187	NEW	248	LEFT$
155	DEFDBL	216	INT	188	TAB	249	RIGHT$
156	LINE	217	ABS	189	TO	25Ø	MID$
157	EDIT	218	FRE				
158	ERROR	219	INP				
159	RESUME	22Ø	POS				
16Ø	OUT	221	SQR				

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■

CURVES, CHEMQUIZ, and CANADA MILEAGE

Gordon Speer

CURVES — SINE and COSINE

Plotting curves on the video display is easy, since the Level-II BASIC has a SET(X,Y) command that turns on a little rectangle at any set of co-ordinates from (0,0) to (127,47). That amounts to 6144 different places on the screen. These coordinates start in the upper left hand corner and go to the right and down (not from the center and in both directions, as you may have learned in math class).

I hadn't given much thought to the problem of printing graphs. The old ASR-33 Teletype that I learned on could plot point after point on the same line, if necessary; but my Centronics line printer and IBM Selectric have automatic line feeds, so the entire line must be ready for the printer when transmitted from the computer. How, then, do you plot several intertwining curves, such as these sine and cosine curves, or the famous biorhythm charts? As always, there seems to be a way if you think about it a while. I decided to start with a string variable containing a line of spaces. To insert a print character to the graph, use the LEFT$ and RIGHT$ functions to save the rest of the line EXCEPT the point to be plotted, where the character is inserted. There is no limit to the number of characters that can be inserted this way. Of course, if two characters happen to be plotted in the same spot, the last one to be inserted is the one that will be printed.

```
10Ø    'CURVES: SINE AND COSINE
11Ø INPUT "VIDEO DISPLAY=1, PRINTER=2";Q
12Ø ON Q GOTO 13Ø  ,22Ø
13Ø CLS
14Ø FOR A=Ø TO 72Ø STEP 6       'TWO CYCLES, 12Ø STEPS
15Ø LET AR=A*3.14159/18Ø        'ANGLE IN RADIANS
16Ø SET(A/6,23.5-SIN(AR)*1Ø)    '23.5 IS HALFWAY DOWN THE
SCREEN
17Ø SET(A/6,23.5-COS(AR)*1Ø)
18Ø NEXT A
19Ø GOTO 19Ø                    'LOCK THE DISPLAY
2ØØ '
21Ø '
22Ø CLEAR 3ØØ
23Ø REM  PRINTER VERSION FOLLOWS:
24Ø FOR A=Ø TO 72Ø STEP 6       'TWO CYCLES, 12Ø STEPS
25Ø LET AR=A*3.14159/18Ø        'ANGLE IN RADIANS
26Ø LET SP=4Ø+SIN(AR)*3Ø        'SINE PRINT POSITION
27Ø LET CP=4Ø+COS(AR)*3Ø        'COSINE PRINT POSITION
28Ø LET P$=STRING$(8Ø,32)       'STRING OF 8Ø SPACES
29Ø LET P$=LEFT$(P$,SP-1)+"S"+RIGHT$(P$,8Ø-SP)
3ØØ LET P$=LEFT$(P$,CP-1)+"C"+RIGHT$(P$,8Ø-CP)
31Ø LPRINT P$
32Ø NEXT A
```

CHEMQUIZ

At this time of year there are millions of high school and college students studying chemistry, and learning how all those anions and cations get together to form inorganic compounds. The rules are pretty simple. Positive cations are metals which have lost electrons, negative anions are non-metals which have gained electrons, and compounds are formed when enough of each have combined to give a total charge of zero. Subscripts are used to indicate how many of each ion are present, and the subscript is omitted if there is only one ion.

This program generates compounds at random, displays either the name or formula on the video display, and won't give you another name or formula until you correctly identify the one displayed. You can easily add more ions to the DATA statements, and you might even teach the program to count how many compounds you have named or typed the formulas of. I thought it might be difficult to print the subscripts one line below the formulas. As it turned out, there wasn't much to it. Line 1090 determines if the character is a numeral, and line 1110 prints it down one line.

```
1ØØ    'CHEMQUIZ       requires lower-case letters
11Ø CLEAR 2ØØØ
12Ø DIM CN$(4Ø),CS$(4Ø),CV(4Ø),AN$(4Ø),AS$(4Ø),AV(4Ø)
13Ø 'cation and anion names, symbols, and valences
14Ø DATA sodium,Na,1,ammonium,NH4,1,copper(II),Cu,2
15Ø DATA magnesium,Mg,2,iron(III),Fe,3,aluminum,Al,3
16Ø DATA chloride,Cl,-1,sulfate,SO4,-2,oxide,O,-2
17Ø DATA phosphate,PO4,-3,nitrate,NO3,-1,silver,Ag,1
18Ø DATA potassium,K,1,chlorate,ClO3,-1,sulfide,S,-2
19Ø DATA Ø,Ø,Ø
2ØØ CLS
21Ø PRINT,"   C H E M   Q U I Z
22Ø READ N$,S$,V                'name, symbol, valence
23Ø PRINT @ 8*RND(11Ø)+64,S$;
24Ø PRINT @ 8*RND(11Ø)+64,N$;
25Ø ON SGN(V)+2 GOTO 3ØØ  ,34Ø  ,26Ø
26Ø 'cations
27Ø LET C=C+1                   'counts the cations as stored
28Ø LET CN$(C)=N$:CS$(C)=S$:CV(C)=V
29Ø GOTO 22Ø
3ØØ 'anions
31Ø LET A=A+1                   'counts the anions
32Ø LET AN$(A)=N$:AS$(A)=S$:AV(A)=V
33Ø GOTO 22Ø
34Ø 'program mode
35Ø FOR ZZ=1 TO 5ØØØ:NEXT
36Ø CLS:PRINT CHR$(23)
37Ø INPUT"Formulas or Names (f/n)";Q$
```

```
38Ø IF Q$="f" THEN 53Ø
39Ø IF Q$ <> "n" THEN 37Ø
4ØØ 'generate random names - ask for formulas
41Ø GOSUB 7ØØ
42Ø PRINT @ 33Ø,CN$(X);" ";AN$(Y)
43Ø LET P=66Ø
44Ø GOSUB 77Ø                    'generate the correct formula
45Ø 'key-in the name and check it one character at a time
46Ø FOR J=1 TO LEN(F$)
47Ø LET P$=INKEY$:IF P$="" THEN 47Ø
48Ø IF P$ <> MID$(F$,J,1) THEN 47Ø
49Ø GOSUB 1Ø7Ø
5ØØ NEXT J
51Ø FOR ZZ=1 TO 1ØØØ:NEXT       'DELAY
52Ø GOTO 41Ø
53Ø 'generate random formulas - ask for names
54Ø GOSUB 7ØØ
55Ø GOSUB 77Ø                    'generate the formula to print
56Ø LET P=34Ø
57Ø FOR J=1 TO LEN(F$)
58Ø LET P$=MID$(F$,J,1)
59Ø GOSUB 1Ø7Ø
6ØØ NEXT J
61Ø PRINT @ 65Ø,;
62Ø LET N$=CN$(X)+" "+AN$(Y)
63Ø FOR J=1 TO LEN(N$)
64Ø LET P$=INKEY$:IF P$="" THEN 64Ø
65Ø IF P$ <> MID$(N$,J,1) THEN 64Ø
66Ø PRINT P$;
67Ø NEXT J
68Ø FOR ZZ=1 TO 1ØØØ:NEXT
69Ø GOTO 54Ø
7ØØ 'subroutine to choose ions at random
71Ø CLS:PRINT CHR$(23)
72Ø LET X=RND(C):Y=RND(A)
73Ø IF X=XX THEN 72Ø
74Ø IF Y=YY THEN 72Ø             'prevents repeats
75Ø LET XX=X:YY=Y                'save for comparison
76Ø RETURN
77Ø 'subroutine to generate formulas
78Ø LET L$=CS$(X):R$=AS$(Y)     'left and right halves
79Ø LET L=ABS(AV(Y)):R=CV(X)    'subscripts (exchanged valence)
8ØØ IF L=R THEN L=1:R=1
81Ø IF L/2=INT(L/2) AND R/2=INT(R/2) THEN L=L/2:R=R/2
82Ø 'count capital letters in ion formulas
83Ø IF L=1 THEN 9ØØ
84Ø K=Ø                          'capital counter
85Ø FOR J=1 TO LEN(L$)
86Ø IF ABS(ASC(MID$(L$,J,1))-77.5) > 13 THEN 88Ø
87Ø LET K=K+1
88Ø NEXT J
89Ø IF K > 1 THEN L$ = "("+L$+")"
9ØØ IF R=1 THEN 97Ø
91Ø K=Ø
92Ø FOR J=1 TO LEN(R$)
93Ø IF ABS(ASC(MID$(R$,J,1))-77.5) > 13 THEN 95Ø
94Ø LET K=K+1
```

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SCREEN WRITER

Video Masthead Generation Program

Joseph Rosenman

The SCREEN WRITER program will access a screen image and create a Load Module to re-display that image from the DOS. More specifically, the program allows the user to create a screen image using BASIC PRINT statements, then creates a /CMD file that will re-create the video display. This permits the creation of a "masthead" to be displayed upon system initialization, or to be strategically displayed during the execution of a "Chain" file. This article will be divided into two parts: a "Users Guide", and a "Technical Explanation" section. The program is designed to run under standard Disk Basic. The /CMD file generated will run under any TRSDOS compatible DOS.

USERS GUIDE

The first step in running this program is the setting up of the PRINT statements at the end of the program. This is all ways done at BASIC COMMAND level, not under program control. There is a sample print sequence all ready provided. You might want to use or modify this example, or replace it with an entirely new series of prints. There can be as many as 14 lines accomadated. Make sure that your PRINTs are followed by a RETURN statement. The reason I didn't design the program to accept lines under program control is that it is not possible to enter graphic (or other special) characters directly. While the method employed (that of editing print statements into the source code) is awkward, I feel it is the easiest and most direct way to get the best results. Furthermore, almost every TRS-80 user is familiar with BASIC to some degree. Therefore, no potential user of SCREEN WRITER need learn a special protocol or symbolic representation.

The PRINT line itself can cause a display of upto 64 characters (the CRT limit). Any ASCII character that can be displayed is legal. By using the STRING$ and CHR$ functions, it is possible to create a graphic block "box" around text. That is exactly what my example does. By selecting different graphic block codes, different boxes can be created. A very common problem is the miscounting of column locations when formating the line. Several aborted runs will usually be required in order to satisfactorally create a masthead. In other words, the borders of the image won't line up correctly unless the character counts for each line correspond with each other. What this means is that you can format the first fourteen lines of the CRT screen any way you like, then redisplay that screen image via a single DOS command.

The program will require a name for the /CMD file created. The entire filespec should be used. For example, TITLE/CMD:1 is a name I often use. The extension should be /CMD so the DOS knows that the file is a Load Module. The program can save to any available drive. The Load address is a little more complex. The program needs a place in memory to execute. The default address is 7000H. In fact, the program can be located anywhere in memory from 5200H to F000H. You can specify the load address either in decimal or in hexadecimal. If you are using hexadecimal, make sure you follow the number by an "H" (as in the notation used above). DO NOT precede the number by a leading 0 (i.e., use BC00H, not 0BC00H).

The program will terminate upon completion of the disk write. If you want to write a new masthead, or create the same masthead at a different location, re-run the program. Be advised that there is a long initialization required before the program is ready to interact, so be patient. One final note: if you include PRINTs for 10 lines, and tell the program that there are only 8 lines, the last 2 lines will be IGNORED. If you include 8 PRINTs and tell the program that there are 10 lines, there will be two blank lines included. If you select a masthead that is 14 lines in size, the top line will scroll off the CRT when you return to DOS READY (this won't happen when the masthead is 13 line or less in size). The only way to save the "Source" for the masthead is to save the entire SCREEN WRITER program with the new PRINTs. One final alternative exists. The source code could be saved in ASCII format (using the "A" option during a BASIC SAVE). Then, different "end" sections could be MERGEd onto the "Processing body" of the program. If you must save disk space, this approach will save space when different masthead patterns are required, but will necessitate manual file MERGEs prior to every run.

TECHNICAL REFERENCE

This program needs to perform several fairly sophisticated operations in order to work. The lack of accurate information as to the construction of the Load Modules nearly made this program an impossibility. Fortunately, after "tearing apart" other correct Load Modules I finally figured this mess out (I'll bet that I got some error messages that most of you never knew existed!). Along with the machine instructions, there are special "Loader Codes" that must be generated in order to make the module "readable". The DATA statements at line 1310 provide the raw machine language code needed to move the "saved" screen image to the video display, and to reset the cursor. The code is read into the "S" array.

Included in this code are some of the "Loader codes" mentioned. Specifically, the first four numbers form the loader code: 01 1B 00 70 which means "Load (01) the next 27 bytes (1B) into address 7000H (00 70)." These 27 bytes are the machine code instructions used to display the masthead, reproduced below.

```
            ØØ1ØØ ; ASSEMBLY LANGUAGE LISTING OF MACHINE
CODE GENERATED
            ØØ11Ø ; BY THE "SCWRITER" PROGRAM.
            ØØ12Ø ; THIS CODE ASSUMES THE DEFAULT LOAD
ADDRESS 7ØØØH
            ØØ13Ø ; AND A PROGRAM SIZE OF 8 LINES.
            ØØ14Ø ;
7ØØØ        ØØ15Ø        ORG     7ØØØH
7ØØØ CDC9Ø1 ØØ16Ø SCWRIT CALL    Ø1C9H          ; CLEAR
SCREEN
7ØØ3 211D7Ø ØØ17Ø        LD      HL,71DH        ;
BEGINNING OF SCREEN BUF
7ØØ6 11ØØ3C ØØ18Ø        LD      DE,3CØØH       ; START
OF VIDEO
7ØØ9 Ø1ØØØ2 ØØ19Ø        LD      BC,Ø2ØØH       ; BYTE
COUNT FOR 8 LINES
7ØØC EDBØ   ØØ2ØØ        LDIR                   ;
RESTORE VIDEO IMAGE
7ØØE 212141Ø ØØ21Ø       LD      HL,4Ø21H       ;
CURSOR MSB LOCATION
7Ø11 363E   ØØ22Ø        LD      (HL),3EH       ; SAVE
MSB OF CURSOR LOC
7Ø13 2B     ØØ23Ø        DEC     HL             ; POINT
TO CURSOR LSB
7Ø14 36ØØ   ØØ24Ø        LD      (HL),ØØH       ; SAVE
LSB OF CURSOR LOC
7Ø16 C32D4Ø ØØ25Ø        JP      4Ø2DH          ;
NORMAL RETURN TO DOS
ØØ8Ø        ØØ26Ø VIDBUF DEFS    128            ; SPACE
FOR LINES 1 & 2
ØØ8Ø        ØØ27Ø        DEFS    128            ;
LINES 3 & 4
ØØ8Ø        ØØ28Ø        DEFS    128            ;
LINES 5 & 6
ØØ8Ø        ØØ29Ø        DEFS    128            ;
LINES 7 & 8
7ØØØ        ØØ3ØØ        END     SCWRIT
ØØØØØ TOTAL ERRORS

SCWRIT 7ØØØ ØØ16Ø   ØØ3ØØ
VIDBUF 7Ø19 ØØ26Ø
```

Note that the above assembly includes the machine code.

The organization of information in the S array is as follows:

S(Ø-3)	Ø1 1B ØØ 7Ø	- Load Module, 1B bytes, Load at 7ØØØH		1,27,Ø,112
S(4-6)	CD C9 Ø1	- CALL	Ø1C9H	2Ø5,2Ø1,1
S(7-9)	21 1D Ø1	- LD	HL,7Ø1DH	33,29,1
S(1Ø-12)	11 ØØ 3C	- LD	DE,3CØØH	17,Ø,6Ø
S(13-15)	Ø1 ØØ Ø2	- LH	BC,Ø2ØØH	1,Ø,2
S(16-17)	ED BØ	- LDIR		237,176
S(18-2Ø)	21 21 4Ø	- LD	HL,4Ø21H	33,33,64
S(21-22)	36 3E	- LD	(HL),3EH	54,62
S(23)	2B	- DEC	HL	43
S(24-25)	36 ØØ	- LD	(HL),ØØH	54,Ø
S(26-28)	C3 2D 4Ø	- JP	4Ø2DH	195,45,64

The values given above will not all ways be those required. Specifically, the value loaded into BC in line 190 of the assembly will change depending on the number of lines, as well as the source address loaded into HL in line 170. The cursor location must also change depending on the size of the display (in lines 220 and 240). In addition, all the Loader addresses must reflect the actual origin of the program load module. The video image is stored as 64 byte blocks (that is, one line per block). This is not the most efficient way of creating the Load Module, but it insures the maximum flexibility. The DATA PROCESS routines (at line 770) update the information in the "S" array to reflect different masthead sizes and different load addresses. If the load address is given in hexadecimal, the program will branch to a HEX to DEC conversion subroutine (line 1180). First the machine language block is written to the disk file, then the screen lines are written. Each block requires its own Loader codes. Finally, the END OF FILE loader codes are written, and the program terminates. Each Block begins with a 01, followed by a byte count then a 2 byte load address. The EOF block is a 2 byte code 0202 followed by the "transfer address" (the address to begin execution). In the case of SCREEN WRITER generated modules, this address is the same as the initial load address.

The S array is modified as follows:

```
S(2-3)   : The initial load address of the module.
S(8-9)   : The address of the screen buffer.
S(14-15) : The size of the screen module in bytes.
S(22,25) : MSB and LSB of the cursor reset address.
```

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■

SALARY RATE CHARTS

Frank P. Vlamings

This program charts an annual salary or income into monthly, bi-monthly, weekly, daily, and hourly proportions. There is a complete video display for the results and/or hard copy for each option chosen.

I have used a Centronics Model 702 printer in writing this program. For printers that are not equipped to print in bold letter headings, line 510 in the program should be revised to delete the "CHR$(14)".

The maximum annual income that may be used in this program is $999,999.99 for the video display and $9,999,999.99 for the hard copy.

```
1Ø CLEAR 2ØØ:L$=STRING$(73,61): F$=STRING$(55,61)
2Ø CLS
3Ø PRINT"THIS PROGRAM BREAKS DOWN AN ANNUAL SALARY INTO:"
4Ø PRINT" A. MONTHLY RATE (+BI-MONTHLY ON PRINT-OUT ONLY!)"
5Ø PRINT" B. WEEKLY RATE"
6Ø PRINT" C. DAILY RATE"
7Ø PRINT" D. HOURLY RATE"
8Ø PRINT:PRINT
9Ø PRINT"ALL COMPUTATIONS ARE BASED FROM ANNUAL INCOME......."
1ØØ PRINT:PRINT
11Ø PRINT"ENABLE PRINTER FOR PRINT-OUT............."
12Ø PRINT
13Ø PRINT: INPUT"ENTER: (1) FOR VIDEO DISPLAY
(2) FOR PRINT-OUT";A
14Ø IF A<1 OR A>2 THEN 2Ø
15Ø IF A=2 THEN 33Ø
16Ø C=Ø:CLS: INPUT"STARTING ANNUAL SALARY RATE";V:PRINT
17Ø INPUT "HIGHEST ANNUAL SALARY RATE";W:PRINT
18Ø INPUT "SALARY STEP RATE";Z
19Ø IF W<V OR V>W OR Z>W THEN 16Ø
2ØØ GOSUB 63Ø
21Ø FOR Y=V TO W STEP Z
22Ø IF C<1Ø GOTO 24Ø
23Ø INPUT"PRESS <ENTER> TO CONTINUE...";X$:C=Ø: GOSUB 63Ø
24Ø M=Y/12:W=Y/52:D=Y/26Ø:H=Y/2Ø8Ø
25Ø PRINTTAB(Ø)USING"######.##";Y;
26Ø PRINTTAB(12)USING"######.##";M;
27Ø PRINTTAB(24)USING"#####.##";W;
28Ø PRINTTAB(36)USING"####.##";D;
29Ø PRINTTAB(48)USING"###.##";H
3ØØ C=C+1: NEXT Y
31Ø PRINT:INPUT"DO YOU WISH TO START AGAIN (Y/N)";R$
32Ø IF R$="Y" THEN 1Ø ELSE END
33Ø CLS
34Ø INPUT"STARTING ANNUAL SALARY RATE";V
```

continued on page 60

VOL. 4 - DISASSEMBLED HANDBOOK FOR TRS-80

Robert M. Richardson

CHAPTER 8

ASCII RADIO TELETYPE TRANSMIT PROGRAM

INTRODUCTION

ASCII code is the native language of our marvelous Model I and Model III TRS-80. No code conversions to Baudot or Morse are necessary to translate the language.— hurray. All the program need do is to create its own parallel to serial, and vice versa UART (universal-asynchronous-imagiver-transmitter), and we are OFF AND RUNNING.

In this Chapter, and Chapters 9 and 10, we will write a program that does all these good things for us, plus transmit the prepared messages AND input message we did in previous Chapters, BUT without the code conversion that was previously required. Since we will be transmiting and receiving on the amateur radio bands, we will ignore the 8th bit of the ASCII code and use the American Radio Relay League's bulletin station in Newington, Connecticut, W1AW, as our standard. Also, we will be using 170 cycle per second FREQUENCY SHIFT KEYING, as we did in the last 3 Chapters on Baudot teletype, since that is what W1AW now uses and it is most convenient to have a daily source of test signals (and something of interest to copy). THE PROGRAMS MAY BE EASILY MODIFIED FOR 300 BAUD.

This Chapter, and Chapters 9 & 10 are written for a Baud rate of 110 TO ENSURE COMPATABILITY WITH HIGH QUALITY TU's.

WHY NOT 110 BAUD "AND" 300 BAUD, COACH ? ? ?

Another good question, Gridley. You will surely recall that Baud rate and bandwidth required for transmitting a given Baud rate, are relatively proportional. As the Baud rate increases, information bits transmitted per second goes up, the bandwidth required to carry this information also increases, AND the bandwidth of the limiter/amplifiers and discriminator circuit in the receiving system must all increase proportionally.

After testing a goodly number of radio teletype terminal units, TU's, including many homebrew units, we found the Flesher TU-170 factory assembled and tested unit, the most cost-effective TU on the market, bar none. Its receiving discriminator circuit is (bandwidth) optimized for 60 to 100 WPM Baudot equivalent speed (therefore REJECTING other out of band signals), and since 300 Baud ASCII RTTY requires well over 300% more bandwidth, it MUST BE modified to accomodate 300 Baud ASCII.

SOUNDS LIKE A BIG DEAL TO ME TO WORK BOTH 110 & 300 BAUD:

Not really, Gridley. It only involves switching 3 resistors and 2 capacitors in or out the the circuit to allow 300 Baud ASCII reception along with the normal 60, 66, 75, & 100 WPM Baudot and 110 Baud ASCII RTTY. See APPENDIX 7 for details.

EXPANDED PROGRAM COMMENTARY

Let's run through the program briefly.

WHY ? ? ? I UNDERSTOOD THE BAUDOT PROGRAMS PERFECTLY ? ? ?

Yes Gridley, old friend, we know you did. Now, we are going to use the 8 bit ASCII code instead of the 5 bit Baudot code, and ALL the timing parameters will be different. If you wish, by all means skip these Chapters and write your own ASCII transmit and receive programs. It is entirely up to you. You may be excused and write them in the library. What do you want to do Gridley? The decision is yours?

HMMMM? I THINK I HAD BETTER STAY RIGHT HERE ! ! !

Stout fellow, Gridley. You will make the Dean's LIST yet.

I AM ALREADY ON THE DEAN'S LIST ! ! !

Yes, I know, Gridley.....but, I mean the good one.

Lines 160-220: Initialize the program at 29000 decimal so we will have adequate room in MEM to add the next Chapter's ASCII RECEIVE program and still stay below 32767 decimal. As such, the combined object code programs will fit very nicely into a 16K MEM Model I or Model III TRS-80. REMEMBER: The programs in Chapters 8, 9, and 10 will probably NOT fit into a 16K MEM TRS-80 along with the EDTASM as the total bytes required for the EDTASM AND the source code WITH comments will exceed the 16K MEM limit. TRS-80s with either 32K or 48K MEM available will have no problem editing and assembling these programs.

Line 230: Ensures CLS compatability between the Model I and Model III by turning OFF the Model III's clock AND most importantly turning ON its external I/O bus. For those who wish to purchase an inexpensive Model III to Model I external I/O bus adaptor rather than build the unit outlined in

Appendix 6, Design Solution, Inc. at P. O. Box 1225, Fayetteville, Arkansas 72701 (phone: (501) 521-0281), now has an excellent identical unit. Both Basic's CLS and the assembly language CALL 01C9H (CLS), disable the Model III external I/O bus, hence it MUST be turned back ON for the Model III.

Lines 240-330: First zero out our characters per line counter, SIGN3, since the program as written is set up to send an automatic carriage return every 72 characters/spaces. This is entirely optional and is included for the person on the receiving end who may be copying your signal on a 72 characters/line ASCII terminal and/or speedy line printer. We have intentionally left out the automatic line feed as most line printers that are fast enough to follow 110 Baud ASCII incorporate an internal line feed with every carriage return. Add one if you wish.
File: Disassembled HANDBOOK, Chapter 8, part 2

Line 340: Sets our data bit length for 110 Baud ASCII. The number 610 when loaded into the BC register and decremented to zero via the CALL 060H to ROM, corresponds to a time delay of very close to 9.091 milliseconds which is the data bit length for 110 Baud ASCII. ALL 110 Baud ASCII uses this pulse length for the start bit @ 2295 Hz, which is followed by the 8 data bits with 2125 Hz = Mark and 2295 Hz = space. The stop bit, always a Mark tone, may be either ONE or TWO data bits in length, but on the amateur bands we have NEVER heard a signal that did not subscribe to the TWO data bits stop length convention, including W1AW. As such, this program will transmit a stop bit TWO data bits long after the 8 data bits have been transmitted (lines 750 and 760).

HOW ARE WE GONNA TRANSMIT 300 BAUD ASCII ? ? ?

Good question, Gridley. Glad you are hanging in there. For starters let's try scaling down 110 Baud to 300 Baud. Try this formula for size. Since we are using 610 for a data bit length of 9.091 milliseconds = 110 Baud, and 300 Baud has a data bit length of 3.333 milliseconds, then:

$$\frac{610}{9.091} = \frac{X}{3.333} \qquad \text{therefore X = approximately 224}$$

Program execution time must be allowed for, so a good ballpark number to start with for 300 Baud would be in the vicinity of 200 for SPEED2 in line 340. We have not been able to locate any 300 Baud ASCII stations using 190 cycle frequency-shift keying to test this constant on, so remember it is only approximate at best and surely needs fine tuning. Also, remember to delete line 760 as ALL 300 Baud transmissions only use ONE DATA BIT LENGTH stop pulse time delay instead of 110 Baud's two.

Lines 370-790: We will return to in a moment. Let's goto line 800 where the keyboard awaits your command.

Lines 800-880: First test your keyboard input for a space = 32, and if so, then jump around around the other tests to VIDEO2 in line 930. If we consider the average word's length = 5 letters, then every 6th character must be a space. This saves a miniscule amount of time, and may be omitted if desired. Lines 830-840 return you to Basic if SHIFT B is pressed, 860-870 sends the program off to the prepared message MENU if SHIFT UP-ARROW is pressed, 870-880 set up the prepared message routine WITHOUT a CLS or MENU display. You must then input A to W for whatever message you wish (more later).

Lines 890-900: Test the CLEAR key. It is your TRANSMIT/RECEIVE toggle switch and will send you off to RECEIVE MODE in Chapter 10's program.

Lines 910-920: Check to see if any lower case ASCII characters (greater than ASCII 96) have been sent from the keyboard, and if so, ignores them by jumping back to KYBD2 in line 790.

Lines 930-940: First display the character from the keyboard, in "A" register, on the video display and then jumps off to SEND in line 370 (we finally got back there).

Lines 370-430: Save the keyboard input character in the stack via PUSH AF and then loads the characters per line counter, SIGN3 from memory, into "A", and adds 1 to it in line 390. We are presuming that the individual at the receiving end of the circuit is using a relatively FAST line printer capable of handling the speed of 110 Baud with 2 stop bits = 100 words per minute. We also presume this line printer utilizes 72 characters per line (most do), and therefore test the number of characters since a carriage return in line 410. IF 72 characters have been sent, then AUTO1 in line 1000 is called.

Lines 1000-1100 display a left arrow on the Model I or a "bracket" on the Model III, so you will know a carriage return was transmitted. Lines 1020-1030 then zero out the character counter, send a start bit, then an ASCII 13 = 00001101 binary = carriage return, and finally 2 stop bits before creating a 3 character length time delay in lines 1150 & 1160 for the mechanical carriage to return. This time delay should be adequate for most ASCII modestly fast line printers. Adjust the value in TIME7, line 740, if you wish to increase or decrease

this time delay. If ALL the stations you are working utilize bi-directional line printers, then you might as well delete or reduce this time delay. Line 1170 RETurns the program to line 430 that POPs the former "A" register that was saved in the stack in line 370, into the "D" register.

Lines 440-550: Are the real "work horses" of this program. Line 440 zeroes out the bit counter, L register, and then sends the start bit, always a SPACE, in line 450. Lines 460-490 test the least significant bit of the "D" register and transmit a Mark if it is a 1, or a Space if it is a zero. The reason for testing the bit twice, rather than once, is to create EXACTLY equivalent time delays. This is relatively unimportant at 110 Baud data rates, but at data rates of 600 Baud and up, can become quite critical. Line 500 adds 1 to the bit counter, tests it to see if 8 bits have been sent in lines 510-520, and IF NOT moves all of the D register's bits one to the right in line 540 and then line 550 goes back to send the next bit at SEND2 in line 460. This is your own homebrew UART and it works remarkably well. It should handle data rates up to 1200 Baud quite handily with the appropriate timing constant.

Lines 750-790: Send the stop bit time delay via CALLing TIME6 twice, and then check SIGN2 to see if a prepared message is being transmitted.

IF a prepared message is NOT being transmitted, then the program falls through to line 800 which has it back to the keyboard awaiting your command. Let's follow the program from the point where you pressed SHIFT UP-ARROW and lines 860 and 870 send it off to MENU in line 1220.

Lines 1220-1640: First CLS the video display, skip a line (CARRET), and then display the MENU shown below:

PREPARED MESSAGE SUBROUTINE

CQ = A	QTH = B
CQ DX = C	CQ SS = D
QRZ = E	73 = F
RST 5X9 PLUS = G	RST 5X5 = H
QRX = I	QRM = J
QRN = K	QSY = L
QSY UP = M	QSY DOWN = N
SECTION = O	TRS-80 = P
PROGRAM HERE = Q	RIG HERE = R
RYRYRY = S	QUICK BROWN = T
HANDLE = U	INPUT MESSAGE = V & W

ENTER PREPARED MESSAGE DESIRED?

These prepared messages are virtually the same as those in Chapter 5's Baudot RRTY transmit program. Most all of them are just as applicable to ASCII RTTY as to Baudot RTTY, with the exception of "RYRYRY." A good ASCII substitute for the RYRYRY which tests the 5 bits of Baudot would be U*U*U* which tests the first 7 bits of ASCII as U = 01010101 and * = 00101010. As this Volume is primarily about radio communications, we will skip blithely over the graphics symbols and leave the most significant bit alone (ignore it) in the next Chapter which covers the ASCII radio teletype RECEIVE program. We will wisely leave the string packers, animated graphics characters, and the like to the expert Android Nims that wrote the Leo Christopherson Program series. As a case in point, let's follow the program through what happens when we press T to send the "QUICK BROWN" prepared message.

Lines 1640-2140: First CLS. Remember, "CLS" is a dirty word for the Model III since it deactivates the external I/O bus AND starts the clock interrupts running again. As such, we will save "A" register in the stack, for safety's sake, while all this is going on. Line 1670 retores "A" from the stack, then looks for a match in lines to 2140. IF no match is found, line 2140 sends you back to the MENU once more saying in essence, "try again." The T matchup is found in lines 2060-2070 which jumps off to QUICK in line 2810 that loads the IY register with QUICK1's address. The next line, 2820, jumps the program to SEND3 in line 2870.

Lines 2870-2880: Stuffs a 1 into SIGN2's MEM location. This is the program's prepared message signpost. A 1 in SIGN2 signifies a prepared message is being transmitted and a zero in SIGN2 says "all clear, no prepared message is in the process of being sent." If you will look back at lines 770 to 780, you will note the program tests SIGN2 for the prepared message status just before letting you have at the keyboard again in line 800. IF a message is in the process of being transmitted, then line 790 sends the program off to SEND4 in line 2890 where we are now.

Lines 2890-2910: The IY register has our message's starting address in MEM in it. You will recall that both the IX and IY registers are 16 bits wide, so any address up to 65535 may be held in either or both. Actually, the IX and IY registers are each TWO 8 bit registers that may be used separately, but that's the subject of another story about Zilog's unpublished opcodes. For the time being, let's pretend they are just simple 16 bit registers and treat them as such. Line 2890 loads the contents of IY's MEM location into the A register, and line 2900 tests it for zero. Each DEFM usually is followed by a DEFB zero which is the message delimiter; i.e., to tell the subroutine in ROM at 28A7H, "you have finished the message."

Our little prepared message subroutines, work the same way. Line 2910 jumps the program ahead to KYBD3 in line 2940 IF the message has been completed. At 2940-2960, the message signpost is loaded with a zero, and then your are returned to the keyboard.

Lines 2920-2930: Add one to the IY register and then goto XMIT3 in line 810 where the character in the "A" register is finally displayed and transmitted, just the same as if it were input by the keyboard.

----- Now let's run through the "INPUT MESSAGE V & W" subroutine for those who may have skipped the earlier Chapter that covered this aspect in the Baudot radio teletype program. We will go back to line 1640 where the displayed MENU is waiting for your input from the keyboard....a V or W. If you input a W without inputting a message, the program will output:

YOU FORGOT TO INPUT A MESSAGE - YOU FORGOT TO INPUT A MESSAGE

V is used to INPUT a message and W is used to transmit the message you input. No one in his right mind wishes to transmit to the wonderful world of ham radio that he FORGOT to input a message, so let's have at the input a "V" subroutine. ------ Lines 1640-2110: Awaits our keyboard input for the letter "V". After pressing the "V", the program falls through to line 2100 where the ASCII 86 = V is subtracted from the "A" register and the Z flag set by the ComPare 86. Line 2110 jumps the program off to INPUT2 in line 3390 since the result of the compare was zero.

Line 3390: First, the HL register is loaded with the MEM address of INPUT1.

NOTE: INPUT1 is always placed at the very tail end of the program. Why so, Gridley?

S-I-L-E-N-C-E ! ! !

Sorry to wake you, Gridley. The reason INPUT1 is always placed at the end of the program is so that ALL remaining memory is available to the user for the INPUT message. If you have 32K MEM you will have about 16+ pages of 16 lines per page available for message input, and if you have 48K MEM you will have over 32 pages available. Now, this is a bit much, except for club secretaries who wish to transmit a really long monthly newsletter, or authors sending a Chapter to their publisher, BUT it is there and available IF you wish to use it. You will note that INPUT1 is at the very end of Chapter 10's combined ASCII radio teletype transmit and receive program, for the same reason.

Lines 3400-3540: These 15 simple lines do the entire job of stashing our input message in MEM. The first line awaits our keyboard input. The next line tests for a backspace, and if so, jumps the program to line 3490 where 1 is subtracted from the HL register, a backspace issued to the video display, and then returns to the keyboard in line 3400.

WHAT IF YOU KEEP PRESSING BACKSPACES BEYOND THE UPPER LEFT CORNER OF THE VIDEO DISPLAY ? ? ?

Good question, Gridley. First, you will be wiping out line 3620 (1 backspace too many), then 3610 (2 more backspaces), and then 3600 (2 more backspaces), etc. Obviously, this sort of foolishness is a NO-NO. The reason we put the backspace into this subroutine was to allow you to correct for a typing error. NEVER backspace beyond the first character in the upper, left-hand side of the video display unless for some perverted reason you wish to bolix up the program. We could have obviated this error, but why waste the memory required to do so. The program will suffer those who make typing errors (we often do), but fools and idiots, NO.

ARE YOU ADDRESSING I ? ? ?

No comment, Gridley. Let's get back to work.

Lines 3430-3440: Test for a SHIFT D input = you are all done and wish to terminate the input message subroutine by jumping to DONE in line 3520. All DONE does is to stash a zero into MEM, the same as DEFB zero, at the end of the input message and then jumps the program off to KYBD2 in line 770.

Lines 3450-3480: First load the character you input from the keyboard into the proper memory loaction (HL), then displays it on video, adds plus one to the HL register for the NEXT memory location, and finally jumps back to INPUT3 in line 3400 where the program awaits the next character from the keyboard.

NOTE: The "input a message" subroutine DOES NOT test for illegal characters such as SHIFT E, F, G, H, etc., as does the routine after line 800. Illegal characters will be displayed, but WILL NOT BE TRANSMITTED by the program. If you wish to eliminate most of the illegal characters automatically, just add the following 2 lines:

```
03445    CP    96       ;SUBTRACT 96 SET SIGN FLAG
03446    JP    P,INPUT3 :IF A>96, GOTO INPUT3
```

REMINDER: The return to BASIC subroutine in lines 950 to 990 will work with BOTH the Model I and Model III, but to eliminate an occasional error message with the Model I, change line 990 to read:

```
JP    072H
```

text continued on page 54

Editor's note: because of space limitations, this month's program listing is being published without comments.

```
00100 ; W4UCH ASCII TELETYPE TRANSMIT PROGRAM
00110 ;
00120 ; 110 BAUD(MAY BE MODIFIED FOR 300 BAUD)
00130 ;
00140 ; COPYRIGHT (C) 1981       ASCII 1 & 2
00150 ;
00160 W4UCH   EQU    29000
00170         ORG    W4UCH
00180         EX     AF,AF'
00190         EXX
00200         PUSH   IX
00210         PUSH   IY
00220         DI
00230         CALL   CLS
00240         JP     GO2
00250 GO1     CALL   CARRET
00260 GO2     LD     A,0
00270         LD     (SIGN3),A
00280         LD     HL,MESS
00290         CALL   28A7H
00300         CALL   CARRET
00310         LD     A,0EH
00320         CALL   033H
00330         JP     SEND
00340 SPEED2  DEFW   610
00350 MESS    DEFM   'TRANSMIT MODE -
110 BAUD'
00360         DEFB   0
00370 SEND    PUSH   AF
00380         LD     A,(SIGN3)
00390         INC    A
00400         LD     (SIGN3),A
00410         CP     72
00420         CALL   Z,AUTO1
00430         POP    DE
00440 SEND1   LD     L,0
00450         CALL   SPACE.
00460 SEND2   BIT    0,D
00470         CALL   NZ,MARK
00480         BIT    0,D
00490         CALL   Z,SPACE
00500         INC    L
00510         LD     A,8
00520         CP     L
00530         JP     Z,FINIS1
00540         RRC    D
00550         JP     SEND2
00560 SPACE   LD     A,4
00570         OUT    (0),A
00580         LD     BC,(SPEED2)
00590         CALL   060H
00600         RET
00610 MARK    LD     A,0
00620         OUT    (0),A
00630         LD     BC,(SPEED2)
00640         CALL   060H
00650         RET
00660 CARRET  LD     A,13
00670         CALL   033H
00680         RET
00690 TIME6   LD     A,0
00700         OUT    (0),A
00710         LD     BC,(SPEED2)
00720         CALL   060H
00730         RET
00740 TIME7   DEFW   18000
00750 FINIS1  CALL   TIME6
00760         CALL   TIME6
00770 KYBD2   LD     A,(SIGN2)
00780         CP     1
00790         JP     Z,SEND4
00800         CALL   049H
00810 XMIT3   CP     32
00820         JP     Z,VIDEO2
00830         CP     98
00840         JP     Z,BASIC
00850         CP     27
00860         JP     Z,MENU
00870         CP     91
00880         JP     Z,SEND5
00890         CP     31
00900         JP     Z,GO2
00910         CP     96
00920         JP     P,KYBD2
00930 VIDEO2  CALL   033H
00940         JP     SEND
00950 BASIC   EX     AF,AF'
00960         EXX
00970         POP    IY
00980         POP    IX
00990         JP     1A19H
01000 AUTO1   LD     A,93
01010         CALL   033H
01020         LD     A,0
01030         LD     (SIGN3),A
01040         CALL   SPACE
01050         CALL   SPACE
01060         CALL   MARK
01070         CALL   SPACE
01080         CALL   SPACE
01090         CALL   MARK
01100         CALL   MARK
01110         CALL   MARK
01120         CALL   MARK
01130         CALL   MARK
01140         CALL   MARK
01150         LD     BC,(TIME7)
01160         CALL   060H
01170         RET
01180 SEND5   LD     A,1
01190         LD     (SIGN2),A
01200         CALL   049H
01210         JP     SEND6
01220 MENU    CALL   CLS
01230         CALL   CARRET
01240         LD     HL,MENU1
01250         CALL   28A7H
01260         CALL   CARRET
01270         CALL   CARRET
01280         LD     HL,MS1
01290         CALL   28A7H
01300         CALL   CARRET
01310         LD     HL,MS2
01320         CALL   28A7H
01330         CALL   CARRET
01340         LD     HL,MS3
01350         CALL   28A7H
01360         CALL   CARRET
01370         LD     HL,MS4
01380         CALL   28A7H
01390         CALL   CARRET
01400         LD     HL,MS5
01410         CALL   28A7H
01420         CALL   CARRET
01430         LD     HL,MS6
01440         CALL   28A7H
01450         CALL   CARRET
01460         LD     HL,MS7
01470         CALL   28A7H
01480         CALL   CARRET
01490         LD     HL,MS8
01500         CALL   28A7H
01510         CALL   CARRET
01520         LD     HL,MS9
01530         CALL   28A7H
01540         CALL   CARRET
01550         LD     HL,MS10
01560         CALL   28A7H
01570         CALL   CARRET
01580         LD     HL,MS10A
01590         CALL   28A7H
01600         CALL   CARRET
01610         CALL   CARRET
01620         LD     HL,MS11
01630         CALL   28A7H
01640         CALL   049H
01650         PUSH   AF
01660         CALL   CLS
01670         POP    AF
01680 SEND6   CP     65
01690         JP     Z,CQ
01700         CP     66
01710         JP     Z,QTH
01720         CP     67
01730         JP     Z,CQDX
01740         CP     68
01750         JP     Z,CQSS
01760         CP     69
01770         JP     Z,QRZ
01780         CP     70
01790         JP     Z,SEVEN3
01800         CP     71
```

```
Ø181Ø          JP      Z,RST59
Ø182Ø          CP      72
Ø183Ø          JP      Z,RST55
Ø184Ø          CP      73
Ø185Ø          JP      Z,QRX
Ø186Ø          CP      74
Ø187Ø          JP      Z,QRM
Ø188Ø          CP      75
Ø189Ø          JP      Z,QRN
Ø19ØØ          CP      76
Ø191Ø          JP      Z,QSY
Ø192Ø          CP      77
Ø193Ø          JP      Z,QSYUP
Ø194Ø          CP      78
Ø195Ø          JP      Z,QSYDN
Ø196Ø          CP      79
Ø197Ø          JP      Z,SECT
Ø198Ø          CP      8Ø
Ø199Ø          JP      Z,TRS8Ø
Ø2ØØØ          CP      81
Ø2Ø1Ø          JP      Z,PGMHR
Ø2Ø2Ø          CP      82
Ø2Ø3Ø          JP      Z,RIGHR
Ø2Ø4Ø          CP      83
Ø2Ø5Ø          JP      Z,RYRY
Ø2Ø6Ø          CP      84
Ø2Ø7Ø          JP      Z,QUICK
Ø2Ø8Ø          CP      85
Ø2Ø9Ø          JP      Z,HANDL
Ø21ØØ          CP      86
Ø211Ø          JP      Z,INPUT2
Ø212Ø          CP      87
Ø213Ø          JP      Z,INPUT
Ø214Ø          JP      MENU
Ø215Ø MENU1    DEFM    '
     PREPARED MESSAGE SUBROUTINE'
Ø216Ø          DEFB    Ø
Ø217Ø MS1      DEFM    '        CQ = A
                         QTH = B'
Ø218Ø          DEFB    Ø
Ø219Ø MS2      DEFM    '        CQ DX = C
                        CQ SS = D'
Ø22ØØ          DEFB    Ø
Ø221Ø MS3      DEFM    '        QRZ = E
                        73 = F'
Ø222Ø          DEFB    Ø
Ø223Ø MS4      DEFM    '        RST 5X9
PLUS = G                   RST 5X5 = H'
Ø224Ø          DEFB    Ø
Ø225Ø MS5      DEFM    '        QRX = I
                        QRM = J'
Ø226Ø          DEFB    Ø
Ø227Ø MS6      DEFM    '        QRN = K
                        QSY = L'
Ø228Ø          DEFB    Ø
Ø229Ø MS7      DEFM    '        QSY UP = M
                       QSY DOWN = N'
Ø231Ø MS8      DEFM    '        SECTION = O
                      TRS-8Ø = P'
Ø232Ø          DEFB    Ø
Ø233Ø MS9      DEFM    '        PROGRAM
HERE = Q                   RIG HERE = R'
Ø234Ø          DEFB    Ø
Ø235Ø MS1Ø     DEFM    '        RYRYRY = S
                       QUICK BROWN = T'
Ø236Ø          DEFB    Ø
Ø237Ø          CALL    CARRET
Ø238Ø MS1ØA    DEFM    '        HANDLE = U
                     INPUT MESSAGE = V & W'
Ø239Ø          DEFB    Ø
Ø24ØØ          CALL    CARRET
Ø241Ø MS11     DEFM    '             ENTER
PREPARED MESSAGE DESIRED ? '
Ø242Ø          DEFB    Ø
Ø243Ø CQ       LD      IY,CQ1
Ø244Ø          JP      SEND3
Ø245Ø QTH      LD      IY,QTH1
Ø246Ø          JP      SEND3
Ø247Ø CQDX     LD      IY,CQDX1
Ø248Ø          JP      SEND3
Ø249Ø CQSS     LD      IY,CQSS1
Ø25ØØ          JP      SEND3
Ø251Ø QRZ      LD      IY,QRZ1
Ø252Ø          JP      SEND3
Ø253Ø SEVEN3   LD      IY,SVN31
Ø254Ø          JP      SEND3
Ø255Ø RST59    LD      IY,RST591
Ø256Ø          JP      SEND3
Ø257Ø RST55    LD      IY,RST551
Ø258Ø          JP      SEND3
Ø259Ø QRX      LD      IY,QRX1
Ø26ØØ          JP      SEND3
Ø261Ø QRM      LD      IY,QRM1
Ø262Ø          JP      SEND3
Ø263Ø QRN      LD      IY,QRN1
Ø264Ø          JP      SEND3
Ø265Ø QSY      LD      IY,QSY1
Ø266Ø          JP      SEND3
Ø267Ø QSYUP    LD      IY,QSYUP1
Ø268Ø          JP      SEND3
Ø269Ø QSYDN    LD      IY,QSYDN1
Ø27ØØ          JP      SEND3
Ø271Ø SECT     LD      IY,SECT1
Ø272Ø          JP      SEND3
Ø273Ø TRS8Ø    LD      IY,TRS8Ø1
Ø274Ø          JP      SEND3
Ø275Ø PGMHR    LD      IY,PGMHR1
Ø276Ø          JP      SEND3
Ø277Ø RIGHR    LD      IY,RIGHR1
Ø278Ø          JP      SEND3
Ø279Ø RYRY     LD      IY,RYRY1
Ø28ØØ          JP      SEND3
Ø281Ø QUICK    LD      IY,QUICK1
Ø282Ø          JP      SEND3
Ø283Ø HANDL    LD      IY,HANDL1
Ø284Ø          JP      SEND3
Ø285Ø INPUT    LD      IY,INPUT1
Ø286Ø          JP      SEND3
Ø287Ø SEND3    LD      A,1
Ø288Ø          LD      (SIGN2),A
Ø289Ø SEND4    LD      A,(IY)
Ø29ØØ          CP      Ø
Ø291Ø          JP      Z,KYBD3
Ø292Ø          INC     IY
Ø293Ø          JP      XMIT3
Ø294Ø KYBD3    LD      A,Ø
Ø295Ø          LD      (SIGN2),A
Ø296Ø          JP      KYBD2
Ø297Ø CQ1      DEFM    ' CQ CQ CQ DE
W4UCH/2 W4UCH/2 K K K '
Ø298Ø          DEFB    Ø
Ø299Ø QTH1     DEFM    'QTH IS BOX 1Ø65 -
CHAUTAUQUA LAKE, NEW YORK 14722 '
Ø3ØØØ          DEFB    Ø
Ø3Ø1Ø CQDX1    DEFM    'CQ DX CQ DX CQ DX
DE W4UCH/2 K K K '
Ø3Ø2Ø          DEFB    Ø
Ø3Ø3Ø CQSS1    DEFM    'CQ SS CQ SS CQ SS
DE W4UCH/2 K K K '
Ø3Ø4Ø          DEFB    Ø
Ø3Ø5Ø QRZ1     DEFM    'QRZ QRZ QRZ DE
W4UCH/2 K K K '
Ø3Ø6Ø          DEFB    Ø
Ø3Ø7Ø SVN31    DEFM    '73 TO YOU AND URS.
MNY TNX FB QSO. DE W4UCH/2 K K K '
Ø3Ø8Ø          DEFB    Ø
Ø3Ø9Ø RST591   DEFM    'UR RST 5X9
PLUS...A WHOPPING BIG SIGNAL HERE AT
CHAUTAUQUA LAKE '
Ø31ØØ          DEFB    Ø
Ø311Ø RST551   DEFM    'UR RST 5X5 WITH MO
DEST QSB.  LETS HOPE THE BAND IMPROVES. '
Ø312Ø          DEFB    Ø
Ø313Ø QRX1     DEFM    'QRX A MINUTE. THE
PHONE. STANDBY. '
Ø314Ø          DEFB    Ø
Ø315Ø QRM1     DEFM    'QRM QUITE BAD.
PLEASE TRY AGAIN. DE W4UCH/2 K K K '
Ø316Ø          DEFB    Ø
Ø317Ø QRN1     DEFM    'LOCAL QRN TERRIBLE.
PLEASE TRY AGAIN. DE W4UCH/2 K K K '
Ø318Ø          DEFB    Ø
Ø319Ø QSY1     DEFM    'QRM TERRIBLE. LETS
QSY? WHERE MOVE? DE W4UCH/2 K K K '
Ø32ØØ          DEFB    Ø
Ø321Ø QSYUP1   DEFM    'LETS BOTH MOVE UP
1 KHZ UP 1 KHZ? DE W4UCH/2 K K K '
Ø322Ø          DEFB    Ø
Ø323Ø QSYDN1   DEFM    'LETS BOTH MOVE
DOWN 1 KHZ DOWN 1 KHZ? DE W4UCH/2 K K K '
Ø324Ø          DEFB    Ø
Ø325Ø SECT1    DEFM    'ARRL SECTION IS
WEST. NY - WEST. NY DE W4UCH/2 K K K '
Ø326Ø          DEFB    Ø
Ø327Ø TRS8Ø1   DEFM    'TRS-8Ø MICROCOMPUTER
HERE IS DOING ALL THE WORK FOR ME. '
```

```
Ø328Ø          DEFB    Ø
Ø329Ø PGMHR1   DEFM    'PROGRAM IS FROM
DISASSEMBLED HANDBOOK FOR TRS-8Ø VOLUME
4.'
Ø33ØØ          DEFB    Ø
Ø331Ø RIGHR1   DEFM    'RIG HR IS OLD HT-37,
ITT 3Ø21 RECVR AND DIPOLE IN THE ATTIC. '
Ø332Ø          DEFB    Ø
Ø333Ø RYRY1    DEFM 'RYRYRYRYRYRYRYRYRY
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY '
Ø334Ø          DEFB    Ø
Ø335Ø QUICK1   DEFM    'THE QUICK BROWN FOX
JUMPED OVER THE LAZY DOGS. Ø123456789 '
Ø336Ø          DEFB    Ø
Ø337Ø HANDL1   DEFM    'HANDLE IS (BOB).
35 YEARS HAMMING, BUT NEW TO ASCII RTTY. '
Ø338Ø          DEFB    Ø
Ø339Ø INPUT2   LD      HL,INPUT1
Ø34ØØ INPUT3   CALL    Ø49H
Ø341Ø          CP      8
Ø342Ø          JP      Z,BACK
Ø343Ø          CP      1ØØ
Ø344Ø          JP      Z,DONE
Ø345Ø          LD      (HL),A
Ø346Ø          CALL    Ø33H
Ø347Ø          INC     HL
Ø348Ø          JP      INPUT3
Ø349Ø BACK     DEC     HL
Ø35ØØ          CALL    Ø33H
Ø351Ø          JP      INPUT3
Ø352Ø DONE     LD      A,Ø
Ø353Ø          LD      (HL),A
Ø354Ø          JP      KYBD2
Ø355Ø SIGN2    DEFB    Ø
Ø356Ø SIGN3    DEFB    Ø
Ø357Ø CLS      CALL    Ø1C9H
Ø358Ø          LD      A,Ø
Ø359Ø          OUT     (224),A
Ø36ØØ          LD      A,48
Ø361Ø          OUT     (236),A
Ø362Ø          RET
Ø363Ø INPUT1   DEFM    'YOU FORGOT TO
INPUT A MESSAGE - YOU FORGOT TO INPUT A
MESSAGE  '
Ø364Ø          DEFB    Ø
Ø365Ø          END     W4UCH
```

instead of

```
JP     1A19H.
```

CONCLUSION OF CHAPTER 8

110 Baud ASCII radio teleype is going by leaps and bounds on the amateur radio bands. Not just the popular 80, 40, 20, 15, and 10 meter short wave bands, but also on the VHF/UHF bands of 6, 2, and 3/4 meters where it is now occasionally heard. As microcomputers proliferate throughout the world-wide ranks of radio amateurs AND war surplus Baudot teletype machines give up the ghost and fade away, ASCII will EVENTUALLY become the standard, rather than the exception, which it is today.

The American Radio Relay League, ARRL, is to be commended for their leadership of the ASCII evolution, rather than revolution by transmitting the daily ARRL bulletins to radio amateurs in both Baudot AND 110 Baud ASCII. See Chapter 6, page 18 for the daily bulletin schedules and HF frequencies. The bulletins are first transmitted in Baudot 60 speed, and then repeated in 110 Baud ASCII radio teletype with 2 stop bits. Though eight data bits are transmitted, the MSB carries NO relevant information (same as this Chapter's program).

The essential aspects of the program in this Chapter are really NOTHING more than the software UART, parallel to serial conversion, accomplished in lines 440-550 and 750-760. The rest is merely icing on the ASCII cake.

MODEL III CORNER

Hubert S. Howe, Jr.

TRSDOS 1.3 ZAPS

Everyone with a TRS-80 Model III should now be using TRSDOS version 1.3, since it has been available for several months and is significantly better than the earlier versions. Nevertheless, there are still errors in version 1.3, for which Radio Shack has just issued corrections. One of these "zaps" fixes a problem with Editing in Basic, another a bug in XFERSYS, and two of them fix a problem with the LOAD command. All of these patches can be implmented by using the BUILD command to type in the following short program, which we will call PATCH:

```
PATCH BASIC/CMD (ADD=58F8,FIND=F1,CHG=00)
PATCH XFERSYS/CMD (ADD=548E,
    FIND=3500FD21,CHG=FD360001)
PATCH *6 (ADD=5850,FIND=3A62,CHG=BF5F)
PATCH *6 (ADD=5FBE,FIND=20697320616374,
    CHG=0D116544C31C44)
```

After typing in these four lines, type BREAK to exit from BUILD. The disk is patched by typing PATCH PATCH. The advantage of doing it this way is that you only have to type in the program once and can then patch all of your TRSDOS 1.3 diskettes by executing the PATCH file.

One other nice undocumented feature of TRSDOS 1.3 is a program on the diskette supplied called HERZ50/BLD. This program contains a patch for the disk if the Model III is to be used in European countries, where the electric power is 50 Hz instead of 60 Hz as it is here. If you thought that it should be executed because it was on the disk, you should "unzap" your diskette, so that it will be right for running in the United States. This can be done by executing the following patch:

```
PATCH *0 (ADD=4047,FIND=BF42,CHG=2935)
```

If you get the message "string not found" while executing any of these commands, it probably means that your disk has already been patched and doesn't need any of these fixes.

WHY NOT DOUBLE SIDED?

According to the technical information about the TRS-80 Model III's disk controller chip, which is the Western Digital FD 1793, and the Tandon disk drives used as standard by Radio Shack, there appears to be no reason why a completely double-sided system couldn't be implemented in the Model III at no additional charge for the hardware. The FD 1793 happens to be one of the disk controllers that specifically has side indicators in its formatting, and the Tandon drives supposedly have double-sided heads, which is again a standard used by this company on all its drives.

Why didn't Radio Shack implement a double-sided system? Perhaps there are some reasons we are not aware of, affecting the reliability of operation, or perhaps not all the Model III hardware is the same. The preliminary indication is rather that RS didn't want the trouble of developing a double-sided disk operating system. How would the other side be accessed? Would it be considered another drive, or could one file be split on both sides of the diskette? Where would the directory (which would, of course, have to be larger) go? We are looking for another company, particularly one like Lifeboat Associates, to come up with a double-sided DOS that will double the capacity of the Model III disks for no extra charge!

Do you have a question about the Model III, or a program specifically for the Model III? Send it to Model III Corner, H & E Computronics, 50 North Pascack Road, Spring Valley, New York 10977. ■

QUESTIONS AND ANSWERS

Conducted by Hubert S. Howe, Jr.

QUESTION

from Thomas Collins, Jr., 125 Atlas Dr., New Castle, Delaware 19720: With the Data Base program on the free cassette, can I change line 150 to MF=1: MI=2691 and write just one large record?

ANSWER

No. First of all, you would have to say MF=2691 and MI=1, because MF is for the fields and MI for the records; but then, you have to remember that in Basic there is the zero subscript, so this is actually saving room for 2692 by 2 fields.

The next problem you get if you try this is that it says "Subscript out of range" if you use a number as large as 2691. For some reason, it will continue to give this error message if MF is 2481 or higher. From 2480 down, it simply says "Out of memory." About the largest number you can use for MF with a 48K disk system is 860.

Therefore, the answer to your question is simply that it is impractical to use the Data Base program in the manner that you suggest.

QUESTION

from Ray Van Rensburg, P.O. Box 398, Albany, Western Australia: I recently took out a subscription to your magazine and ordered various cassette tape programs for my Level II 16K machine from other suppliers. While the majority of the tapes are OK, the odd one is faulty. The manufacturers do not appear to be as efficient at dealing with queries as they are at taking your money initially, and I am getting more and more frustrated at the tapes lying around, totally useless to me. I have listed and examined the programs on the video display, and some of the problems are elementary, such as bad punctuation in the Title!?! I have tried editing the line, which the TRS-80 seems to accept, but when I run the program it reverts to the original bad line. Similarly I have tried deleting the line, with the same result. Finally, I have tried to RUN from the line following, but it won't!

It would seem that the tapes are protected in some way which precludes making any changes to them. I feel sure you must have had many readers experiencing these problems and I wonder whether you have a solution for this.

ANSWER

This is certainly a frustrating problem, which is probably caused by bad media, although in your case it could be that the tapes have become partially "zapped" by being exposed to X-rays during their long period of transit. I doubt seriously that these programs are being "protected" in some way, though that possibility can't entirely be ruled out.

When a BASIC program is loaded into memory awaiting execution, the format of each line is as follows: first there is a pointer to the memory address of the *next* line, then a binary representation of the line number, then the statement itself, in which each verb is replaced by binary "tokens", and finally a terminator byte (zero). When the program (or tape from which it is read) gets "zapped", any of these bytes might get replaced with garbage. This may cause the pointer to the next line to get off, in which case if you LIST the program you will see spurious line numbers with incomprehensible statements. (If the binary tokens get zapped, the statement itself will be full of ridiculous things with many verbs next to one another.) You can't edit the lines, because replacing the line back into memory requires having the pointer to the next line adjusted properly; otherwise, everything following the line will again be off.

There is a possible solution to this problem, but it requires working from a disk system, where you have the possibility of saving the programs in "ASCII" form, and the Electric Pencil word processing program. The Pencil is necessary because it is the only one that produces a pure ASCII file. SCRIPSIT puts in markers and other bytes that make it unusable for this purpose.

What you should do is to load the program into memory and then save it using the A option (SAVE"PROGRAM",A). Now load the program into the Electric Pencil. (This requires placing a zero at the end of the file, as described in our March 1981 Questions and Answers, and saving the file with the extension "PCL".) Now you can go through the program with the Pencil and see just what garbage is there, edit it (if you can figure out what to do), and save it back to disk. When you go back to BASIC, you can load the Pencil file directly, with no further modifications.

Nevertheless, if you have received a bad copy of a program, most vendors will replace it with a good copy. If they don't, you can write letters to magazines like this so that other people can read about your experiences and avoid buying from those vendors.

QUESTION

from Dr. Siegfried Thomeier, 13 Exmouth Street, St. John's, Newfoundland, A1B 2E1, Canada: The main problem I have with my TRS-80 Model I Level 2 16K machine is still volume sensitivity for loading purchased program tapes. There are no problems with my

own tapes. Is there some machine language program that could be used to reduce this volume sensitivity?

My TRS-80 was one of the first, if not *the* first, purchased in Newfoundland, So this volume sensitivity may also have to do with this being one of the early machines.

ANSWER

There is, of course, a cassette modification available from Radio Shack. If you still have trouble, we have found a better way of coping with these problems: there is a device called the PK-80 Peak Reading VM ("The Peeker") made by Cook Laboratories, 375 Ely Avenue, Norwalk, CT 06854. This is a battery-operated meter that goes between the cassette recorder and the TRS-80 and allows you to read the volume level of incoming tapes. All you have to do to get it right is to adjust the level until it is between two marks on the meter. Just don't forget to turn it off when you're finished, because leaving it on will run the battery down. The Peeker costs about $35, but is available for less in kit form. ■

COLOR COMPUTER CORNER

Joseph Rosenman

This Month: Software Reviews

I had hoped to be able to write about the new Color Computer disk drives in this issue. Unfortunately, I have not yet been able to get any. When I do, I will devote an issue to a review of them. Instead, I will review some software for the Color Computer, starting this month with two pieces of software that Radio Shack sells for the Color Computer. Both are on the ROM packs.

PINBALL

(Cat. no. 26-3052, List price $29.95)

As with all the ROM packs, using the software is easier than pie. All that you need to do is to plug in the pack and turn on the computer. Of course, you will also need to have the joysticks. The program begins by offering you three options: to begin playing the game, to edit the board, or to read in a previously stored board. To play the game, you "pull back" the right joystick. This "loads" the ball. Then, you push the joystick forward to release the ball. The buttons on the joysticks activate the right and left flippers. The game moves at a pretty quick clip. Those of you who are familiar with the Pinball game on the Model 1 (from Acorn software) will be a little disappointed with this pinball. It isn't quite as fast, and the board is "static." The Color Computer Pinball has no "Bermuda square." I also think that the board is rather "bare." Fortunately, one of the features of the Color Computer pinball is the ability to edit the playing board and save it onto cassette. While the edit features are a little awkward, I found them useable. The board uses a combination of 4 types of "bumpers":

1) Edge Bump (Green, 0 points)
2) Circle Pop (Red, 50 points)
3) Edge Pop (Red, 50 points)
4) Knock-out (Black, 150 points)

The Knock-outs will dissappear when struck (they all re-appear when the last one is removed). The Circle Pops and the Edge Pops all add speed when struck, and the Edge Bump subtracts speed when struck. The Edge Bump and Edge Pop form the "frame" of the board, and the Circle Pops and Knock-outs are placed into the board. As mentioned above, the board can be saved onto cassette after editing. It is necessary to have the Pinball Rom pack in to read in a previously saved board (only the board data is saved onto the cassette tape). The program has sound, though it is nothing to boast about. All in all, the game is fun. The ability to create your own boards is a creative plus that adds to the enjoyment of this game.

SKIING

(Cat. No. 26-3058, List price $39.95)

Skiing is a realistic simulation game, that requires "you" to maneuver yourself down the ski course of 29 gates. Radio Shack recommends a 16K Color Computer for this game. The game produces a three dimensional view of skiing over a course (mostly downhill). Your speed and direction are controlled by the right joystick. When the game first comes on, you are faced with three choices: start the game, randomly create a new course, or toggle between "simple" and "complex" games. After you start the game, you need to pull the joystick back, then forward again. The COMPUTER will say "Get ready, . . . get set, . . . BANG" — and you're off! While in simple mode, the joystick controls speed (front/back) and direction (left/right). You need to maneuver through the different colored gates without missing any and without leaving the course. A time count is kept and is recorded in the program menu if the course is completed without errors. The program will beep at you if you miss a flag and will "snap" if you hit a flag or fence. One interesting feature is that you can veer so far off course that the course will dissappear. (Eventually, you will run back into the course.)

In Complex mode, the game becomes a real challenge. The joystick still controls direction (left/right), but speed is handled diferently. You speed up going downhill, and slow down going uphill or turning. To speed up (or start off), you need to "poll off" by pushing the joystick button. While playing in this mode, it is very easy to lose control. Since the games are all timed, one can continue to beat ones last speed with a "perfect" run. When you reach the end of the course (in both the simple and complex game), there will be a crowd at the finish line to "cheer" you in. Time to try again for a better time.

In the next issue, I will be reviewing software by Datasoft, Inc., and Spectral Associates.

Joseph Rosenman
35-91 161 Street, Apt. 4J
Flushing, NY 11358

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```
950 NEXT J
960 IF K > 1 THEN R$ = "("+R$+")"
970 LET F$=L$+CHR$(L+48)+R$+CHR$(R+48)
980 'eliminate 1's from formula
990 LET FF$=""
```

```
1000 FOR J=1 TO LEN(F$)
1010 LET P$=MID$(F$,J,1)
1020 IF P$="1" THEN 1040
1030 LET FF$=FF$+P$
1040 NEXT J
1050 LET F$=FF$
1060 RETURN
1070 'print formulas on two different lines
1080 LET P=P+2                  'position across the line
1090 IF ABS(ASC(P$)-54) < 6 THEN 1110
1100 PRINT @ P,P$;:RETURN
1110 PRINT @ P+64,P$;:RETURN
```

CANADA MILEAGE

Tom Nicholls, of Westchester, Illinois submitted this problem: When traveling in Canada, and even in some parts of the United States, you purchase your gasoline in liters. You may or may not fill your tank at each stop, and your car's odometer may register the distance in either miles or kilometers. How do you compute the gas "mileage" in miles per gallon, and what would that be in kilometers per liter?

```
100    'CANADA MILEAGE
110 CLS
120 CLEAR 200
130 INPUT "BEGINNING ODOMETER READING";O
140 INPUT "IS THAT MILES, OR KILOMETERS";DU$     'DISTANCE
UNITS
```

```
150 IF LEFT$(DU$,1)="M" THEN 170                'RESPONSE OK
160 IF LEFT$(DU$,1) <> "K" THEN 140             'ERROR TRAP
170 PRINT,"VOLUME UNITS ARE LITERS OR GALLONS (L/G)"
180 PRINT,"LAST INPUT INDICATES FILLED OR NOT FILLED (F/N)"
190 PRINT,"SAMPLE INPUT:  32.4,L,23833,F"
200 LET PO=0                    'SAVE PREVIOUS ODOMETER READING
210 INPUT "VOLUME, UNITS, ODOMETER, F/N";V,VU$,O,F$
220 IF VU$="L" THEN 250         'ALREADY IN LITERS
230 IF VU$ <> "G" THEN 210      'ERROR TRAP
240 LET V=V*3.78541             'CONVERTS GALLONS TO LITERS
250 LET D=O-PO                  'DISTANCE
260 LET PO=O
270 IF DU$="K" THEN 290         'ALREADY IN KILOMETERS
280 LET D=D*1.60934             'CONVERTS MILES TO KILOMETERS
290 LET TV=TV+V                 'TOTAL VOLUME USED, LITERS
300 LET TD=TD+D                 'TOTAL DISTANCE, KILOMETERS
310 IF F$="F" THEN 330
320 GOTO 210
330 REM  FILLED TANK - CALCULATE RESULTS AND DISPLAY THEM
340 LET CM=TD/TV                'CANADIAN "MILEAGE", KM/L
350 LET AM=TD*.621373/(TV*.264172)      'AMERICAN MILEAGE
360 PRINT
370 PRINT USING"###.## MILES PER GALLON";AM;
380 PRINT USING"      -----     ###.## KILOMETERS PER LITER";CM
390 PRINT
400 LET TD=0:TV=0               'RESET THE TOTALS TO ZERO
410 GOTO 210
420 '
```


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Sterling, IL 61081
Phone (815) 625-5251

■

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```
350 INPUT"HIGHEST ANNUAL SALARY RATE";W
360 INPUT"SALARY STEP RATE";Z:PRINT
370 IF W<V OR V>W OR Z>W THEN 330
380 GOSUB 510
390 FOR Y=V TO W STEP Z
400 M=Y/12:B=Y/24:W=Y/52:D=Y/260:H=Y/2080
410 A$="#######.##": B$="######.##": C$="#####.##"
420 D$="####.##": E$="###.##"
430 LPRINTTAB(3)USINGA$;Y;:LPRINTTAB(16)USINGB$;M;
440 LPRINTTAB(29)USINGB$;B;
450 LPRINTTAB(43)USINGC$;W;:LPRINTTAB(57)USINGD$;D;
460 LPRINTSTRING$(7," ")USING E$;H
470 NEXT Y
480 LPRINTTAB(4) L$
490 INPUT"DO YOU WISH TO START AGAIN (Y/N)....";R$
500 IF R$="Y" THEN 10 ELSE END
510 LPRINTTAB(9)CHR$(14)"** SALARY RATE CHART **"
520 LPRINTCHR$(32)
530 LPRINTTAB(7)"YEARLY";TAB(18)"MONTHLY";
540 LPRINTTAB(30)"BI-MONTHLY";
550 LPRINTTAB(45)"WEEKLY";TAB(58)"DAYLY";
560 LPRINTSTRING$(8," ")"HOURLY"
570 LPRINTTAB(7)"INCOME";TAB(18)"INCOME";
580 LPRINTTAB(32)"INCOME";
```

continued on page 62

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HOW ACCEL2 WORKS

TRS-80 Model I/III BASIC Compiler

ACCEL2 uses a novel translation technique that keeps code growth down and insures highest compatibility with BASIC source programs while giving huge speedups. Only a carefully chosen subset of BASIC instructions is translated. The non-compilable statements are left in the compiled program in their original source form and at run-time are actually given to the BASIC interpreter to execute. Program flow may flip into direct execution of the compiled machine instructions and then flop back to interpretation many times during execution.

Why Compilation improves performance.

*Name Resolution. Term given to the process of identifying the value of a variable given its name. As a program runs, the interpreter builds a dictionary consisting of a chain of items, each containing a variable name, data type and current value. Every time a variable is to be resolved the interpreter must sequentially search this dictionary. By contrast, ACCEL2 builds the variable dictionary once at compile time and thereafter can refer to the variable names by direct address, with no run-time search.

*Line Resolution. The interpreter has to take the line-number following a GOTO or GOSUB, convert it to binary, and then search the program sequentially to find the target line. At compile-time ACCEL2 generates single machine-instructions for GOTO or GOSUB using the actual address of the target line. For the interpreter, both name resolution and line resolution get slower as the program gets more complex, whereas for compiled code these two operations are independent of program size or number of variables.

*Computational Operations. The interpreter must parse each statement every time, find the one-byte codes that correspond to the operations, look ahead to the next operator to establish the precedence rules and check for data-type mismatch and conversion. Constants must be converted from character strings to internal binary. But under ACCEL2 constants are converted and embedded right in the Z80 instruction stream, and operations are translated once and for all at compile-time into sequences of calls to ROM or the run-time component. INTEGER operations are actually turned into directly executing straight-line Z80 code!

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D-1

continued from page 60

```
590 LPRINTTAB(45)"INCOME";TAB(58)"INCOME";
600 LPRINTSTRING$(7," ")"INCOME"
610 LPRINTTAB(4) L$
620 RETURN
630 CLS:PRINTTAB(12)"S A L A R Y  R A T E  C H A R T"
640 PRINT F$
650 PRINTTAB(1)"YEAR";:PRINTTAB(13)"MONTH";
660 PRINTTAB(25)"WEEK";:PRINTTAB(37)"DAY";
670 PRINTTAB(49)"HOUR"
680 PRINT F$
690 RETURN
700 'A PROGRAM USING LEVEL II BASIC FOR TRS-80 MODEL 1
710 'BY: MR.FRANK P.VLAMINGS
720 '    36217 WORTHING DRIVE
730 '    NEWARK
740 '    CALIFORNIA    94560
750 '    PHONE(415) 793-6484
```

■

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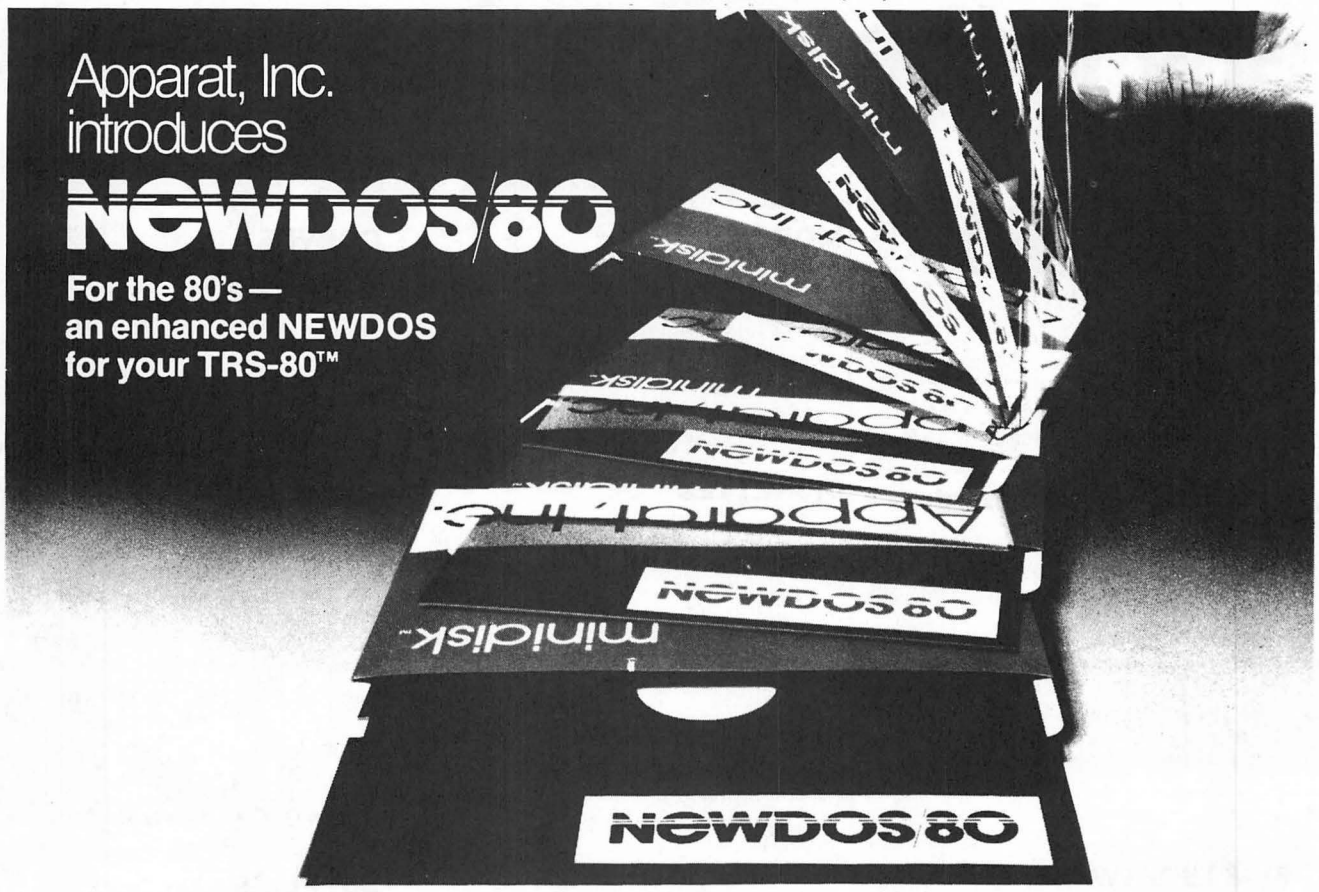

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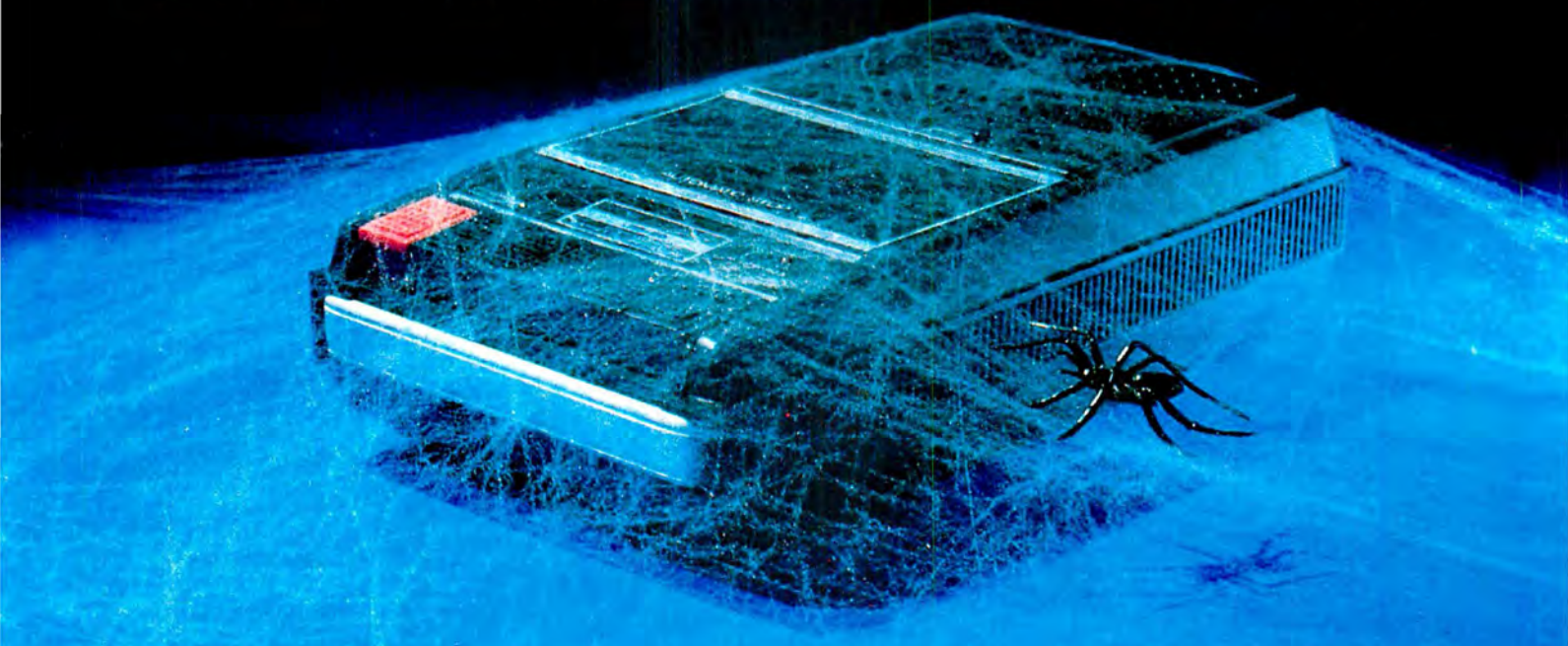

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