

TRS-80TM COMPUTING

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Radio Shack points out some problems to avoid

Radio Shack has recently started including the following list with Level II computers. It includes material that all Level II users should know about, so we reprint it here:

WON'T READ DATA

After executing an INPUT#-n (input from cassette), some TRS-80s will not READ properly from DATA statements. Instead, a RESTORE will automatically be performed before each READ, so that only first DATA item will be read.

If your TRS-80 operates this way (depends on a few ICs from one supplier), there is a simple fix. Insert the statement,

```
POKE 16553,255
```

immediately after every INPUT#-n statement.

TRUNCATED PRINTS

A PRINT#-n statement can put no more than 248 bytes on the tape. If you have a lengthy PRINT# list, only the first 248 bytes will be saved on tape; the rest will be lost. Therefore, you should break up such lists into two or more PRINT# statements.

RESETTING EXPANDED TRS-80

If you have an expansion interface connected and you need to Reset the computer, hold down the BREAK key and press Reset. This will return you to the MEMORY SIZE question. Any BASIC program in memory will be lost by this Reset sequence.

LOST VARIABLES

If you stop a Basic program during execution, and then alter the program itself, all variables will be reset where you left off. RUN it again. Note: If a syntax error is encountered and Basic puts you in the Edit mode, type E to return to the Command mode. You can then examine variable values, if you wish, before fixing the syntax error.

LPRINT STALL

If you attempt to execute an LPRINT or an LLIST when a line printer is not connected (or is turned off), the computer will "freeze up". Either turn on the line printer, or, if one is not connected, Reset the computer (see Lost Variables above.)

FUNCTIONS SINGLE-PRECISION

All the built-in mathematical functions in Level II Basic return single-precision results (6-7 digits of accuracy). Trig functions use or return radians, not degrees. A radian-degree conversion is given in the LEVEL II Reference Manual.

OBSCURE

Shift characters are not always interchangeable with their unshifted counterparts. For example, PRINT @ will not work if you use a shifted @, even though it will look ok on the screen. If you can't find anything wrong with a line which causes a syntax error message, try re-typing the line, watching out for the shift key.

Spaces are sometimes important in Level II Basic. The following line is incorrect:

```
IFD OD=0
```

because OD is interpreted to mean "double-precision zero". Change it to:

```
IFD O THEN D=0
```

SECOND CASSETTE

To use the CLOAD? with cassette #2, use this format:

```
CLOAD#-2,?"filename"
```

KEY BOUNCE

If you frequently get "double entries" when pressing a particular key, remove the plastic key cap, and carefully clean the contacts, using a stiff piece of paper. Insert the paper between the contacts, press the key down to pinch the paper, and pull the paper out while the contacts are pinching it.

The maximum TAB for an LPRINT statement is 63. The Line Printer won't tab past column 63. There's a simple way around this limitation, using the STRING\$ function to simulate tabs past column 63. Example:

```
LPRINT TAB (5)"NAME"TAB(30)
"ADDRESS"STRING$(63,32)"BALANCE"
will print "NAME" at column 5,
"ADDRESS" at column 30, and
"BALANCE" at column 100.
```

If you have other questions regarding operation of your TRS-80, call Customer Service, (817) 390-3583, or write: TRS-80 Customer Service, Radio Shack, box 185, Ft. Worth TX 76102

Lowercase, denser graphics, better cassette lead in survey

A user survey was included in TRS-80 Computing 1:2, to be filled out and returned to San Luis Rey.

Of 162 surveys received and compiled prior to press time, 158 own, four borrow or desire TRS-80s.

Lowercase letters were requested by 81, or exactly half of those returning surveys. Denser graphics came next with 41 requests, with better, faster cassette following with 23, numeric pad, 21, and better, unbounded keyboard 19.

Color graphics scored 15, one-piece case 13, better cassette relay 8, sound 6. Built-in serial interface, 6.

Six owners wanted full control of cursor, five wanted S-100 interfacing.

Better store support accumulated 10 comments, ranging from maintaining computer items in stock (1), making lowercase modification (1), classes (2), knowledgeable clerks (3), and communication and word processing, each one the exact meaning now forgotten.

Reference manuals also accumulated much flack, 44, but spread over: DOS (5), maintenance and repair (3), Level II written like Level I manual (3), listings and manuals on Basics and system software (3), on machine language (2), editor/assembler (1), the expansion interface (2), disk documentation (2), and just "manuals" (8).

Suggested ROMmed system software included renumbering (7), Fortran (1), Pas-

cal (1), assembler (5), and machine language monitor (1), and a bigger Basic (1).

Many complaints were about packaging: expansion interface connector too short (2), reset should be on keyboard, and lock (1), plugs keyed so they can't be put in wrong (2), master on/off (2), colored plastic (1) and improved quality (4), and dust covers (1).

Second cassette without expansion interface scored 3, and two owners wanted cassette deck built onto keyboard unit. Eight wanted computer-controlled cassette, one wanted switch to turn on cassette for rewind and fast-forward, another wanted self-check on loading, and program listing displayed during CLOADing (1).

CPU speedup was mentioned by three, full cursor control by six, 80-character line display (1), modular expansion box (2), with option of ROM in higher 16K (1), easier-to-use graphics (1), green monitor screen (1), and music (1).

Eight wanted higher disk capacity, bubble memory (1), greater memory without expansion box (3), and another wanted built-in timer. Also without buying expansion box: parallel port (5), IEEE 488 (1), paper tape (1), and card reader (1).

Also interface: real-world (3), joysticks (3), paddles (2), originate/answer modem (1), remote keyboard (1). On the keyboard, user-defined keys (2), and command keys (3).

Better power supply (4), built-in and battery backup (1,1), supplies and shielding

(RFI/EMI) accounted for 2,1 respectively.

Interest in rebuilt Radio-Shack-supplied Selectric was 3, echo-back printer-keyboard feature, 1, and Radio Shack Centronics modifications for graphics and lowercase, 1.

Larger video screen, (1), scrolling control scored (5), finer video scan (6), remote video terminal (1), and improved definition (3).

SOFTWARE

Increased accuracy was requested three times, speed once. Also eliminate bugs in Basic, 1, make error messages more specific, not wipe out variables during Reset, make compiler Basic available (2,1).

Also on Basic, user-defined functions (14), bigger ROMmed Basic, 3, remove unwanted math features (1), add append and chain features (1,2), MAT (5), IMAGE (1), password (1), slowed scrolling on LST (1). Also mentioned were GOSUB VAR, GOTO VAR, (1,1,1), syntax checking while keying (1), and having Level II insert a "F" at location of error, as does Level I.

Combined Level I & II in same computer fared 8, clock built into Level II (1), interrupts (1), improved editor (3), relocate editor/assembler (3), text editing (4), and system diagnostic cassette (3).

CPM drew one mention, improved DOS (3), typewriter-like Shift (1), Focal, Pascal, Pilot (1,3,2), plotting (6), and easier-to-use real-time clock (1).

\$15 for 12 issues

box 158, San Luis Rey CA 92068

TRS-80 COMPUTING 1:3

2

Want competitive price for add ons, Level I's good features

Lowercase, both CPU and in RSprinters as well as RS support of word processing.

A memory expansion kit that is competitively priced, so as to cut down the number of non-electronics skilled folks who would purchase the cheapest kit with untested RAMs and poor instructions, and end up either zapping the MOS RAMs or just plain getting bad ones. In my experience in development and production of electronics equipment for government and industry, I have always found that when equipment or components from others were incorporated in our gear, we always got the blame. As a result, I can see RS having returned any number of butchered-up units that have been worked on by owners who have trouble with the Thanksgiving Turkey, much less having any knowledge or experience working with high-density circuit boards and critical components. If RS provided such a kit, it should include the RAMs as well as DIP jumper blocks. If this was done, it could at least be assured that the non-experienced individual could be given proper directions with regards to installation, and that for sure he/she would be fully instructed not to get so excited about getting more RAM that he/she does a dance on a shag rug with leather-soled shoes and then kisses his MOS goodbye with a 1-inch spark.

Level I Basic should be dropped and only Level II offered. Level I is fine, and the instruction manual is well-done. One of the few that I have seen that can get a new comer into computing quickly, and in that regard is fine. The faults I would see with Level I are, in that in the interest in cutting down memory usage, any number of abbreviations of commands/statements are used, and I would question this for the average user. As an example: the word PRINT means something to almost everyone, but when shortened to P., both the uninformed as well as old-time Basic time-share users such as myself, have to think about it. For sure, the Level I Basic accepts the full statements, but the manual directs one towards the short form which is not usable in Level II or most other advanced Basic systems. In my case I have worked with computers for some 15 years and have been programming in Basic for at least 10 years, and would suggest that there is no reason for the existence of Level I in the TRS-80 now that the product has been established. I have always had access to computing activity until I went into business for myself, and it was only a few years ago I gave serious consideration to an EP system at 10 to 20 times the price. My point here is that I purchased a Level II so that I could obtain the necessary functions and capability. They all work fine, but when I attempt to teach my youngsters programming in Basic, I find it is damn hard to just let them read the Level I manual, since at least some of it does not apply to Level II on a one-to-one basis. So why bother with Level I, since those familiar with Basic will require retraining, as will all Level I users when they go to Level II. Level II is no harder than Level I in terms

of learning the basic operations and only happens to offer greater potential.

A keypad would be handy, and I see RS now offers it for \$90 which would seem a little high. If they threw in a lowercase mod at the same time, it would most likely be a good seller and would keep a lot of folks from butchering-up their circuit board with an exacto knife.

Regarding TRS-80 Computing. I find that the copies I have received to date very interesting. It is good to see folks developing some needed mods, and I would expect to see some of these in new TRS-80s before long. I do however have one suggestion in this regard. I would suspect that many of your readers are not skilled in electronics fabrication beyond a simple Heathkit or two, and could well cause themselves a problem attempting some of the suggested mods. Someplace along the line you are going to run into a guy who has at his TRS-80 with a kitchen knife, a 350-watt soldering gun, a roll of acid core and the wire left over from adding running lights to his camper. Thus every article should contain a statement that it should not be attempted by a novice until he has learned the right procedure and has the proper tools. Also, it would be a good idea to indicate if possible, how many units have been modified, and the extent to which the mod has been checked out. Most of the articles on mods are clear to me, but are a little on the sketchy side and could do with a little better drawings or referral to RS's tech manual, (a copy of which I haven't gotten yet) to make sure the owner cuts the right foil, finds the right IC etc.

In any case, keep up the good work. I might also mention that I would guess that many of us would like to see more on use of non-RS peripherals, as well as program listings of useful programs.

-G.W. STOMBERG, 3010 Broadmoor dr., Las Cruces NM 88001

LEVEL I FEATURES

I wish that Level II and Disk BASIC had kept all the nice features of Level I, such as:

- 1) You don't lose all your variables, strings and arrays every time you make the least change in your program—even one character.
- 2) You don't lose the whole program if you push Reset.
- 3) No need to dimension arrays. (If you have to DIM, you should be able to re-DIM later in the program.)
- 4) No need to reserve space for strings. (If you must, you should be able to change this without using CLEAR—for Pete's sake!)
- 5) Wrap-around graphics. A pleasant convenience (but you can program around this loss and survive.)
- 6) All those abbreviations—I really don't care about. I'm glad Level II/Disk has a ' symbol for REM—makes the program easier to scan, and I wish the interpreter didn't convert the ? (for Print) to the word PRINT when you

List—but these are minor.)

Other wishes include lowercase and denser graphics. Random files on disk don't have to be this complicated! (That ribbon cable between the keyboard and interface is too short! One strong point of the TRS-80 was that you could put the keyboard in a good typing position without having the video up against your nose. This cable ought to be shielded and at least two feet longer. And optional cables of various lengths should be available—shielded, of course.)

I could write a book on the good things in Level I (which, considering its size is miraculous!) and Level II and disk Basic. Except for the items above, the Radio Shack Basics are a delight. But this is a gripe session, right?

-B.C. TAYLOR, 3723 Purdue, Houston TX 77005

LOWERCASE KEYBOARD

Standard lowercase characters—this is so important, the others don't count for much—I voided the warranty to get lowercase and don't like having to do that!

Decent keyboard, with good feel and no repeats. I really think it's #&!*y to add a standard numeric keypad and penalize earlier purchasers by making them pay \$85 for it. It must cost almost nothing, or they couldn't make it standard with no price rise. For a \$10-15 service fee, I'd like it. For \$85...up theirs!!!

On Basic, Level II ability in Edit to Edit line#.

-R. HATCH, 5375 Wellesley, La Mesa CA 92041

USER FUNCTIONS, CLOCK, Reset

I really would have liked user defined functions included in Level II. There are many programs, mostly games, that require it.

It would be nice if the clock function in the expansion interface were available a little more easily.

The Reset switch—I would have liked it to have been located on the surface of the keyboard, but away from the main keys, and with a lock to prevent accidental tripping. And I am distressed by the remarks on the fact that you lose everything in the expansion interface memory when you hit the Reset button. I know that you can prevent loss by CSAVEing a program out, but it then requires you to CLOAD the program back in again to RUN, and any program over 20K takes a while to load at 500 baud!

And just a question—when are we going to have an Originate/Answer modem available to us? HMMMMMMMMM?

-BARRY J. KOEB, 5060 Bakman ave., Apt. 10, N. Hollywood CA 91601

LOWERCASE

While I realize that lowercase is of more importance to some than others, there should be an option for those who do prefer it. This option should be furnished by the Radio Shack in order that an owner can rest assured that his unit is being worked on by qualified personnel.

-J.D. ROSS, 4012 Shenandoah ave., Dallas TX 75205

Compiler could use Level II routines, wants list on loading

Also, with cassette, more than one program in memory at a time (1), and tape that converts non-Radio Shack tapes to Level II (1).

As for disk, editor/assembler (1), and less complicated files (1).

Of those who borrow or "covet" (words of the survey) a TRS-80, one thought the survey was for TRS-80 Computing editorial suggestions. Two of the remaining three want lowercase letters and higher resolution graphics, one further wants the printer to have lowercase letters and high resolution graphics.

Thomas A. Nelson of Salt Lake City wrote: "Non-bouncy keys; dependable tape. I like the design but want higher quality and better dependability. Wouldn't mind somewhat higher price. I don't like other computers because they do not have the support only a big company can give. Tandy could improve quality, raise price and sell me a computer". Nelson lives at 826 E. Parkway ave., zip 84106.

Here follow some of the more eloquent replies from the 162-return sample (about two-thirds of replies received to date):

WANTS MORE, MORE

More reliable keyboard (and debounced) with a lower profile, quieter, smoother action and n-key rollover.

A color scheme with lively colors. A tougher, less brittle plastic case such as used on some Infoton terminals. A 4-megahertz CPU and associated electronics.

A finer-scan video terminal. Lowercase and special characters that print. Full ASCII character set. At least 24x80 video screen. Full keyboard cursor control with line insertion and deletion. Complete control over video scrolling like a UNIVAC UNISCOPE 100 but smarter scroll control.

Screen tabs that are programmable and unique to the screen as in the U-100, as well as columnar tabs. Underlining, reverse video, protected and blinking fields (as well as tabs) that do not require (or occupy) dead spaces on the video screen. A winking cursor that does not erase the character in the same space with it, but changes back and forth between the cursor character and the character in that position. Control key and shift lock.

Ability to switch from Level I to Level II without losing memory or n-key rollover.

Finer resolution graphics capability. Ability to write in the space immediately to the left of a graphics square (but not in

TOLL-FREE NUMBER

Hugh Matthias' Computing Services now has a TOLL-FREE NUMBER—Oh, happy day! It is (800) 433-1679. He still has the old number too, so if you can't get through on the free number (business is expected to be brisk—can't imagine why) you may have to dial (817) 390-3583 and pay Ma Bell yourself.

the same square). Interface for color graphics on a home TV.

Big floppies with dual-sided and double density drives (1.6 megabyte) such as Shugart SA850. Rigid disks such as CAL-Comp Marksman or Shugart SA4000.

Programmable tabs that work on the printer as well—not like the Intel MOS 230 (yuchki)

A line-number oriented editor that works on Basic programs as well as assembly language.

A letter-quality printer. Stepwise upgrades to add the above or below features in reasonable dollar increments.

Fix bug in Level I that causes Blackjack to wipe out first two lines of source code if you enter nothing when it asks you to hit or stand etc. (and then play—or try to play—the next hand.)

Take out "A" abbreviation for "AT" in print statements. How silly! Why don't fractional steps always work on loops? Why is FOR-NEXT limited to 32K? (~32K TO=32K). Why can't we put REM after RETURN or GOTO? Int(-.5) is 0 but should be -1!

Don't get me wrong, I really like my TRS-80. It is very addicting. I want more, more, more, more, more!!!

—JON KETTENHOFEN, 5810 W. Carol Ann way, Glendale AZ 85306

'SAFETY' CLOAD

Guns have "safety" switches. Why not a CLOAD safety switch or program mod so a truly stupid like me cannot lose or unintentionally "wipe-out" during CLOAD? Why not have every CLOAD a CLOAD? unless you manually over-ride it? Grief! Grief! Grief!

How about a decent Level II tutorial for text for Level II too? (by Dave Lein).

Why not offer a low-cost power interrupt (save your program) option? It could be either simple "A" cell ni-cads for the +5 VDC, +12VDC and -5VDC requirements and only have to run a minute or two...or conversely, a std 12VDC auto storage battery driving a 120VAC inverter, a la Heathkit, which the TRS-80 uses as a power source.

How about offering a DIP switch selected option that allows us users to purchase from Radio Shack a ROM (12K up) option for either FORTRAN (yuk) or PASCAL (yeech)? I would certainly buy it.

Rather than save 5¢ a TRS-80 system, why not make the connecting cables 12" longer so my two cassettes are accessible...also bring video display cable out of the REAR.

There is absolutely no valid excuse for selling the expansion/interface without a decent manual, schematic, or even simplistic explanation of what it does and how it works!

Include one ounce of methyl alcohol and a swab with every cassette. Maybe every TRS-80 owner would get the message about "clean cassette heads work better." (Seems like I have "fixed" every cassette in NY state this way).

—ROBERT M. RICHARDSON, Drawer 1065, Chautauqua NY 14722

EXPANSION INTERFACE

Instead of expansion interface being "all inclusive" it may have been better if you could add controller or RAM boards as you need them rather than giving you disk controllers if you want only more RAM, and so forth.

—JOHN F. STRAZZARINO, 637 Brussels st., San Francisco CA 94134

COMPILED BASIC

Two cassettes without expansion interface.

Compiled Basic with same statements as Level II. It could produce a series of subroutine calls to Level II ROM.

Ability to use cassette for unattended operation of long programs. This requires ability to link programs and some way to rewind cassette and switch from Read to Write under software control. Floppy disks can do this, but they are expensive and have limited storage capacity. If cassettes can be used unattended, speed is not a primary consideration.

—PAUL GEISSLER, 12504 Windover Turn, Bowie MD 20715

BETTER DOCUMENTATION

Steve Leininger has given us a pretty good machine with the help of Radio Shack merchandising but it lacks certain refinements to qualify as a business system, lowercase printing and display. And since CP/M probably supports the broadest set of business applications software, it would be desirable to have a compatible TRS-80 CP/M system especially as Radio Shack isn't turning out business software applications as fast as they are TRS-80 computers that are supposed to be of or have business capability.

Some features are probably in the system that aren't even documented, and some features such as chaining are mentioned in some of Tandy-Radio Shack's literature, but don't seem to be available or aren't explained.

On the whole, it's a pretty good system (the only one I have experience with), but it is not without potential to cause one frustrations. Radio Shack and the TRS-80 did a lot to advance microcomputing in spite of the TRS-80's shortcomings.

—T. SWALENBERG, box 13089, Columbus OH 43213

LIST ON LOAD

I would enjoy the computer listing the program as it is loading. This would let you know what you were loading and identify any loading problems before the end of the load.

I would also like to know how to prevent the computer from clearing all data every time I type RUN and/or change a line in my program. In fact, it would help if the instruction manual had enough information to allow some working with machine level changes in the ROM. Don't get me wrong—I love it, but these changes would make it more helpful to me.

—WILLIAM C. SHARPE, 457 Moreland ave. N.E., Atlanta GA 30317

Disk-system problem: that 'lost data during read' (ugh!)

By JOHN STRONG
Author copyright 1979
3733 Mt. Almagosa pl.
San Diego CA 92111

There are a series of unpleasant error messages which some DOS users see occasionally. One extremely aggravating message is DATA LOST DURING READ. It causes the TRS-80 to go back into TRSDOS from Basic, give a DOSREADY message and erase everything in RAM. Back to GO and do not collect \$200!!!

If you had a painstakingly-created program or computation in RAM—that's tuff. It seems reasonable to a dumb user (me) that this particular error message shouldn't have to wipe out RAM. How about that Radio Shack?

Moaning won't help much, but certain other measures ease the pain. We have about ten DOS users in our San Diego TUG. When we started comparing notes about TRS problems we were surprised to find DOS problems rather common. Some users (neophytes to computing) were under the impression that frequent disk errors were par for the course. Not true at all. A few DOS users report virtually trouble-free operation, sometimes from the very start and sometimes after various repairs. Presumably, all DOS systems should act that way once their bugs are fixed.

We list below some of the things you can do or cures you can try if you are having DOS problems. Some of the items are recommended by Radio Shack, others are the untested suggestions of apparently knowledgeable people. In any event read the whole list and try the easy cures first. Let us know how you come out.

YOUR DEALER

Talk over your problem with your dealer. He probably won't help much because few dealers have direct experience with DOS—but try anyway. It makes him feel important.

R.S. REPAIRMAN

Turn in the entire computer to your dealer to be fixed if it develops frequent DOS errors. Your local official Radio Shack repairman should be the best qualified to guide you. Ideally, do this before the warranty on the interface expires.

HUGH MATTHIAS

Call or write Hugh Matthias, Radio Shack Computing Services, box 185, Ft. Worth TX 76162. (817) 390-3583, ask to speak to a DOS programming expert and rap with him. He has some extremely helpful experts on his staff and they are sympathetic and helpful. Some of the items in this list are from them. As mentioned elsewhere in this issue, Hugh Matthias also has a toll-free number, (800) 433-1679.

INTERFERENCE

Interference and noise on the AC power line can cause DOS glitches. A line interference filter is sometimes helpful. Radio Shack sells one for TV, AM and FM: Archer Cat. #15-1106. The boys (and girls) in the back room at Matthias' recommend one sold by Allied Electronics:

"Twin-T" AC Filter #7542060/10R1 at \$16.98 as being the best available for TRS-80 use. If you have only one filter available it should go on the power cord from the interface. Don't get that cord mixed up with the power cord from the CPU power supply which happens also to be located in the interface.

Do not attempt to use one line filter for your entire TRS-80 system. To do so would leave the interface unprotected from other units in the system which might be making noise: line printer, disk drives, etc. If you have a second filter, put it on the CPU. Beyond that, who knows? I would try the disk drives but it is your system. Experiment.

LINE SURGES

Power surges on the AC line may be to blame. High voltage surges may damage the computer and low voltage surges may cause the power supplies to go out of regulation, making the computer crash.

If the surges are due to nearby heavy equipment being switched on or off, plug the computer into another circuit. That may help. An expensive but more certain solution would be to buy a Sola constant voltage transformer at an electronic equipment store. Radio Shack doesn't sell these transformers. The line printer probably does not need to be plugged into the Sola, which is lucky, because it takes so much current.

Just on general principles you should use good, heavy extension cords and multiple receptacle strips. Avoid a rat's nest of cords and cube sockets.

BAD MEMORY

Bad memory chips may be to blame. In the early months of the TRS-80 program some bad memory chips were used. They weren't bad then but they are now and they cause a bunch of irritating problems—especially mysterious syntax errors. Radio Shack is eager to root out these bad chips and replace them free. (If you are in warranty?)

BUFFER CABLE

Radio Shack has found that some problems in expansion interfaces with 16K or 32K memory are due to parts tolerance and design margin. If your repairman finds that your computer is one of the few that has this problem, he will install a buffer cable between the keyboard and the interface and make certain internal changes in the interface. Sometimes it helps, and sometimes it doesn't.

One thing is certain. Once you have had the buffer cable modification, NEVER switch back to the old cable. Doing so will burn out the interface power supply.

BACKUP DISKS

Radio Shack says the very first thing you should do with your new DOS system is to make a BACKUP of the TRSDOS disk. I disagree. I think you should make three backups! Boy, when you are out of TRSDOS disks, you're out of computing!! I know. It happened to me. And while you are at it, make two backups of any important data

disks you may be using.

This won't solve the problem completely, but can convert a major disaster into a minor irritation. Remember that, unlike cassettes, disks can be destroyed if there is a computer failure during reading. That is, the information on a disk can be erased or changed so it is permanently unavailable. And, unfortunately, there are plenty of ways to permanently damage a disk.

FAULTY DISKS

Bad diskettes may be to blame. No matter how many times you bulk-erase them, they continue to cause sporadic errors.

HOW THIS REPORT GOT WRITTEN

It all started in mid-October when I started using my new dual-drive TRSDOS system. Problems galore—most of them due to my inexperience and ignorance. With the help of a couple of smart Radio Shack dealers and other friends who had TRSDOS systems, I finally got my system going. But operation was far from acceptable and I was desperate. I planned to use the system for a business application and without a lot more reliability, the operation was doomed.

First, I went to a San Diego TUG meeting and talked to all 12 members who had disk systems. Some had never had any trouble at all, some had problems but cured them and others still had serious problems and were mad. I listened to everybody and noted all cures and improvements.

Then I put myself in the hands of our local TRS-80 repairman, Tim Hensler. He helped a lot—especially when he pointed out that my two drives were connected backwards! Gadzooks! Still not 100 per cent reliable though.

Then on a business trip through Texas, I stopped in Ft. Worth for face to face discussions with the Matthias crew of TRS-80 problem solvers.

So this article is the result. A compilation of all the remotely sensible-sounding cures I've heard about for reducing TRS-80 problems. I haven't checked them all, but I presume that you are as eager for immediate help as I was, so here they are, unchecked. Try any or all of them and if they work, use them.

It is obvious at this point that no one particular item is the source of most problems. Even the famous buffered cable fix does no good on some systems—probably because those systems are being goofed up by other things: disk damage, interference or what not.

It surprised me to note that TRS-80 owners with previous experience on large computers had the least trouble. Maybe that was due to their more reverent handling of diskettes and care to ensure a clean environment for the TRS-80. We slobs should take note and clean up our act.

—JOHN

LOST DATA, Cont. :

To guard against this, assign every one of your diskettes a serial number. Then make a record of every disk error that occurs in your system, the serial number of the diskette involved and the disk drive number. You may be surprised to find that some diskettes never have errors and others are error-prone. Replace the stinkers.

If one of your DOS disks is the culprit, replace it with a new DOS disk from Radio Shack. Or you could replace it with a BACKUP (on a new blank disk) of one of your other DOS disks which works properly. If the culprit turns out to be one used in drive 1, 2 or 3, replace it with a new disk which you have formatted. In both cases you may be able to reuse the bad disk after erasing it with a bulk eraser then FORMATING it, noting any bad tracks that are detected. Then bulk-erase and reFORMAT it a couple more times. If the same tracks show up bad every time, it is probably safe to use it as a data disk with those tracks locked out. But if different tracks show up bad, you have a real stinker on your hands. Retire it.

MASTER SWITCH NOT GOOD

Tim Hensler told me about this one. Avoid using one master switch on a plug strip to turn off/on the entire TRS-80 system. Turn off/on each unit in turn using its local power switch—keyboard last.

That sounded odd to me but a couple of experts pointed out that turning on the whole system all at once could cause voltage spikes or transients which might blow out an IC—even including the Z80 itself.

The local power switch on each unit usually interrupts the DC voltage to its circuits but leaves the AC to its power supply still turned on. Personally, I am not very keen on leaving my power supplies on all the time, especially when I am not home. So instead, I plug all my units into a large plug strip with a master switch. After I have individually turned off the more vulnerable units (the keyboard and the interface), I turn off the master switch and let the transients do what they will. My major ICs are now isolated and protected because I turned them off first.

How about that Radio Shack? Is that OK?

By the way, the officially-sanctioned power-up sequence is: Turn ON the interface. Turn ON the mini disk drives one after the other with the terminal drive first (26-1160). Turn ON the keyboard last. Power-down is the reverse.

CLOCK OFF

One user recommends that the clock always be turned off when it is not being used (CMD" T"). Presumably, this should eliminate or sharply reduce disk errors. It is not clear which commands require that the clock be ON but this could be found out without too much trouble. The problem is that I haven't found a single computer expert who thinks this makes any sense at all. The only thing in its favor is the fact that two different users insist it solved all their problems. So try it. You may like it.

DUST

The evil specter of dust on diskettes hovers over us all. Keep those disks clean and keep dust covers over the computer when it is not being used. We have no proof that Mr. Clean has less disk errors than anyone else, but it sounds like a good idea anyway.

DISK VENTILATION

The first TRS-80 disk drives tended to overheat if used for long periods or with heavy-duty cycles. If your disks develop errors after their drives have heated up for an hour or more, they may need better ventilation. Mini-disk enclosures are now available with four ventilation slots on the top cover and four in the bottom chassis. Your local TRS-80 repairman can install them, free—presumably, if your covers and chassis are the old type with no ventilation slots.

LOGIC BOARDS

We have two reports of cases where persistent disk errors stopped only after replacement of logic boards in the keyboard, interface or disk drives. Drastic action indeed.

TIRED DISKS

Here is one for the books. One user found all his disk problems miraculously cured when he operated his drive unit on its side! Explain that if you can. Tired disks? Iron-poor blood? It sounds to me like he had better get his disk drive to his friendly TRS-80 repairman—and quickly. It has a screw loose in its innards.

STATIC ELECTRICITY

Back in the old days of high voltages, high currents and high wattages we had no problem with static electricity, just heat. Now with low voltages, currents and watts the heat problem is solved but we have picked up a new sensitivity to static electricity. All sorts of weird goings-on are blamed on static charges—especially with computers used in rooms with thick, spark-producing carpets. Humidifiers might help on cold, dry days. Metallic table tops might help. I have heard of people lining the plastic cases with aluminum foil—but that sounds much too dangerous for me.

I hear that 3M makes an anti-static top cover for such applications. Anyone know about it?

CMD"E"

Want to know more about what caused that DISK I/O ERROR? I hear that CMD"E" will give you that information. Haven't tried it yet though.

TERMINAL DRIVE: 26-1160

Be aware that the instructions on where to connect what disk drive are wrong in the Mini Disk Operators Manual. Refer instead to "More Things You Should Know" August 30, 1978, Item #1. Specifically, a 26-1160 should go in the terminal drive (the one with the highest drive number) and 26-1161 drives should be used in all other positions.

DISKS NEED SLEEP TOO

Never leave disks in a disk drive overnight or for several hours, even if the

computer is turned off, and especially not when the diskette retaining clip is closed. That presses the diskette up against the read/write head leaving a dimple on the surface of the diskette in the last track used.

That dimple will make the head skip bits and cause a disk error. In some cases the dimple will be permanent and that track will never be usable again. If you are lucky, a few hours rest (out of the disk drive, of course) will restore the disk to health and permit you to use the data on it. Never turn the computer on or off with the disk in the drive slot. Serious damage may occur. The proper time to insert and remove the disk is discussed below:

INSERTING A DISKETTE

Radio Shack recommends the following procedure to insert and remove diskettes:

The diskette should be inserted before the keyboard is turned on but after all the rest of the computer has been turned on.

Remove the diskette after the program has ended and all files CLOSED but before any power switches are turned off.

Be sure that the disk drive is stopped when you insert or remove a diskette.

Check that the hole in the center of the diskette is centered reasonably well in the jacket hole. If not, use a pen or pencil (not your finger) to center the diskette approximately.

Insert the diskette in the slot, write-protect notch up, and make sure it is seated properly.

Slowly and carefully close the mini-disk latch. If the latch doesn't close easily, don't force it. Re-insert the diskette and try again. A little unnecessary brutality at this point can chew up the edge of the hole in the diskette and it's goodbye forever to that disk!

TLC FOR DISKETTES

It was Larry Wright, an astute Radio Shack store manager from Kansas City who first made me aware of the need for gentle treatment of diskettes. He pointed out that many DOS troubles can be prevented by disk handling procedures that have been common in the computer field for years. We newcomers just don't know about them—so here goes. The following list includes suggestions from many Radio Shack sources including Larry Wright and Hugh Matthias experts.

Keep diskettes in closed storage envelopes whenever they are not being used in the computer. Never leave them in a drive unit when the computer is turned off.

Don't touch ANY of the exposed surfaces of the diskette and don't try to wipe or clean the diskette.

No magnetic fields from transformers, motors or magnets please.

Diskettes hate heat and direct sunlight. Proper storage temperatures are between 50 and 125 deg. F (12-52 deg. C).

No smoking, cigarette ashes or dust around diskettes.

Write on the diskette jacket label ONLY with a felt-tip pen. A ballpoint or lead pencil can damage the diskette surface.

Again, be sure the disk drive is stopped when you insert or remove a diskette.

Store diskettes vertically like phono records so they won't warp.

(Continued on page 17)

Three-liner lets you combine two Basic programs

By RON MARKEL

TRS-80 Level II Basic maintains a "start of program" pointer at location X'40A4' (Decimal 16548) in its RAM communication area (storage from address X'4000 to address X'42E8'—see Level II Basic reference manual pages D/1 and D/2). This pointer is initialized to X'42E9'

Level II uses this shorthand

Compliments of Joe Deutsch, the following represent Level II tokens for system commands.

These tokens are used to save space in storage of Level II commands.

As character codes 128-255 are used for graphic commands and will not be present in Basic statements, this range of values can be used to store one-character values representing the following commands. You can look at the values stored by doing some experimentation with PEEKs after finding the program storage area in RAM.

128 END		
129 FOR	171 LSET	213 =
130 RESET	172 RSET	214
131 SET	173 SAVE	215 SQN
132 CLS	174 SYSTEM	216 INT
133 CMD	175 LPRINT	217 ABS
134 RANDOM	176 DEF	218 FRE
135 NEXT	177 POKE	219 INP
136 DATA	178 PRINT	220 POS
137 INPUT	179 CONT	221 SQR
138 DIM	180 LIST	222 RND
139 READ	181 LLIST	223 LOG
140 LET	182 DELETE	224 EXP
141 GOTO	183 AUTO	225 COS
142 RUN	184 CLEAR	226 SIN
143 IF	185 CLOAD	227 TAN
144 RESTORE	186 CSAVE	228 ATN
145 GOSUB	187 NEW	229 PEEK
146 RETURN	188 TAB	230 CVI
147 REM	189 TO	231 CVS
148 STOP	190 FN	232 CVD
149 ELSE	191 USING	233 EOF
150 TRON	192 VARPTR	234 LOC
151 TROFF	193USR	235 LOF
152 DEFSTR	194 ERL	236 MKI\$
153 DEFINT	195 ERR	237 MKS\$
154 DEFSTR	196 STRING\$	238 MKD\$
155 DEFDBL	197 INSTR	239 CINT
156 LINE	198 POINT	240 CSNG
157 EDIT	199 TIME\$	241 CDBL
158 ERROR	200 MEM	242 FIX
159 RESUME	201 INKEY\$	243 LEN
160 OUT	202 THEN	244 STR\$
161 ON	203 NOT	245 VAL
162 OPEN	204 STEP	246 ASC
163 FIELD	205 +	247 CHR\$
164 GET	206 -	248 LEFT\$
165 PUT	207 *	249 RIGHT\$
166 CLOSE	208 /	250 MID\$
167 LOAD	209 ↑	251
168 MERGE	210 AND	252
169 NAME	211 OR	253 ?
170 KILL	212 >	254
		255

(Decimal 17129) during power-up initialization.

Using Small Systems Software's RSM1-S machine-language monitor, I was able to find that there are 9 "LD HL, (40A4)" references in the Level II ROM.

Assuming that the TRS-80 DOS would probably require relocation of the "start of program" pointer and that was why Level II routines referred to a pointer that could be easily changed, I ran a test using Poke from the keyboard and changed this pointer to refer to an "end of program" statement.

I then issued a List and received back a Ready message indicating that Level II did not think that there was a program in the machine. I then issued a Cload for a short subroutine that had been kept on tape.

After the Cload completed I issued another List and received the complete subroutine listing. Using Poke again, I replaced the original "start of program" pointer, issued List and this time received back both the original program and the "Appended" subroutine.

To facilitate Appending programs, the following short Basic program was developed:

```

1 CLS:PRINT PEEK (16549); " ";PEEK
  (16548); E=17129
2 S=E:E=PEEK(S+1)*256+PEEK(S):
  IF E># GOTO 2
3 POKE 16549,INT(S/256):POKE 16548
  S-INT(S/256)*256:END

```

To Append a program or subroutine (line numbers should not conflict with the program already in storage) the following procedure should be followed:

- 1) Key in the above program.
- 2) Issue Run.
- 3) Save the PRINTed Peek addresses (they should be 66 233).

- 4) Issue the Cload to bring in the Basic code to be Appended.
 - 5) From the keyboard issue: Poke 16549, 66: Poke 16548,233.
 - 6) Issue List to check out your new combined program.
- From Orange County TRS-80 Newsletter.

More 'goodies' are hidden in Level I Basic

In reference to Edgar Loutit's TRS-80 Level I "Goodies" article on page 16 of issue 1:1, please note that the Level I manual explains (on page 46) that FOR-NEXT loops can be stopped by any WHOLE number (there's a built-in integer function in Level I ROM).

Boolean Algebra (the mathematical base for computer switching circuits) uses the arithmetic multiplication sign (·) the raised dot) and the arithmetic addition sign (+) as logical operators. The logical connective for expressing the AND function is the multiplication sign while the addition sign denotes the OR function.

The relational operators form the logical NOR and Exclusive-OR functions. Level II really confuses things by allowing the use of the words "AND", "OR" and "NOT".

I also believe that it's important to inform readers that neither Level I nor Level II Basic ROM will support lowercase... they must write their own software (or buy it).

—RICHARD E. DOUGLAS, Rte. 2, box 149D, Clewiston FL 33440

Columbus commuter computer uses TRS-80 disk system

An Ohio radio station used a TRS-80 computer to help find rides for some of the 30,000 stranded by a bus system shutdown.

When transport workers recently struck the Central Ohio Transit Authority, Columbus radio station WNCI launched a program to aid car pooling.

"After the first morning," according to WNCI news director Stan Broadway, "it became apparent that there had to be a better way than the stacks of paper we'd accumulated."

A call to Radio Shack's Columbus office resulted in the loan of a TRS-80 system, and store manager William H. Loudon modified a customer information program to put the WNCI/Radio Shack Car Pool Computer program into operation.

"Thanks to Loudon's program, we were able to enter driver volunteers, their address, telephone number and zip codes of origination and destination, and other information," Broadway said. "When a per-

son needing a ride called, we then quickly matched them up with someone close by, going to roughly the same destination.

"As an example of how well the computer itself worked, we first entered the list of riders we had on waiting, and that immediately produced six links we had simply overlooked.

"We think the program was able to accomplish a very important task, and we're indebted to the quick reaction from Radio Shack's people here in helping us, and in turn helping the city of Columbus," Broadway continued. "We are considering launching a real computerized car pool promotion, setting up permanent car pools to help in conservation and traffic reduction in the future," he said.

The TRS-80 microcomputer system is manufactured and sold by Radio Shack stores and dealers, nationwide, and is suitable for a wide variety of business, educational and home applications.

Radio Shack is a division of Tandy Corporation (NYSE).

carpool program

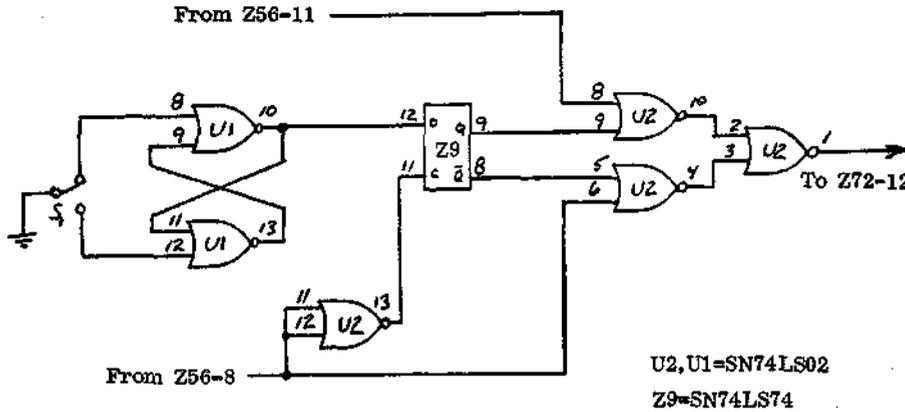
```
1 WNCI / RADIO SHACK BUS STRIKE INFO PROGRAM
2 WRITTEN FOR WNCI RADIO
3 BY BILL LOUDEN PHONE (614) 836-3060
4 THIS PROGRAM IS A QUICK MODIFICATION OF AN
5 EXISTING MAILING/INFO PROGRAM : SOME STATEMENTS
6 ARE NOT NECESSARY IN THIS ADAPTATION. BASED ON
7 A 16K RAM DUAL DISK SYSTEM.
10 CLS
20 CLEAR 500
25 OPEN "R",1,"WNCI/PIL:1"
26 FIELD 1,5 AS Z0$,5 AS ZD$,25 AS N$,25 AS A1$,25 AS A2$,
12 AS P$,2 AS R$,8AS T1$,8 AS T2$
27 IF W1=99 THEN RETURN
30 GOTO 1000
50 SS=LOF(1)
51 SS=SS+1
55 CLS
60 NA$="":INPUT "ENTER THE NAME";NA$:LSETN$=NA$
61 SA$="":INPUT "ENTER THE STREET ADDRESS";SA$:LSETA1$=SA$
62 ZZ$="":INPUT "ENTER THE CITY ";ZZ$:LSETA2$=ZZ$
63 Z1$="":INPUT"ENTER THE ORIGINATING ZIP CODE";Z1$:
LSETZ0$=Z1$:IFLEN(Z1$)<>5 THEN 63
64 Z2$="":INPUT"ENTER THE DESTINATION ZIP CODE";Z2$:
LSETZD$=Z2$:IFLEN(Z2$)<>5THEN64
70 PH$="":INPUT "ENTER THE PHONE #";PH$:LSETP$=PH$
80 R1%=0:INPUT"ENTER THE AMOUNT OF RIDERS";R1%:
LSETR$=MKI$(R1%)
90 T0$="":LINEINPUT"ENTER THE MORNING DRIVE TIME";T0$:
LSET T1$=T0$
100 TD$="":LINEINPUT"ENTER THE EVENING DRIVE TIME";TD$:
LSET T2$=TD$
110 A$=""
120 INPUT "IF INFORMATION IS GOOD PRESS ENTER, IF A
MISTAKE WAS MADE ENTER 'BAD'";AS:IF
A$="BAD"THEN GOTO 55
170 PUT 1,SS
171 SS=SS+1
180 GOTO 1000
500 CLS:RT=99
510 INPUT "ENTER THE MORNING ZIP";Z1$:IFLEN(Z1$)<>5
THEN 500
515 INPUT"ENTER THE EVENING ZIP";Z2$:IFLEN(Z2$)<>5THEN500
520 FIELD 1,5 AS Z0$,5 AS ZD$,87 AS DUMMYS,2 AS R$,
16 AS DUMMYS
555 IF RR=99 THEN 575
575 FOR XX=1 TO LOF (1)
580 GET 1,XX:R1%=CVI(R$): INSERT INTO 581 'AND R1%>0 I'
TO CHECK IF ROOM IS LEFT
581 IF Z0$=Z1$ AND ZD$=Z2$ THEN 590
582 NEXT : CLS : PRINT "NO ZIP CODE MATCH FOUND"
583 GOTO 620
590 GOSUB5030:INPUT"IS THIS MATCH OR ( YES OR NO )";DIS:
IFU1$="NO"THEN 582 ELSE R1%=R1%-1:IFR1%<0 THENR1%=0
600 LSETR$=MKI$(R1%):W1=99:PUT1,XX
611 IF RE=99 THEN RETURN
620 PRINT
630 PRINT
635 A$=""
640 INPUT"TYPE - GO - FOR NEXT ENTRY. PRESS ENTER TO
RETURN TO INDEX":A$
650 RR=0
660 IF A$<>"GO" THEN 1000
670 RR=99 : A$="" : GOTO 500
1000 CLS
1010 QQ=140:D$=STRING$(60,QQ)
1020 PRINT
1030 PRINT D$
1040 PRINT TAB(10)"WNCI / TRS-80 CAR POOL INFORMATION
LIST"
1050 PRINT D$
1060 PRINTTAB(5)"WRITTEN BY BILL LOUDEN RADIO SHACK
WAREHOUSE STORE"
1065 PRINTD$:PRINT@340,"PHONE : 836-3060 ":PRINTD$
1070 PRINT "DO YOU WISH TO:"
1080 PRINT " 1) CREATE A NEW ENTRY"
1090 PRINT " 2) MATCH ZIP CODES"
```

```
1121 PRINT " 3) PRINT COMPLETE LIST TO TV"
1122 PRINT " 4) PRINT COMPLETE LIST TO
PRINTER"
1125 PRINT " 5) SEARCH FILES"
1126 PRINT " 6) TO EDIT FILE"
1127 PRINT " 7) END PROGRAM"
1130 PRINT D$
1140 INPUT "ENTER YOUR CHOICE BY ITS NUMBER";CHOICE
1145 IF CHOICE<1 THEN 1000
1150 ON CHOICE GOTO 50,500,2000,7000,5100,9000,1200
1190 GOTO 1000
1200 CLOSE : END
2000 CLS:FOR XX=1 TO LOF(1)
2010 GET 1,XX:R1%=CVI(R$):RT=99:GOSUB 5030
2015 FOR A=1TO 150:NEXTA
2020 NEXT
2025 INPUT"PRESS ENTER":A$
2030 GOTO 1000
5010 FOR SS=1 TO LOF(1)
5030 PRINTD$: PRINT ROUTINE
5031 PRINTN$;TAB(30)"ORIG. ZIP :";Z0$;TAB(48)"TIME ";T1$
5032 PRINTA1$;TAB(30)"DEST. ZIP :";ZD$;TAB(48)"TIME ";T2$
5033 PRINTA2$;" ";TAB(30)"RIDERS : ";R1%
5034 PRINT"PHONE # "P$;TAB(50)"FILE # .":IF XX=0 PRINTSS
ELSE PRINTXX
5035 IF RE=99 RETURN
5039 PRINTD$:IF RT=99 RETURN
5040 NEXT
5050 INPUT "PRESS ENTER TO RETURN TO MENU";V$
5060 GOTO 1000
5100 CLS
5110 PRINT D$
5120 PRINT "DO YOU WISH TO SEARCH USING THE:"
5130 PRINT " 1) MORNING ZIP CODE"
5140 PRINT " 2) EVENING ZIP CODE"
5150 PRINT " 3) LAST NAME"
5160 PRINT D$
5170 INPUT "ENTER YOUR CHOICE BY ITS NUMBER";Q
5175 W1=99:GOSUB26:IFQ>3 THEN 5100
5180 ON Q GOTO 5200,5400,5600,5100
5190 GOTO 5100
5200 CLS
5205 INPUT "ENTER THE CHARACTER(S) TO BE SEARCHED FOR";L$
5210 LL=LEN(L$)
5215 FOR SS=1 TO LOF(1)
5220 GET 1,SS
5222 IF LEFT$(R$,LL)=L$ THEN RT=99:GOSUB 5030
5230 NEXT
5235 GOTO 5050
5400 CLS
5405 INPUT "ENTER THE CHARACTER(S) TO BE SEARCHED FOR";L$
5410 LL=LEN(L$)
5415 FOR SS=1 TO LOF(1)
5420 GET 1,SS
5430 IFZD$=L$ THEN RT=99:GOSUB 5030:GOTO5050
5435 NEXT SS:GOTO 5050
5600 CLS
5605 INPUT "ENTER THE CHARACTER(S) TO BE SEARCHED FOR";L$
5610 LL=LEN(L$)
5615 FOR SS=1 TO LOF(1)
5620 GET 1,SS
5622 FOR Z=1TOLEN L$
5625 IF MID$(R$,Z,1)=Z THEN 5640
5630 NEXT Z,SS
5635 GOTO 5050
5640 IF MID$(R$,Z+1,LL)=L$ THEN RT=99:GOSUB 5030
5645 NEXT SS:GOTO5050
7000 CLS:PRINT:PRINT:PRINT:PRINT:INPUT"READY PRINTER .....
PRESS ENTER":A1$
7001 IF PEEK(14312)>127 THEN CLS:FORP1=1TO15:PRINT@320,
" ":PRINTCHR$(23)"LINE PRINTER NOT READY":FORA=1
TO50:NEXT A:CLS:NEXTP1:GOTO8000
7002 FOR SS=1TOLOF(1)
7003 D$=STRING$(60,45)
7005 LPRINT"NAME";TAB(30)"MORNING ZIP";
TAB(50)"EVENING ZIP"
7020 GET 1,SS
7022 LPRINT D$
7025 LPRINT"FILE # : ";SS
7030 LPRINTN$;TAB(30)Z0$;TAB(50)ZD$
7040 LPRINTA1$;TAB(30)T1$;TAB(50)T2$
7050 LPRINT A2$
7060 LPRINT P$;TAB(30)"RIDERS";R1%
7070 LPRINT D$:LPRINT D$
7080 NEXT
7085 D$=STRING$(60,140)
7090 GOTO 1000
8000 CLS:INPUT"DO WISH OUTPUT ON SCREEN ... YES OR NO ..."
:CH$
8001 IF CH$="YES" THENRT=99:FORSS=1TO LOF(1):GET1,SS:
GOSUB5030:NEXTSS:GOTO 5050 ELSE GOTO 1000
9000 CLS:INPUT"ENTER FILE # TO BE CHANGED ";FF:
IF FF>LOF(1) THEN9000
9010 W1=99:GOSUB26:GET 1,FF:SS=FF:GOTO 55
```

\$15 for 12 issues

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8 . TRS-80 COMPUTING 1:3



Here's better way to speed up clock

In Steve Gibson's article on speeding up the TRS-80, I found one error. Step 5 should be pin '11' not pin 12 of ICZ56. I found this works but the memory hangs up whenever you switch speeds. (Also, step 6, pin 14 of Z56, not Z43...Ed.)

I made the following changes (see Figure 1) and found I can load a tape at one speed, switch speed (when processor is idle) and run at the other speed. This allows me to load my slow speed tapes, switch speeds and generate high speed tapes. Also, it allows me to continue to swap tapes with my friends.

The mod is as follows:

1. If you use Z7 on the processor, carefully cut and separate the following pin connection 10,11,12,13.
2. Cut trace going from Z56-8 to Z72-12 as described in Steve Gibson's article.
3. Add jumper from Z43-2 to Z56-14.
4. Wire rest of circuit per diagram.
5. Connect U1 pins 2,3,5 and 6 to 7.

You now have a circuit that will run at one speed or the other, without losing the program in memory.

—HENRY BARTMAN, 12 Stage Coach rd., Windsor CT 06095

Wants 4 MHz clock speed

I have recently read about your service in an issue of Interface Age. I own a TRS-80 and am interested in performing hardware modifications to the unit. I have already installed Level II and 16K myself, and as per the article I read, would like to re-install Level I, have lowercase letters, etc.

One thing which I am particularly interested in performing, which I have not heard anyone doing as yet, is to replace the crystal, the CPU and do whatever else is necessary to speed up the unit to 4MHz. I was wondering if you have any such information on this type of a modification and if not, may I recommend that someone take on such a project, as I am sure there will be quite a number of people interested in performing such a modification.

—Joseph Boykin, Ohio State University, Department of Psychology, 217N E. Stadium, 404C W. 17th ave., Columbus OH 43210

BETTER CLOCK SPEEDUP—Diagram shows Henry Bartman's approach, which allows speed-up without loss of program in memory. TRS-80 Computing tested it, and has not gotten it going. Proceed at own risk (but it was easy to restore circuit. ED)

Expansion error for 'D' boards

I believe there is an error on p.10 TRS-80 Computing, Vol. 1, No. 1, concerning 16K memory expansion "Here's how to expand TRS-80 memory to 16K".

If the jumpers are installed as diagrammed, the memory on my Level II "D" series board will not clear.

I picked up an expansion kit from "Jade Computer Products" which incidentally has identical instructions as per the above-mentioned article.

The memory upgrade will work if you change the jumpers to match the diagram on page 15, Vol. 1, No. 2 (the Level II ROM upgrade). I know the Level II 16K diagram is correct—the Level I 16K appears to be correct—but I don't know for sure.

—DOUG A. KOPESO, 3970 Gloria ln., Carlsbad CA 92008

Video checkers on cassette

Compu-Quote of Canoga Park, California has converted its popular video checkers to TRS-80 16K Level II. The new cassette produces complete checkerboard graphics.

The game is played conforming to international rules. As the player and the computer take turns, the checkers blink and move to indicate passage. Kinged pieces are identified on the display and messages appear at the right of the board relating to each move. In accordance with international rules of the game, the program will not accept illegal moves and warns of their entry.

Video checkers may be ordered for \$14.95 from Compu-Quote, 6914 Berquist ave., Canoga Park CA 91307. Specify TRS-80 version.

Lowercase mod story errs

Apparently, someone did not check the modifications listed in the 1:1 edition, "Here's a fix for Level II lowercase"; because, as presented, the fix does not work!

On the logic drawing on page 29, Q is reset high during normal BASIC operation. But, in that case, pin 13 of Z25 (a positive-OR/negative-AND gate) is enabled and so the normal RS character set does not appear. In other words, swap the connections to pins 1 and 13 on Z25.

Secondly, if Q is high during BASIC operation, then a 1 (not a 0 as the text states) must be strobed in through the D-input to make the flip-flop toggle. In other words, enable the lowercase mod by sending 10 (hex) to port FF—not 00 (hex)!

Lastly, the procedure given to isolate the unused-by-RS pins on Z25 may not be complete. On my machine, pins 2 and 13 are connected by an invisible and inaccessible track on the component side of the PCB, beneath the IC. A possible (but nasty) solution is to cut either pin 2 or pin 13 and lever it clear of the PCB before connecting to it, but this puts a lot of mechanical stress on the IC. A better solution might be to use the spare gate in Z73—but beware; I haven't checked for hidden tracks there.

I hope that this correction will save someone the several hours that it took me to unravel the problem and make the fix work.

The peculiar lowercase character-set could probably be rectified by changing Z29 (MCM 6670) to something like an MCM 6570, but I haven't tried this.

—MARTIN TOBIAS, 8290 N. Federal Blvd., #100, Westminster CO 80030

Lowercase code needs Poke

I just finished my second installation of Dan Liken's lowercase modification as given in TRS-80 Computing, 1:1.

The first installation didn't work using Tim Mann's Basic software given in 1:2, so I thought I'd gotten a bad 2102 RAM.

On the second installation, I used the switch suggested by Tim Mann. With the switch I was able to read my diagnostics in English instead of control character language.

Initially, the second installation didn't work either. After beating my brain for a long time I finally remembered something about read-data statements giving problems in some computers, as mentioned in Tim Hensler's article in 1:1.

People with these problems must precede Mann's Basic software by a POKE 16553,255 or by a 16553,128. It is convenient to make this Line 5 of Mann's software. I suggest always using the POKE 16553, 128 because the read-data problem is sometimes difficult to detect and it need not occur on every power-up.

—JOHN P. RAHN, 1019 Randall, Ridgecrest CA 93555

Critique: user discusses problems with disk system

(The following letter to Radio Shack brings up some interesting points. Ed.)

I currently have a 32K TRS-80 with one disk. I would like to describe some problems I have had, and am having. Further, I would like to make some recommendations as to documentation, enhancements etc. for both software and hardware.

APPEND DOESN'T WORK

I believe you are aware of this problem with disk Basic, version two, although you failed to mention it in your newsletter recently, or when we might expect it to be fixed.

BACK-UP

I have a single disk system, and when I attempt to back-up a diskette which has files located past track 29, I can successfully back-up the diskette to track 29 and when it encounters track 30, I get the destination error message (destination disk read error). I have tried a different disk unit and have had the interface unit in the repair center. I have tried numerous diskettes for both the sending and receiving diskette. I have used another user's TRS-DOS and the failure continues. I now believe the problem is software or possibly the interface which the repair center is operating satisfactorily. HELP!!!

OTHER PROBLEMS

Tape is such a problem. I refuse to use it at all. The problems are well-known by your staff, I am sure, as they are receiving wide circulation in the trade press.

The power plug going into the TRS-80 is identical to the video and tape plug. They are interchangeable and are not even color coded. I made an error and plugged the power into the tape jack and it was costly. I believe you have a design problem—at the minimum you should have color-coded the plugs, cables and receptacle.

When loading programs in disk Basic, I have had several experiences of receiving a message that indicated "INTERNAL ERRORS", I would find the program damaged. What is causing these errors, and what can be done to fix them?

When saving programs with disk Basic, I note on rare occasions, reloading them,

Disenchanted with Radio Shack

In October 1977 I purchased a TRS-80 4K and subsequently updated to 16K II with expansion module. The experience has left me disenchanted with Radio Shack: non-confirmed ship dates, long wait periods, non-existent practical software, a non-existent S-100 interface (announced months ago) and a keyboard that persistently Enters, at its whim and fancy, multiple characters per singular manual keystroke.

In no manner has the TRS-80 been as colorful as the advertising and performance equaled promises.

It is not a business-applications "total" system and its inability to accept lower-

that some of the statement numbers were changed and in an incorrect location in the program i.e. not in sequential order. Why?

The system also has a tendency to auto reset during operation of disk Basic. Funny? Could be power, but I am not certain.

DOCUMENTATION

The Level II manual is not organized in the same alphabetic command fashion as the well-written "Level I Manual" was, and is cumbersome to use as a result. The summary of commands does not have page references or in the alternative, an index with page numbers would be nice.

The DOS preliminary manual is not at all adequate. It is lacking in organization and in depth.

In the area of DOS it is important to know how the directory is being handled, where it resides on the system diskette, whether it is maintained in memory or is retrieved from the diskette each time it is required.

It would also be nice to know what commands can be issued from DOS only, and which commands can be issued from disk Basic only, and which commands can be issued from either.

That brings me to another point, it sure would be nice to be able to display the directory when you are in disk Basic mode. What is needed I feel, is two sets of publications. One at a concepts, facilities and functions level, and a second one at an in-depth level.

I would also like to know the functions of the system disk files, by file name. Maybe I do not need all of them. I would also like to know what is the memory mapping when you are in DOS mode and when you are in disk Basic mode? These questions need addressing so that the user can feel comfortable in using the system.

COMPATIBILITY

Something fell through the cracks when the machine language programs (I have the assembler/editor and the conversion programs) were not designed to be compatible with the disk Basic, and therefore cannot be stored on the diskette. Someone did

case alpha, renders it quite useless as a word-processing system. Quite naturally, these deficiencies will cost extra (such as the parallel to parallel "cable" for the printers) at some future time.

—R.C. MAXWELL, box 94, Salem NH 03079

Program catalog from Lasman

Jeff Lasman's Practical Applications, software house offers a catalog of TRS-80 games, education, engineering, and business applications.

For a copy, write Jeff Lasman's Practical Applications, Box 4139, Foster City, CA 94404.

not know what someone else was doing, it would appear. Are these problems going to be fixed?? When??

The conversion program and documentation should have warned people that they must define the variables as integers in Level II, and further, that the "A" array would have to be dimensioned. This could have easily been done in the conversion documentation.

DISKETTE MANAGEMENT

How is diskette fragmentation handled? What are its impacts on the user? Is there a compress program in the mill if it is needed? When might we expect it?

It would be nice to have the track addresses on the directory listing. Can we expect that? If so, when?

What about the aforementioned ability to display the directory from disk Basic instead of jumping back and forth? The amount of free space would be helpful as well from Basic.

ENHANCEMENTS

A generalized sort program (disk) for files of over 200 records is needed, as the memory sorts require too much time for these long sorts. I would suggest a key sort with the capability to merge the various strings of keys as is done by many disk sorts.

It would be easier to design and prevent re-programming down the road if we knew what your future plans were as it relates to both hardware and software. I would think you could publish this as a letter of intention and avoid any commitments, but provide necessary long-range guidance to the users.

I would suggest you people investigate the use of both sides of the diskette, as is possible with the Pertec unit.

I would suggest you investigate double minis like the Micropolis units if you are to maintain the leadership you have established.

When can we expect the next release of DOS and what will be different?

—NAME WITHHELD

Has built remote control

Just to let you know of some accomplishments, Level I/II mod., and lowercase have been successful, and also have installed a remote keyboard that parallels the TRS-80 keyboard in front of the encoder with total success.

I am typing on an IBM computer terminal Selectric that has an inverted keyboard (upper-lowercase switched) that I am hoping to interface to my TRS-80.

—DAVE WOOD, DEW Enterprises, 917 W. Colorado ave., Colorado Springs, CO 80905

Bogota reader wants programs

We have various models of the TRS-80 here, most of them 16K Level I, but some few 16K Level II, too.

We are needing a maximum of possible programs written for these micro-computers, and we are willing to pay generously.

Right now we urgently need general ledger and accounting programs, but more and more we'll be needing special applications' software.

So, if you feel that you could be of any help to us, we kindly invite you to drop us a line or send us a catalog or any other by airmail. Any expenses you might incur in, be positively sure that we will send you a check in US funds, or cash right away.

—Ropohl F. Eckhard, gen. mgr., Alectronic Ltda., Calle 63 No. 11-45, Bogota, Colombia

Likes absence of games

Enclosed is my check for a one-year subscription to your publication.

My primary reason for subscribing is the absence of games and graphics routines in your first issue. I am hoping this is an indication of the content of future issues.

I have absolutely no quarrel with those who prefer to use the computer for that purpose, as I firmly believe the owner's first option is his enjoyment, and it should suit his personal use, whatever the purpose.

While I do appreciate complete, ready-to-run utility programs, I am also quite interested in collecting sophisticated sub-routines that I can use to increase the efficiency and/or the capability of my own programs.

—MAURICE L. DYER, 3110 Tawny Oak dr., San Antonio TX 78230

Problems with TV interference

We have a problem of T.V. interference.

Our T.V. reception gets so bad that it makes it impossible to watch half of our channels. I would appreciate any information you can get out on that.

I am really glad to see the TRS-80 becoming so popular. My husband has just installed a 16K kit we received from "Microcomputer System's, Inc." in Florida at a cost of \$125 (we kept the 4K) and Radio Shack Level II.

It's a little more than we can actually handle yet, but with practice we hope to put all that computer power to work. I am personally interested in programs aimed at teaching children. (My 5 year old loves "Mica", our TRS-80).

—DORNA J. McCAW, Box 199
New Boston IL 61272

Interested in ham radio

As a computer hobbyist, amateur radio operator, and professional Systems Analyst, I'm very much interested in learning more about micro-computing.

Although I have nearly 12 years of experience in Systems and programming on large computers (currently a 4-Mega-byte Amdahl 470/V6 running IBM's MVS operating system), I'm just beginning to learn how powerful micro-computers are. I'm always looking for new programming hints and "tricks" as well as finding out what other people are doing with both software and hardware.

I currently own a 16K Level II TRS-80 which was just recently upgraded from a 4K Level I machine. I also have Radio Shack's "T-Bug" machine language monitor and their Editor/Assembler.

In addition to some educational programs for my children, and games for the whole family, I'm hoping to eventually use it with my amateur radio station to send and receive CW and RTTY. I'm also currently working on my own Tiny Pilot Interpreter, and I'm interested in a PASCAL compiler/interpreter.

—DICK KRAMER, WB9PVW, 401 N. Cherry st., Abingdon IL 61410

Some hope of functional system

Having entered the world of TRS-80 Computing in total ignorance, and three months and over a thousand dollars later, I still have an incomplete system. (I'm still waiting for delivery of a Level II conversion.)

After reading your introductory newsletter, there seems to be some hope of turning this system into a functional computer at a somewhat more reasonable cost and a more flexible manner than through Radio Shack's peripherals.

I'm interested in using my TRS-80 to do some word-processing and would like to have all the information available to make the necessary conversions.

—JOHN ALLEN JANSEN, 1544 Cochran ave., Los Angeles CA 90019

Combine Level II, two-chip Level I?

In regards to the article by Dan Likins on the switch from Level I to Level II, did he say if there is a way to switch if you have the two-chip Level I in the machine?

—DAVE WOOD, DEW Enterprises, 917 W. Colorado ave., Colorado Springs CO 80905

(To use a two-chip Level I with a three-chip Level II, you need two of those Mickey Mouse boards, one for the Level I and the other usually associated with Level II. We've heard that some people are doing it, but any imagined-or real power supply problem with the Level I/II conversion would be aggravated by a two-chip Level I rig. We would recommend the Apparatus Level I in Level II, instead. Ed.)

Radio Shack offers fixes

By JEFF LASMAN

Pres., Practical Applications

Radio Shack has just made three important announcements for TRS-80 owners. Unfortunately, the announcements have been made only to store managers, so we repeat them here.

1) Radio Shack has a fix for your DOS system if it automatically re-boots into DOS from the middle of Basic without you wanting it to. This fix is available at no charge to end users, though the managers have to pay for it, and probably won't bring it to your attention unless you ask them for it. Not all disk systems are affected, but if yours is, the fix is a lifesaver.

2) Radio Shack has a board installation fix for the CPU unit if you have continuous tape-loading problems. Won't do any good for occasional problems, but if yours is one of those TRS-80 Level II computers that just doesn't reliably load tape, this fix, also at no charge for you if you ask for it, is now available.

3) A new program tape with a keyboard "debounce" routine and a routine enabling Level II users to use the clock without the disk system, is now available, free. Program tape #CT-0300.

If your Radio Shack is not knowledgeable about these points, refer your manager to the bulletin sent out by Radio Shack. This is a white bulletin, and not the colored "Update" the managers are used to seeing, so some of them may have overlooked it. ASK!

WANTS TRADE PROGRAMS

I've seen one issue of your publication and it looks great to me. As a suggestion, I'd like to see a copy of the dis-assembled Level II monitor.

—RICHARD KORS, 119A Flynn ave., Mountain View, CA 94043

REVERSE VIDEO KIT AVAILABLE

Parts and instructions for converting TRS-80s to switch-selectable reverse video is available for \$6 from Dan Likens' Computer Control, 3001 Red Hill, bldg. 1, Costa Mesa CA 92626.



Robert Purser lists programs

In CIE TRS-80 Bulletin 1:4, a page of Robert Purser's computer cassette reference list is reproduced. The following five pages complete that listing. A new, expanded list is due now from the publisher.

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Steve Coleman

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TRS1 Mortgage Calculations 4K \$ 6.95
TRS2 Mortgage Calculations 16K \$ 6.95

Herman Demontoy
2 Pioneer Road
Painted Post, NY 14870
(607) 936-6035

TRS1 T1-10 games \$ 11.00
TRS1 T2-10 games \$ 11.00
TRS1 T-3-5 games \$ 5.00
TRS2 T21-10 games \$ 11.00
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(add \$1.00 for postage)

P. Dersler
1040 Alex Hts Dr. #25
Alex, HI 96701

TRS2 Spelling Bee (grades 2-8) \$ 5.00
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Caldwrest, NJ 07755

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TRS Match the Squares \$ 8.95
TRS Angle Shots \$ 9.95

B. Erickson
P. O. Box 11099
Chicago, IL 60611

TRS1 Enigmas 1-7 games
TRS1 Enigmas 2-8 games
TRS1 Enigmas 3-7 games
TRS1 Electron 1 - Open law, filters, timers
TRS1 Test Program - Frog Race; Catalog \$ 1.00

Emtoo-Desoto Products
P. O. Box 6128
Shreveport, LA 71106

TRS Star Trek \$ 2.45
TRS Wumpus \$ 2.45
TRS Digital Mastermind \$ 2.45
TRS File Locator \$ 2.45
TRS Oriental Rings \$ 2.45
TRS Biohythm \$ 2.45
TRS All Star Baseball \$ 2.45

Fault & Associates
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(714) 879-6930

TRS2 Hexadecimal dump of memory \$ 12.95
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R. Fitzgerald
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Dallas, TX 75220

TRS Lunar/Martian Lander \$ 8.00
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TRS Oklahoma - Texas Football \$ 12.00
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Michael Flanagan
4700 Outlook Drive
Brooklyn, Ohio 44144
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TRS1 Pioneer, Space Voyage, Star Wars - RT, Zone Hockey II, Lunar Lander, Breakaway, Survival - RT, Capitalists, Football, Baseball, Frusto-Race - RT

(4 for \$10.00, each additional \$1.00)

J. Fox
27 Prince William Rd.
Morganville, NJ 07751

TRS Analyze Utility Expense \$ 10.00
TRS Option Writing \$ 12.00
TRS1 Math Tutor \$ 12.00
TRS2 Math Tutor \$ 12.00

G2 Program Library
GRT Corp
1286 North Lawrence Station Road
Sunnyvale, CA 94086

TRS Beat the House \$ 14.95
TRS Dollars and Sense \$ 14.95
TRS Clinic \$ 14.95

box 158, San Luis Rey CA 92068

13 - TUS-80 COMPUTING 1:3

James Geron
920 West Romeya, Apt. 6
Anaheim, CA 92801

- TRS1-Banner, Bingo, Computer Art, Concentration, "Don't it make my brown eyes blue", Kaleidoscope, Keyboard, Life, Peg Puzzle, Roman Numerals, Rotate
- TRS2-Banner, Bingo, Computer Art, Concentration, "Don't it make my brown eyes blue", Kaleidoscope, Keyboard, Life, Peg Puzzle, Roman Numerals, Rotate, Doodle, Nim, Words

H & E Computronics, Inc.
Mathematical Applications Service
Howard Y. Gosman
P. O. Box 189
New City, NY 10956
(914) 425-1535

- TRS2 Master Pac 100 Programs \$ 49.95
- TRS2 Federal Income Tax Pac \$ 49.95
- TRS2 Inventory Control Pac \$ 99.95
- TRS2 Payroll Pac \$ 99.95
- TRS2 Statistics Pac \$ 99.95
- TRS2 Business Decision Pac \$ 99.95
- TRS2 Stock Market Pac \$ 99.95
- TRS2 General Ledger Pac \$ 99.95
- TRS2 Personal Finance Pac \$ 99.95
- TRS2 Math Pac \$ 99.95
- TRS2 Elementary and Advanced \$ 99.95
- TRS2 Gambling Pac I \$ 99.95

Dr. George L. Haller
1500 Galleon Dr.
Naples, FL 33490

- TRS Financial Package & Golf Handicap \$ 10.00

J. and J. Hansen
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San Diego, CA 92120

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- TRS Tic Tac Toe \$ 6.00
- TRS Automated Calendar \$ 10.00
- TRS Math Prompter \$ 10.00
- TRS Reaction Tester \$ 4.00
- TRS Fraction Reducer \$ 8.00
- TRS Number Guesser \$ 5.00
- TRS Metric Trainer \$ 8.00

Jerry Hilde
3923 Arapaho
Little Rock, AR 72209
882-1454

- TRS1 Graphics I - Checkers, Tic Tac Toe, Plot \$ 17.50
- TRS1 Graphics II - Lunar Lander, 23-Matches \$ 17.50
- TRS1 Battle-Space War, Salvo, Target \$ 17.50
- TRS1 Sports-Basketball, Boxing, Football \$ 17.50
- TRS1 Puzzle - Bagles, Squares, Trap \$ 10.00
- TRS1 Value Pac - Space War, Checkers, Boxing \$ 25.00
- TRS1 Accounts Payable - Standard Ledger \$ 35.00
- TRS1 Inventory-On-Line reports by stock number \$ 35.00
- TRS1 Monthly Report-an option for above programs \$ 10.00
- TRS2 Graphics I - Checkers, Tic Tac Toe, Plot \$ 17.50
- TRS2 Graphics II - Lunar Lander, 23-Matches \$ 17.50
- TRS2 Battle-Space War, Salvo, Target \$ 17.50
- TRS2 Sports-Basketball, Boxing, Football \$ 17.50
- TRS2 Puzzle - Bagles, Squares, Trap \$ 10.00
- TRS2 Value Pac - Space War, Checkers \$ 25.00
- TRS2 Accounts Payable - Standard Ledger \$ 35.00
- TRS2 Inventory-On-Line reports by stock # \$ 35.00
- TRS2 Monthly Report-option for above program \$ 10.00

George von Hilsheimer, Ph.D.
Growth Institutes, Inc.
129 North Clara
DeLand, FL 32720

- TRS2 Stats, BarGraph, Incl nonpara stats Trade
- TRS2 Nonparametric correlation for k columns Trade
- TRS2 Predicts Longevity from lifestyle Trade
- TRS2 Scattergram from x, y raw values Trade
- TRS2 Scattergram from ranks Trade

(Also available on disk)

Herbert Howe
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New City, NY 10956

- TRS1 280 Disassembler. Requires 16K RAM. \$ 20.00
- TRS2 280 Disassembler. Requires 16K RAM. \$ 20.00
- TRS2 Contract Bridge Game. Requires 16K. \$ 15.00
- TRS2 LIFE Game. \$ 5.00

F. E. Huebner
P. O. Box 37206
Oak Park, MI 48237

Victor Hnyp
4418 Morrow Road
Modesto, CA 95350

- TRS1 SUPER STARTREK-16K SHORT-CETTE C-10 \$ 10.00
- TRS1 Slot Machine, Space War, Tic-Tac-Toe, Frog, Cannon & Fly Submarine Chase, Wumpus, Reverse, War, Genius, Hamurabi, Acey-Ducey, Start Shooter, Monster, Biorhythm, Stoplight, Lunar Lander, Bomber, Telephone, Tell Accumulator, Bookkeeping, 12/24 Hour Clock, Bingo, Pantzar Attack, Concentration, Cribbage, Pillbox, Star Wars, and over 500 other programs for trade.

TRS1 All kinds of T-Bug programs for trade
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- TRS1 Games II: Bingo-Roull-Dice-Zoo-break \$ 9.95
- TRS1&2 Monopoly \$ 9.95
- TRS1&2 Bus. I: Accts. Rec.-Loan Int.-Sav. Int. \$ 9.95
- TRS1&2 Bus. II: Met.Conv.-Fin.Time Tble.-Bldg \$ 9.95
- TRS1&2 Graphics: Blackboard I, II, III, IV-Maze \$ 9.95

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C. Jones
654 Edinboro Rd., NW
Atlanta, GA 30327

- TRS Depreciation, financial analysis, income tax, interest calculations, real estate selection and evaluation.

Joseph M. Joyce & Associates
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Kansas City, MO 64110
(816) 523-7554

- TRS2 Star Trek \$ 5.95
- TRS2 Casino Craps \$ 5.95
- TRS2 Casino Roulette \$ 5.95
- TRS2 Casino Blackjack \$ 5.95
- TRS2 Casino 7 Card Stud \$ 5.95
- TRS2 Casino Keno \$ 5.95



Instant Software, Inc.
Kibboud
Peterborough, NH 03458

- TRS1&2 Basic/Intermediate Lunar Lander \$ 7.95
- TRS1&2 Space Trek II \$ 7.95
- TRS1&2 Backgammon/Keno \$ 7.95
- TRS1&2 Golf/Cross-Out \$ 7.95
- TRS1&2 Electronics I - Tuned circuits, 555, LM381 \$ 7.95
- TRS1&2 Ham Package \$ 7.95

Robert Lancelot
1871 Acorn Drive
St. Joseph, MI 49085

- TRS1 Checkbook, Graphing, Demo, etc. \$ 10.00

Jeff Lasman's Practical Applications
P. O. Box 4139
Foster City, CA 94404
(415) 573-8217

- TRS2 PILOT Program Development Package \$ 50.00
- TRS1 Artist \$ 5.00
- TRS1 Biorhythm Charting \$ 5.00
- TRS1 Bowling Alley \$ 5.00
- TRS1 Dreidel (gambling game for amusement) \$ 5.00
- TRS1 Fire When Ready, Gridley! \$ 5.00
- TRS1 Full Function Lunar Lander \$ 5.00
- TRS1 Keep Away (a game of chance) \$ 5.00
- TRS1 Mastermind \$ 5.00
- TRS1 Music-Bug (play music) \$ 25.00
- TRS1 One Second Lunar Lander with graphics \$ 5.00
- TRS1 Radio Shack Store Daily Sales \$ 5.00
- TRS1 Star Wars (shoot down spaceships) \$ 5.00
- TRS1 TRS-80 RAM, ROM & Function Text \$ 5.00
- TRS1 Tic Tac Toe \$ 5.00
- TRS2 Art Auction \$ 5.00
- TRS2 Artist Graphic Package \$ 5.00
- TRS2 Biorhythm \$ 5.00
- TRS2 Bowling Alley \$ 5.00
- TRS2 Calendar (printer required) \$ 10.00
- TRS2 Dreidel (gambling game for amusement) \$ 5.00
- TRS2 Fire When Ready, Gridley! \$ 5.00
- TRS2 Full Function Lunar Lander \$ 5.00
- TRS2 Letter Writer (requires line printer) \$ 25.00
- TRS2 Mailing List (requires LP & 2nd C) \$ 20.00
- TRS2 Music (playing and writing system) \$ 35.00
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- TRS2 Tic Tac Toe \$ 5.00
- TRSD File-it (in - memory data base) \$ 25.00

(Notes: The Radio Shack Daily Sales program is free to all Radio Shack Store Managers.)

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James Carrico
P. O. Box 3316
Anaheim, CA 92802
(714) 531-9826

- TRS1&2 Level I Magazine (single copy) \$ 4.00
- TRS1&2 Level I Magazine (half year) \$ 22.00
- TRS1&2 Level I Magazine (year) \$ 40.00
- TRS1&2 Special Sample Introductory Issue Offer \$ 3.00

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Liberty Ridge
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Rockport, IN 47635

Logan
436 Warner Circle
Norfolk, VA 23509

- TRS Graphics \$ 5.00

M, M, & S Software
M. Stolzberg
16 Marilyn Lane
Westbury, NY 11590

- TRS1 MK Statistics-Mean, SD, r, corr, Anova, etc. \$ 9.00
- TRS2 MK Statistics-Above - even more! \$ 9.00
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- TRS2 16K Disassembler-above with symbolic tape \$ 20.00
- TRS2 16K Contract Bridge-You against TRS-80! \$ 15.00
- TRS2 16K Life-In machine language-600K faster! \$ 6.00

D. MacAdam
52 School Street
Chatham, MA 02633

- TRS1 Life Cassette and instructions \$ 8.00

(Listing only with instructions \$6.00)

\$15 for 12 issues box 158, San Luis Rey CA 92068 14 - TRS-80 COMPUTING 1:3

\$15 for 12 ISSUES
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 15 - TRS-80 COMPUTING 1:8

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 Tim Quinlan
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 Chelsea, MA 02190
 (617) 884-7291

- TRS1&2 Galactic Blockage Runner \$ 9.95
- TRS1&2 Magic Isle 7.95
- TRS1&2 Science Fiction Sampler 5.95
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- TRS1&2 TRS-80 Demo Program 5.95
- TRS1&2 Othello III 5.95
- TRS1&2 Games - Group I 5.95
- TRS1&2 Graphics - Group I 9.95
- TRS1&2 Personal Finance Package 5.95
- TRS1&2 Bingo Calling Program 5.95
- TRS1&2 Diet Planning Package 9.95
- TRS1&2 Daily Biorhythm Program 5.95
- TR51 Computer Support Package 5.95
- TRS1&2 Mastermind II - Micklus 7.95
- TRS1&2 Tarot Cards - Rowlett 9.95
- TRS1&2 Treasure Hunt - Micklus 7.95
- TR52 Solaria 9.95
- TR52 R/T Lunar Lander 7.95
- TR51 Space Colony 7.95

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Matrix Magazine

A magazine for the professional astrologer
 Michael Erlewine
 1041 North Main Street
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- TR52 16K Complete Natal Horoscope Package \$ 40.00

(a variety of programs similar to those listed
 in the PET columns are being made available for
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 7106 Colgate Drive
 Alexandria, VA 22307

- TR5 Star Trek \$ 9.95
- TR5 Biorhythm 7.00
- TR5 Lunar Lander 5.00

Micro Architect, Ltd.
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 96 Dorhan Street
 Arlington, MA 02174

- TRS1&2 IDM-I, Cassette Data Base Manager 8K \$ 20.00
- TRS1&2 INV-I, Inventory Management 12K \$ 20.00
- TRS1&2 Finance-I, Stock and Bank Account 4K \$ 15.00
- TR52 Word-I, Word Processor 16K \$ 25.00
- TR52 Stat-I, Statistics Package 4K \$ 15.00
- TR52 Mail-III, a mailing system (disk req.) 16K \$ 35.00
- TR52 Word-III, a diskette-based word processor \$ 35.00
- TR52 Mail-I, a mailing system 16K \$ 25.00
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- TR52 Sale-I sales analysis 4K \$ 10.00
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- TRS1&2 Stock-I, stock information 4K \$ 10.00
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- TR52 INV-III, a disk based inv. sys. 16K \$ 35.00
- TR52 KEY-III, diskette data access util. 1K \$ 16.00

Micro-Keyer
 Box K
 Kingsport, TN 37662

- TRS1&2 Morse Code with send/receive hardware \$ 39.95

Micro Logic Corp.
 Box 174
 Hackensack, NY, 07602

- TR51 Billiard Ball \$ 4.95
- TR52 Billiard Ball \$ 4.95

Micro Management Systems
 Radio Shack Dealer - Mini Mall
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 Cairo, GA 31724
 (912) 377-7120

- TR5D Inventory program (sequential files) \$ 90.00
- TR52 Fixed Asset Depreciation Schedule \$ 35.00
- TR5D Disk File Retrieval \$ 30.00
- TR5D General Ledger - Balance Forward \$195.00
- TR5D Trial Balance - option \$ 80.00
- TR5D Budget Analysis - option \$ 25.00
- TR5D A/R subledger - option \$140.00
- TR5D A/P subledger - option \$ 50.00

Micro-Meg
 P. O. 6265
 Arlington, VA 22206

- TR51 Intelligent Micro-Mouse \$ 10.00

Microtronics
 5943 Pioneer Road
 Hughson, CA 95326
 (209) 634-8888 or 667-2888

- TR5 Morse and RTTY with Ham Interface kit \$ 99.00
- TR5 Morse and RTTY with Ham Interface \$129.00

Microware
 P. O. Box 47
 Blacksburg, VA 24060

- TR5 Inventory Control \$ 8.95
- TR5 Mailing List \$ 8.95

Miller Microcomputer Services
 61 Lake Shore Rd.
 Natick, MA 01760
 (617) 653-6136

- TR51 Games (Star Trek II, Cannon, Logicmaster) \$ 12.00
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- TR51 Combination (all 31 above programs) \$ 22.50
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(Add shipping/handling. Mass. orders add 5% sales tax.
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- TR51 Great Circle Navigation \$ 5.00

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 P. O. Box 1025
 Arvada, CO 80001

- TR5 R4-BG1 Games \$ 10.00
- TR5 R4-BG2 Games \$ 10.00

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- TR52 SORTIII 16K in mem. alphanumeric sort \$ 19.95
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 Tewksbury, MA 01876
 (617) 851-3156

- TR5D A/R, A/P, GL, PR, Job Cost, WP \$400.00

L. Owens
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 Thomasville, GA 31792

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D. Palmer
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 Lynn Haven, FL 32444

- TR51&2 Music Generation - needs no hardware \$ 9.95

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 Box 136
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 (617) 783-0694

- TR51 Introductory Special \$ 12.95
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- TR51 Stimulating Simulations \$ 14.95
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- TR51 Preschool IQ Builder \$ 9.50
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- TR52 Story Builder/Word Master ages 5-up \$ 9.50

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- TR52 Combo 3 - simulated slot machines \$ 4.50
- TR52 Budget 2 - home budget system \$ 4.50
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- TR52 Cycle 7 - biorhythm \$ 6.75
- TR52 Dates - number of days between \$ 4.50
- TR52 Menu Planner \$ 9.00
- TR52 Customized Payroll program \$ 30.00

Programs Consultants
 3400 Wilshire Boulevard
 Los Angeles, CA 90010

- TR52 TRS-80 FORTH language \$ 17.00
- TR52 System Debug Facility \$ 17.00

Programmers Software Exchange
 2110 North 2nd Street
 Cabot, AR 72023

- TR5 Craps, Acey Ducey, Lunar Lander, Betnum, Matchm, Harkle, Wumpus, Hammurabi, Russian roulette, Guess, Reverse, Bagel, Biorhythm, King, Sand Pile, Star Wars, Star Trek, Football, Ghose Hunt, PM Box, Golf, WPC, Target, Slot Machine, Moon Pilot

(Enclose blank cassette with order, \$10.00 per program, \$1.00 catalog)

PR5
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Quality Software
 10031 Odessa Ave.
 Sepulveda, CA 91343

- TR52 Fastgammon \$ 28.00

J. Quintanar
 715 South Alder Street
 Port Angeles, WA 95362

- TR5-80 Lunar Lander \$ 7.50

\$15 for 12 issues

RACET Computers
702 Palmdale
Orange, CA 92665

- TRS2 Remodel - renumber, move, delete \$ 24.95
- TRS2 Time Series Analysis/Modeling \$ 14.95
- TRS2 Optical Systems Layout/Analysis \$ 19.95

Radio Shack
Dept. TR5 - 80
One Yandy Center
Ft. Worth, TX 76102

- TRS1 26-1501 Payroll Level I \$ 19.95
- TRS1&2 26-1502 In-Memory Information \$ 19.95
- TRS2 26-1503 Mailing List \$ 19.95
- TRSD 26-1551 Mailing List 32K \$ 39.95
- TRSD 26-1552 General Ledger \$ 99.95
- TRS1 26-1602 Personal Finance \$ 14.95
- TRS1 26-1701 Math I \$ 19.95
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- TRS1 26-1802 Quick Watson \$ 4.95
- TRS2 26-1803 Blackjack L-II \$ 4.95
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- TRS 26-1901 Microchess \$ 19.95
- TRS 26-2001 T-Bug Cassette \$ 14.95
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- TRS1 26-2003 Level I Basic Course \$ 12.95
- TRS2 26-2004 Level II Renumber \$ 9.95

(Notes: Fort Worth offices does not accept mail orders.
Order through your local Radio Shack store)

Phil Reitz
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Westfield, NJ 07090

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Route 3, Box 53
Salem, VA 24135

- TRS1 Alphabetic Punch Cards for Knitting Looms \$ 24.95
- TRS2 Alphabetic Punch Card for Knitting Looms \$ 24.95

(Level I is 4K; Level II is 16K)

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- TRS1 Space Cruiser - An unusual game \$ 10.00
- TRS1 Tobruk - War Game (A.H.) \$ 10.00
- TRS1 The movie "The Castle of Doom" \$ 10.00
- TRS1 Astrophysics Basic I (astronomy) \$ 10.00

G. W. Scheil
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Kansas City, MO 64110

- TRS1 Starfleet 4K \$ 10.00
- TRS2 Starfleet 4K \$ 10.00
- TRS1 Star Trek 4K \$ 5.00
- TRS2 Star Trek 4K \$ 5.00

Sel-Tronics, Inc.
721 Ellsworth Dr.
Silver Springs, MD 20910
(301) 589-3391

- TRS1 Demo cassette with Dual Cassette I/O \$ 69.95

Sandy Sigal
63512 Mammoth Ave.
Van Nuys, CA 91405

- TRS Graphic Lunar Lander, Slot Machine, Art \$ 12.95

Simulations Publications
Strategy & Tactics Magazine
44 East 23rd Street
New York, NY 11010
(212) 673-4103

(Aids for War Games available someday soon.)

Small System Software
P. O. Box 366
Newbury Park, CA 91320

- TRS1&2 RSM-1S Monitor/Disassembler \$ 23.95
- TRS1&2 RSL-1 Drawing/Life \$ 14.95
- TRS1&2 RSM-1 Monitor \$ 17.95
- TRS1&2 ESP-1 Assembler/Editor/Monitor \$ 29.95
- TRS1&2 Air Raid-Shooting Gallery Game \$ 18.95
- TRS1&2 Electric Pencil 16K Word Processor \$ 99.95
- TRS1&2 Electric Pencil & TRS232 Interface \$ 139.95
- TRS1&2 RSM-2 Advanced 16K Monitor \$ 26.95
- TRS2 RSM-2D Advanced Disk Monitor \$ 29.95
- TRS2 CNV-1 Disk Conversion Program \$ 9.95

Softbyte
315 Dominion Drive
Newport News, VA 23602

- TRSD Federal Income Tax Systems \$285.00

Softwell Unlimited
P. O. Box 145
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Ham Radio

- TRS2 W4GKP Logging Program \$ 9.95
- TRS2 DXCC Counties Record \$ 9.95
- TRS2 WAS Record \$ 9.95
- TRS2 W4NYPF Contest Logger \$ 9.95
- TRS2 European DX Contest Logger \$ 9.95

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- TRS2 Dis-Assembler Object Program \$ 15.00
- TRS2 Dis-Assembler Symbolic Program \$ 15.00

Business

- TRS1 General Accounting \$ 9.95
- TRS2 General Accounting \$ 9.95
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- TRS1 Array Manipulation \$ 4.95
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- TRS1 Bingo Caller \$ 4.95
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10796 Vanover
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(213) 983-3763

TRS Software Exchange

Software
23469 Hardt Street
Loma Linda, CA 92354

Software Industries
Ted Carter
902 Pinecrest Drive
Richardson, TX 75080
(214) 235-0915

- TRS2 Tank, Fast Draw, Hangman \$ 11.95
- TRS1&2 Bomber, Sketch, Biortm \$ 12.95
- TRS1&2 Skooter, Lander, Spacewars \$ 9.95
- TRS1&2 Checkers, Reverse, Mindermst \$ 9.95
- TRS1&2 Ghost, Tic-Tac-Toe, Hi-Lo, Nim \$ 9.95
- TRS1&2 Wumpus, Dragon \$ 9.95
- TRS1&2 Baseball, Crinkle, Escape \$ 9.95
- TRS1&2 Horse, Craps, '23, Artillery \$ 9.95
- TRS1&2 Mathelp, Carh-R, Dates, Capitois \$ 9.95
- TRS1&2 Checkbook, Interest (Checkbook LI-16K) \$ 9.95
- TRS1&2 Dragon 2, Mission Pacific (16K Required) \$ 18.95

Sam Solomon
6317 Elier
Long Beach, CA 90803
(213) 431-5915

- TRS2 SINGLE-STEP & relocate Obj. code; 2K \$ 14.95
- TRS2 DISASSEMBLER - creates EDTASM source tape \$ 14.95
- TRS1&2 DRAW POKER w/graphics & bluffing; 3K \$ 8.95

(Manual included--list extra; SASE for specs.)

Speakeasy Software Ltd.
Box 1220
Kemptville, Ontario
Canada K0G 1B0
(613) 258-2831

- TRS Bulls and Bears \$ 12.00
- TRS Warlords \$ 12.00

(Available only through computer stores)

Will Summers
406 Third Ave.
Asbury Park, NJ 07712
(201) 774-2785

- TRS1 Othello-2 players \$ 4.00
- TRS1 Yahtzee-to 6 players \$ 4.00

(\$7.00 for both)

TapeTalk Magazine
Rick Utley, Publisher
P. O. Box 34014
San Jose, CA 95154
(408) 938-8273/Toll Free 1-800-835-2246

- TRS1&2 TapeTalk Magazine (single copy) \$ 7.00
- TRS1&2 TapeTalk Magazine (year) \$ 30.00
- TRS1&2 TapeTalk Magazine (Two Years) \$ 54.00

Taylor
P. O. Box 1180
Plattsburgh, NY 12901

- TRS1&2 Aardvark/Capture \$ 13.95
- TRS2 Startrek \$ 13.95
- TRS1&2 Roulette/One Arm Bandit \$ 13.95
- TRS1&2 Patterns/Pinball \$ 10.95
- TRS1&2 Annuities \$ 12.95
- TRS1&2 Spaceship/Cannon \$ 14.95
- TRS1&2 Dice/Hyperbells \$ 13.95
- TRS1&2 1 Ching/Biorhythms \$ 10.95
- TRS2 Poker \$ 16.95
- TRS2 Combustion/Growth \$ 12.95
- TRS2 Rally \$ 19.95
- TRS2 Nim/Hexapaan \$ 20.00
- TRS2 Elec Pak 1-filter design \$ 20.00
- TRS2 Elec Pac 2-attenuators \$ 50.00
- TRS2 Elec Pac 3-standard formulae \$ 20.00
- TRS2 Math Pak 1- trig, inverse, logs \$ 20.00
- TRS1&2 Math Pak 2-primes, factor-as, roots \$ 20.00
- TRS2 Math Pak 3-hyperbolic & inverse func. \$ 25.00
- TRS2 Math Pak 4-gamma & beta \$ 30.00
- TRS2 Math Pak 5-curve fitting \$ 20.00
- TRS2 Math Pak 6-merc vs. eng \$ 20.00
- TRS2 Stat Pak 1-moments, variance, skew \$ 25.00
- TRS2 Econ Pak 1-est. modeling \$ 10.95
- TRS2 Tic-Tac-Toe \$ 19.95
- TRS2 Pyramid-game \$ 12.95
- TRS1&2 Checkers \$ 12.95
- TRS2 Race \$ 12.95
- TRS2 Horse \$ 12.95

(Add \$2 for postage & handling)

Real Industries, Inc.
William Swanson, Pres.
240 East Williams Street
Chesapeake, VA 23046

(The Real Industries Swift computer is compatible with the TRS-80 so its software should be too.)

- TRS1 & 2 Chess Record System \$ 15.00
- TRS1 & 2 Maintenance System \$ 15.00
- TRS1 & 2 Game Package \$ 15.00

box 158, San Luis Rey CA 92068

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Bottom Shelf 100-program library only \$49.50

Bottom Shelf's Library 100, is a collection of Level II programs on five cassettes, packaged in a vinyl binder, along with a printed program index and guide.

The tapes are set up for 4K users on one side and 16K on the other. The programs are arranged into five categories, namely, "Business and Finance", "Education", "Home", "Graphics", and "Games".

BUSINESS AND FINANCE

Of interest to everyone dealing with financial calculation, these programs are detailed in the program guide. Input of data is self-explanatory for the most part, and using the programs should not be too hard for beginning computerists. Sixteen-K machine owners can load all the business and finance programs in three Clouds.

Four-K users will have to load individual programs.

programs in this section are: present value of a future sum, simple interest for days, future value of a present sum, amortization schedule, compound interest rate, installment loan interest rate, days between dates, term of installment loan, and present value of series payments.

Also: real estate investment analysis, effective interest, internal rate of return, regular deposits, depreciation amount/rate/salvage value/schedule, bond present value, bond yield to maturity, sale cost/margin/day of the week, and moving ad.

The moving ad program will be of interest to those who want to use their TRS-80 to have changing messages scroll across the screen. A file of 10 static and 10 moving messages is constructed. Then two static and two moving messages are randomly selected, displayed for 3 cycles, then the process starts over again. A message-building-and-editing routine is part of this program.

LOST READ DATA, Cont.:

No one expects diskettes to last forever but with plenty of TLC you may be able to approach the Specification for Diskette Life: 2.5×10^6 passes/track (110 hours) or about 5 years actual use.

MISCELLANEOUS

There are some internal adjustments in the TRS-80 which may be out of whack and cause disk errors:

- a) Critical power supply voltages
- b) Disk head alignment (azimuth?)
- c) Phasing of certain timing signals
- d) Numerous small problems which add up to occasional disk errors.

We must consider these items as "informed speculation" since we don't yet have reports of any cures being effected by adjustments in these areas.

I hope this all helps someone. If you have suggestions to add to the list, let us know about them. Good luck.

EDUCATION

Tiny Pilot is a simple machine-code programming language which will make program writing available to the novice programmer, either student or teacher. Simple, yet versatile, it will open up new areas for the learning process.

The math test-type programs on the education tape are:

add, subtract, multiply/divide, fractions/decimals.

Also included is a base numbers program, which tests one's ability to convert numbers to a selected base, from 2 to 32.

A 16K program, eduquiz, questions about 10 topics, giving the user a choice of answer modes, either drill, multiple choice, fill in the blank, true/false or matching. At the end, the user can repeat the same category or return to the subject menu for another selection.

subjects are:
on states, their capitals, date of entry into union, order of entry, abbreviations, largest cities. Also inventors and inventions, urban areas and population rank, world capitals and countries, authors and books, and presidents of the United States.

HOME

Includes: Calendar, for any month of the year; Baby Sitter, displays emergency phone numbers; A tap of any key brings up a screen filled with notes, instructions, etc.; Nutrition, displays several categories of food, single-serving shows calory and carbohydrate content.

Bar Tender lists 28 different drinks, with recipe for each; Drunkometer tests reaction time; Vacation and Night Check-off fills screen with reminders which erase as you input their item numbers.

Expense gives detailed expense accounting; Mileage is similar to Expense, but for automotive costs. Conversion equates units of weight and distance; Number Conversion changes numbers to a selected base, from 2 to 32; Message Board

scrolls two messages across the screen. Christmas List is name/address listing program, with sort and edit functions.

GRAPHICS

Line graphics programs include: Blocks, random rectangles on the screen; Fireside, a moving graphics display of graphic symbols; Weird, random graphics characters draw across the screen; Herring, set-reset draws a herringbone pattern; Snoopy, complete with dog house.

Word graphics programs allow you to: Scroll messages from right to left; Flash messages one word at a time; Launch messages up the screen, a letter at a time; Move messages in a vertical scroll; Step messages like stairs.

Sketch, allows the user to draw pictures with graphics characters and save them on tape.

GAMES

Gambling games include wheel of fortune, rolling the dice, flipping a coin, racing horses (and even roaches). For highest possible stakes, there is Russian Roulette....

Guessing Games are also included. Sting Ray and Star Blazer are two space war games, as is an animated graphics game called Doomsday, in which you fly down a mined corridor to fire your energy beam into a narrow target.

The 16K Star Trek gives the capability of seeing all 64 quadrants of the galaxy during the entire game. You are given 30 star dates to destroy a random number of Klingons and return to a star base. This version is a real-time game, with a counter counting off the remaining time. Accuracy is required in entering commands, or you may lose a star date in the process.

Library 100 sells for \$49.50 and \$2 postage and handling. (GA residents add 4 per cent sales tax). From: Bottom Shelf, box 49104, Atlanta GA 30359

Scheil Startrek errors listed

Mechanical failure of TRS-80 Computing's Game printer, combined with poor book-let trimming (the fault of another printer), resulted in errors and omissions in the Startrek by George W. Scheil, issue 1:2. The following lines correct this:

```

150 GOSUB1850: IF (X<1)+(X>6) THEN170
160 ON X GOSUB1110,730,500,410,1410,1190
170 GOSUB1050: IF D<3050 THEN190
180 PRINT"NO MORE STARDATES":END

785 X=A(I):GOSUB890:A=(ABS(W-M)+ABS(Y-N)+3)/4

860 NEXT I:RETURN

1460 IF(A(A(82)-1)=2)+(A(A(82)+1)=2) THEN T=4:E=5000:F=0

1942 RESTORE:FOR I=1 TO INT(X):READ A:NEXT I:X=A:RETURN
1950 PRINT"DESTROYED":K=K-1:L=L-1:A(C+3)=A(C+3)-1:A(X)=0
1960 FOR J=71 TO 75:IF A(J)=Z THEN A(J)=0:A(J+5)=0
1965 NEXT J:RETURN
    
```

Software lets you have Level I, II

By JEFF LASMAN

You can have Level I and Level II in the same computer without any modification at all! The solution is an inexpensive (\$14.95) program from Apparat. "Level I in Level II" loads under system command and immediately converts your 16k Level II computer into a 12k Level I computer, with all the advantages and disadvantages of the Radio Shack Level I.

At first I was confused as to how come you only could get 12k of memory with Level I in the machine, but then I realized that of course four-K of memory was being used by the Level I interpreter, relocated to the top 4k of space in the 16k configuration.

Of course as with Radio Shack's original Level I you get the slow tape transfer rate and the non-rollover keyboard.

AV Systems has applications

A-V Systems Group has recently completed a model of the stock market, (proprietary); and a scheduling program for an ambulance service in the New York area.

The firm is working on an implementation of an extremely versatile word processor and an accounting system including general ledger, payroll, accounts receivable, and accounts payable. The system is designed for accountants and includes full audit trail capabilities. It will be available shortly.

An inventory management system is available which includes sales report, receiving report and inventory records. This inventory management system will be integrated with the accounting system through the general ledger. These programs will all be available for DOS Basic on the TRS-80.

A-V Systems Group is a multi-disciplinary group of independent consultants from management, communications, finance, building planning and design, health, labor management, and systems engineering, who, working together are able to bring the advantages of systems engineering and applications programming to many areas of operation throughout the Northeast. A-V is especially interested in custom financial and business applications.

While the firm supports several machines rather than one machine, it reports that TRS-80 orders placed from various Radio Shack stores are almost ten to one over other equipment orders.

A-V applications run between \$2600 and \$7500 (two machines) for the TRS-80 and between \$7000 and \$25,000 on other equipment. All machines supported are microcomputers.

While small business applications are the majority of its work, the company says it is surprised to find that a number of AAA firms are also extremely interested in micro-equipment for distributed processing applications, as intelligent terminals, or for applications which would be inefficient to program on the client's 370-512K partitioned-memory machine.

Several needs which are extremely im-

All your old Level I tapes and programs are fully usable, and programs produced by this Level I will work perfectly in a Level I machine as sold by Radio Shack. So it seems Level I compatibility is complete.

One problem: Many programmers want Level I in their computer to feed in the machine language programs made for Level I (i.e., slow tape baud rate) TRS-80s. Beware! "Level I in Level II" will NOT work on machine language programs! But for true Level I computing or pure nostalgia (not to mention exchanging tapes with new friends new in computing who only have Level I) or simply to feed in some of those old Clod or Practical Applications Level I programs, this fits the bill.

portant to A-V Systems have emerged in the several months which have passed since it started working with the TRS-80. The most apparent need is applications software. If other programmers wish to supply some of its software needs, A-V Systems will purchase sound programs for resale.

A-V Systems will not re-invent the wheel for its clients. It needs to provide most store managers with lots of information and training relative to selling computers. Especially business systems. The firm also finds that as a computer the TRS-80 is not a panacea for all business problems. That it should not be sold as another piece of Radio Shack equipment. A high level of support is needed.

A-V Systems Group is at 1446 Durham rd., Madison CT 06443 (203) 421-3379.

Mailing list, cash register games

Practical Applications has announced the following new programs:

MAILING LIST for business and professional applications (home use too), uses two floppy disks to keep up to 1300 names and addresses, sort in alphabetical or zip order for labels. Also lists on the screen or printer for fast and easy updating! Can be expanded to more names by simply adding more diskettes. Proved in use, \$49.95. Other versions as low as \$29.95.

CASH REGISTER is what your TRS-80 (Level II) will work like with this program installed. Nothing else needed to keep a complete daily record. May be used with or without line printer to keep track of seven classes of sales, whether taxable or non-taxable, under user-control. Cash registers cost thousands, but this is only \$15.00!

-Practical Applications is at box 4139, Foster City CA 94404 (415) 573-8217, Bank-Americard, Visa and Master Charge accepted.

DISK SYSTEM FOR SALE

San Diego owner has a 32K disk system he will sell for \$1800. Call Bill Root, (714) 455-1330 x 330, or 265-1310 (home).

Firm offers help in programming

Occupational Computing Company, Inc., a microcomputer software supplier, has announced a "team-up-with-a-pro" service for current and prospective owners of the Radio Shack TRS-80 microcomputer.

By completing the request form available in participating Radio Shack stores or by contacting OCC directly, TRS-80 users can get help to turn their ideas into running programs.

The request form asks:

- 1). What data will be fed to the computer,
- 2). How will the computer manipulate the supplied information,
- 3). How will the computer report the results,

OCC provides feasibility consulting, standard and custom software for the TRS-80 microcomputer.

OCC staff has experience in various professional and business applications including financial business systems, securities trading, retailing, wholesale distribution, mail order, transportation, manufacturing, document retrieval, computer assisted instruction, and school management. For information contact Barry Lederman.

-OCCUPATIONAL COMPUTING CO.
22311 Ventura Blvd., #123, Woodland Hills CA 91364

How can one keep Level I ROMs?

How does one keep the Level I ROMs when converting to Level II? Doesn't Radio Shack do it on an exchange-only basis? I use a 12" Sanyo TV as a monitor, but the print is rather hard to read because of narrow letters and spacing, due to the incompatibility of the 6Mhz and 4.5Mhz bandwidth. Has anyone come up with an easy adaptation or modification to solve this problem yet?

Apparat Incorporated offers a very inexpensive 16K RAM conversion. Has anyone used this kit yet?

-NEIL H. MORSE, 923 R st., Eureka CA 95501

(To keep your Level I ROM, you can install Level II yourself, see 1:2 issue. If you've let them get away, try Apparat's Level I in Level II program, \$15. Ed.)

Here's correction on Level I/II mod

We have a TRS-80 Level II here that I tried the Level I/II switch thing per Dan Likins' notes.

I found that all references to pin 20 should instead have been to pin 18. This was the "D" version board and it had jumpers on it, switching 18 and 20 around.

-Roger L. Smith, Personal Computer Place, 1840 W. Southern, Mesa AZ 85202

\$15 for 12 issues
box 108, San Luis Rey, CA 92068
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Bowling league statistics system

A Bowling League Statistics system is now available for the 16K Level II TRS-80. Called BLISS, the system consists of two programs.

The first is used to enter initial data for a league, such as team and player names and scoring options to be used by the league.

The second is used after each league meet to enter each bowler's game scores. BLISS then computes and displays weekly and cumulative statistics for each team and individual. Cumulative data is kept on tape cassette and updated each week.

A large number of options are available to handle nearly any league variation of awarding game points, handicapping, mixed leagues, and blind scoring. Statistics provided for both teams and individuals are: games won, won/lost percentage (teams only) high game and series, average, total pins and league leaders (individuals only).

A simple technique called CFP design guarantees the user complete control over the system while interacting with it. Every item entered by the user is validated for accuracy and, if the user is not sure what is expected at any point, typing HELP produces an explanation.

In fact, the user need know nothing more about computers than how to turn it on, load the program, and type HELP. All entries are as simple and brief as possible, and consistency of interactions is maintained throughout. All values entered by the user can be displayed and easily changed. The user need not worry about being stuck with an invalid entry.

Use T-Bug to relocate

A trick program method I tumbled on to relocate programs at the end of memory, is to use T-Bug and POKE the Start address into memory location 41FE and 41FF.

Record this at the end of any program several times and if your program "bombs" just hit Reset and Cload the 2 byte program into 41FE and 41FF and you are up and running.

-MAX GAERTNER, 825 Pelham ave., Warminster PA 18974

WANTS EIGENVALUE, EIGENVECTOR PROGRAM

Where could I obtain a program for calculating eigenvalues and eigenvectors of a matrix in Basic for use in my TRS-80 Level II computer?

-HEINZ W. STERNBERG, 1100 Ptarmigan dr. #6, Walnut Creek CA 94595

HOW CAN ANOTHER KEYBOARD CONNECT?

Anyone have information on how to interface another keyboard in parallel?

-BORIS LAVRINOFF, 1240 Arthur st., Regina, Sask. Canada S4T 4V7

Extensive, easy-to-read directions are included to show the user what options are available and how to use them. Also included are forms that can be used each week to record the league results. BLISS supports hard copy, but those not having line printer can still use the package.

OPTIONS

Some of the options available in BLISS include six different ways of handicapping; awarding of game points to individuals as well as teams, if desired; awarding game points for total pins as well as individual games; calculating individual leaders in four different categories for both males and females; and calculating blind scores by either a percentage or standard deduction from the bowler's average.

BLISS can be used by TRS-80 owners to keep statistics for their own league or to offer a service to leagues in their area. League record-keeping services could be performed by the owner, or TRS-80 time could be rented to league secretaries to do their own record-keeping. BLISS's simple CFP operation can be easily learned by anyone in minutes.

Provision is made in the initial program to enter or modify cumulative data. This enables the user to begin using BLISS at any time during the bowling season.

BLISS is available for just \$24.95 from Aquarius, 8 Yorktown ave., West Chester PA 19380 (215) 696-3718.

Pilot now ready on cassette

Practical-Pilot, for computer-aided instruction is now available for 16K Level II TRS-80s, from Practical Applications. Practical-Pilot is the new easy-to-learn, easier-to-use language invented by Dr. John Stockweather for computer instruction, and rewritten for Micro-Soft Basic.

Practical Applications has lowered the price to only \$25. Those who bought it at the old \$40 or \$50 prices have been sent rebates and their first update package. Preliminary Applications manuals are available for \$1.

Practical Applications is at box 4139, Foster City CA 94404 (415) 573-8217, Bank-Americard, Visa and Master Charge accepted.

Monitor loses horizontal hold

Have found a monitor problem that seems to crop up fairly often. When you fill the screen with solid white elements there is a loss of horizontal hold.

I got another monitor and have had no problems since.

Replaced my %\$-#+%* relay with a friend's help a la CIE Bulletin 1:3 article and it is working fine. Also popped in 16K memory at the same time. Great!!!

-John Sullivan, 1053 East Palm st., Altadena CA 91001

Channel Data personal ledger

Formerly in PET format, Personal Ledger is a complete double entry bookkeeping system with provisions for budgeting and keeping records of income, deductible and non-deductible expenses, assets and liabilities. Its simple interactive features enable entering transactions, adding or editing accounts, and printing of a detailed Income Statement and Balance Sheet.

Users completely unfamiliar with computerized accounting and with little or no knowledge of bookkeeping can use the system.

Up to 50 accounts are allowed with names and budgets specified by the user. An audit trail of all entered transactions is printed on the screen where it can be copied with the screen printer or copied to cassette if you do not have a printer.

All account data is stored on cassette, loaded prior to entering transactions and stored after entering transactions.

There is no waiting for printing to the tape during operation of the system. Extensive error recovery features are included to allow reentry of an erroneous instruction or value.

Personal Ledger runs in 8k bytes of free RAM on Commodore's PET and 16k bytes on Radio Shack's TRS-80 Level II. Level II BASIC is a version of Micro-Soft BASIC which can be translated to most other BASIC systems with minimum modifications.

Personal Ledger is supplied on cassette in TRS-80 Level II or Commodore PET format (please specify) and includes a complete manual with a program listing, flow charts, sample data, and complete operating instructions. All for only \$20.00 (Calif. residents please add 6% sales tax) by Channel Data Systems, 5960 Mandarin Avenue, Goleta, CA 93017, or telephone (805) 964-6695.

Two errors in 1:1 schematics

At least two errors occur in your schematics and also in the official RS service manual. On your page 28, those two spare gates are in Z25, not Z23. And on your page 24, the Q and Q-bar of the spare flip-flop come out on pins 9 and 8 respectively, not 8 and 7 as shown.

-MARTIN TOBIAS, 8290 N. Federal blvd., #100, Westminster CO 80030

Bug in Level II exponent routine

There is one small bug in the Level II math functions. If you try 3↑6 you get 729.001 yet 3↑7 becomes accurate again. It seems that the exponentiation routine has a rounding error for certain combinations that only appears occasionally.

-R.I. FLETT, 31/9 Nicholson st., Balmain 2041 Australia

High-speed tape for TRS-80

A universal tape storage device that interfaces to Expansion—interfaced TRS-80 has been announced by MECA, manufacturers of Alpha-1 and Delta-1 mass storage systems.

Called BETA-1, this unit plugs directly into a standard eight-bit parallel port, available on the expansion interface. Serial port connection is offered as an option.

An upcoming option will allow the tape to connect directly to unexpanded TRS-80.

The high speed digital tape transport features random SEEK at more than 100 inches per second, with average access times in 10 seconds or less, and loading time at 8,000 bits per second. A double-speed option is available to permit loading speed of 16,000 bits per second.

Employing the industry-standard phase-encoding technique, the BETA-1 is reported to be highly reliable. An internal 8035 microprocessor with a 1K byte program and high level tape operating system assure easy-to-use operation.

Storage capacity and performance are said to compete favorably with more costly disk storage systems. Delivered fully assembled and tested, the BETA-1 is priced at \$399 in single units. Quantity discounts are available to qualified dealers. For information, contact MECA, 7026 O.W.S. rd, Yucca Valley CA 92284. Telephone (714) 365-7686

New England resources listed

Beginning in April New England micro-computer enthusiasts will have a complete directory available for locating products and services. "The First New England Microcomputer Resource Handbook". Designed as a directory of every resource available in New England. "The Handbook" will list and describe: computers, peripherals, software, retailers, repair organizations, courses, clubs, user groups, user publications, and trade journals. "The Handbook" is another resource of The Boston Computer Society.

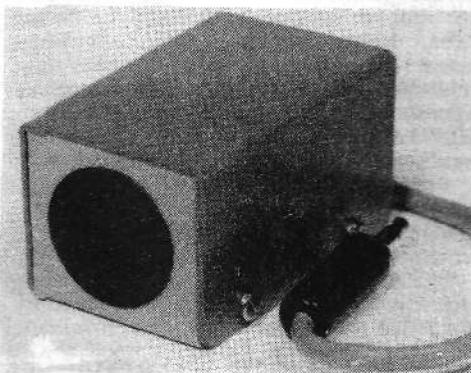
With "The First New England Micro-computer Resource Handbook" home, school, business and laboratory computer users will be able to locate easily software, user groups, peripherals, user publications and repair services.

Prospective purchasers will be able to compare costs and features of computers, as well as services and support by local vendors.

Novices to the microcomputer phenomenon will have a resource for locating stores, clubs and courses to help further their involvement and understanding.

Visitors to the New England area will have a complete list of places to visit.

"The Handbook" will be approximately 75 pages and will sell for \$2 at participating computer stores or by mail from: The Boston Computer Society, 17 Chestnut st., Boston MA 02108



TBEEP—From Web Associates.

CIVIL ENGINEER USING TRS-80

I have a 16K Level II TRS-80 and am just starting to use it in Civil Engineering studies, mostly hydrology and hydraulics.

I am curious to know if any other TRS-80 owner is writing programs in this field.

The first issue of TRS-80 Computing looks great.

—GEORGE A. MAKELA, 15611 Autumnbrook, Houston TX 77068

WANTS HOMEBREW 32K, ATARI INTERFACE

I am particularly interested in a 'homebrew' method of how to increase my TRS-80 to 32K without going the expansion-interface or the TRS-80 to S-100 Bus Interface Route.

Also, if you run across some bright person who has figured out a way to interface an Atari Video Game (the \$179.00 Type) to the TRS-80 to produce color graphics I would be super interested in that.

—BARRY L. ADAMS, 109 Valley Place Greenville NC 27834

Beta-1—High-speed tape for TRS-80 stores one megabyte, with 10 second average access time.

Beeper connects to cassette port

Larger business computers are equipped with beepers to save time by signalling the computer operator that an error has occurred or that some additional action must be taken to continue processing.

More and more TRS-80 business systems are being installed and being operated by non-computer oriented personnel. To the rescue, Web Associates has announced the availability of a low-cost, easy to install, and easy to use software controlled beeper. Tbeep produces a clear, distinct tone similar to that of a pocket pager and is programmed by a minimum of two Level II Basic instructions or by four machine language instructions. With some constraints, the length of the beep is also software controllable.

Tbeep is powered by a long-life battery (included) and is simply plugged in line with the Aux cable to the cassette, not interfering with or making any sound during normal cassette operations.

Some of the more imaginative uses of Tbeep, beyond of course games, are to signal when a long sort or data tape load is complete, or by programming the ON ERROR GOTO statement to go to a subroutine to activate the beeper, one may produce a beep even in the edit mode, if, upon hitting Return, an error occurs.

Tbeep is in a small, neat box of approximately 1 1/4x1 1/4x2 1/4 inches and is compatible with all TRS-80 Level II configurations, including disk. TBEEP sells for \$27.95 (Calif. residents add 6%) and is available for immediate delivery, from Web Associates, box 60-N, Monrovia CA 91016



NORTH



SHIRLEY

North named Tandy chairman

Phil R. North has been named chairman of the board and president of Tandy Corporation, Radio Shack parent company.

He succeeds Charles D. Tandy, founder of the company, who died November 4.

North, 60, has been a director of Tandy Corporation since 1966. From 1968 to 1977 he served as special consultant to Charles Tandy and had been his administrative aide since 1977.

From 1949 to 1956 North was a vice-president of Carter Publications, Inc., and Executive Editor of the Ft. Worth Star-Telegram. From 1956 to 1962 he served as assistant general manager of the newspaper.

A native of Ft. Worth, North graduated from Central (now Paschal) High School in Ft. Worth in 1935 in the same class with Charles Tandy, then earned his Bachelor's Degree from the University of Notre Dame in 1939.

After graduation North reported for the Nashville Tennessean, then in 1940 enlisted in the U.S. Army. He served in the Pacific Theater earning the rank of major as a press aide to General Douglas MacArthur, where at 24 he was the youngest member of MacArthur's staff.

Shirley directs computer sales

Jon A. Shirley has been appointed Radio Shack computer merchandising director.

Shirley, who will report to Radio Shack President Lewis Kornfeld, will be responsible for supervising the operations of the computer products merchandising department, including such functions as product evaluation, buying and advertising.

Since joining Radio Shack in 1958 as a store department manager, Shirley has served as store and district manager, buyer and merchandising manager.

From 1973 until being named to his new position, he had been merchandising vice-president for the European Tandy International Electronics.

Originally from San Diego, Shirley lives in Azle, Texas with his wife Mary, and their children, Erickson, 19; Peter, 11 and Mary, 8.

Kromer directs computer centers

Ted F. Cromer has been named director of Radio Shack Computer Centers, a new chain of sales and service stores presently being opened throughout the country.

In his new position, Cromer will be responsible for opening and supervising the operations of the new Radio Shack Computer Centers. He will report to Radio Shack President Lewis Kornfeld.

Before joining Radio Shack this May as general manager of Tandy Computers, now Radio Shack Computer Centers, Cromer had been with IBM for 13 years in a variety of branch, district and regional positions.

Originally from Fort Worth, Cromer received his B.B.A. from Sam Houston State University. He is presently living in Aledo, Texas with his wife, Carol, and children, Stacy, 18; Kim, 18; Wendy, 16; Eddie, 16; and Buck, 14.

The First of the planned chain of 50 Radio Shack Computer Centers is in operation in Fort Worth. A second store opened recently in Dallas, and additional computer centers are expected to open soon in New York, Tampa, Atlanta, San Francisco, Los Angeles and Chicago.

Some of the new Radio Shack Computer Centers are expected to be located within new or existing Radio Shack stores.

The purpose of the new major-market facilities, according to Kornfeld, the company's president, will be to assist area Radio Shack stores in marketing the company's TRS-80 micro-computer system and peripheral equipment, and provide after-sale technical service to customers.



KORNFELD



CROMER

Kornfeld named Tandy veep

Lewis Kornfeld has been named executive vice president of Tandy Corporation Radio Shack's parent company.

Kornfeld, who has been president of Radio Shack since 1970, will continue to serve in that capacity as well. He has also been a director of Tandy Corporation since 1975.

Kornfeld joined Radio Shack as advertising manager in 1948 and in 1954 was promoted to advertising vice president.



APPEL



ROACH

Appel now senior vice president

Bernard S. Appel has been promoted to Radio Shack senior vice president, merchandising and advertising for Radio Shack.

Appel joined Radio Shack in 1959 as a buyer. In 1966 he was promoted to merchandising manager, and in 1970 was named vice president, merchandising. Earlier, between 1949 and 1959, he gained experience with a general merchandise and catalog house.

A 1949 graduate of Boston English High School, Appel served with the U.S. Coast Guard from 1951 to 1954, and received his A.B.A. from Boston University in 1959.

He's listed in "Who's Who in Finance and Industry", and is a member of the Mason's Adelphi Lodge in Massachusetts, the Shrine Moslah lodge in Ft. Worth and the Electronic V.I.P. club.

Appel has served since 1975 on the board of directors of the Jewish Federation of Ft. Worth, and is currently vice president of congregation Ahaveth Shalom.

Roach oversees operations

John V. Roach has been named executive vice president of Radio Shack where he will be responsible for overseeing and coordinating all phases of the company's worldwide operations.

Roach, 40, reports to Radio Shack President Lewis Kornfeld.

Roach began his career with Radio Shack's parent company, Tandy Corporation, in 1967 as general manager of Tandy Computer Services, the corporate computer service bureau. In this position he was responsible for the development of the accounting, mailing, and merchandising systems used in Radio Shack as well as the rest of the corporation.

Originally from Ft. Worth, Roach graduated in 1961 with a B.A. in physics and in 1965 earned his M.B.A., both from Texas Christian University.

He lives in Ft. Worth with his wife, Jean, and daughter, Amy, 12 and Lori, 5.

Here's index to preliminary DOS, disk Basic manuals

Promises, promises! We TRSDOS owners haven't seen hide nor hair of that famous new DOS manual. We're still blundering along with the old preliminary information! So, to help everyone blunder along more efficiently, we've put together an index to all the mini-disk information available from Radio Shack.

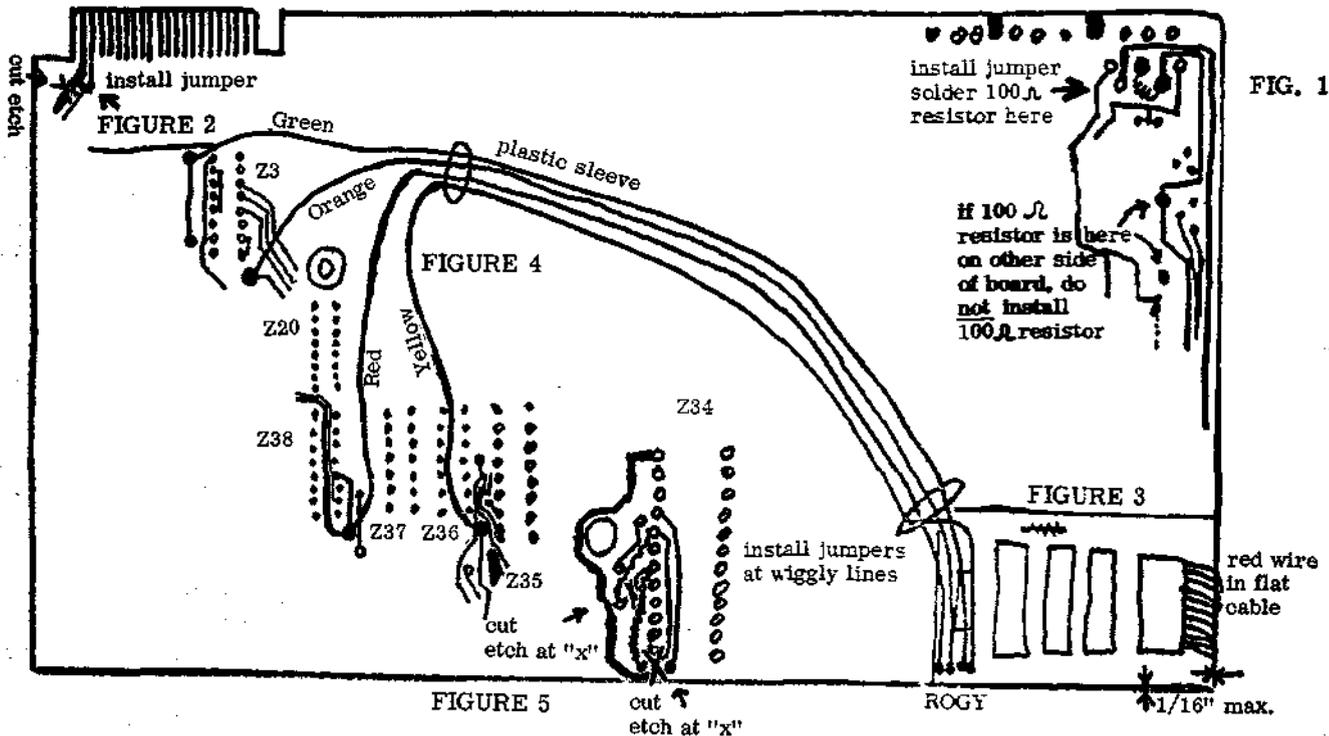
The key to the index is:

Page numbers without a prefix letter refer to items in: DISK BASIC VER 1.1/TRSDOS VER 2.0 Prelim. Inst. Manual—July, 1978

Page numbers preceded by the letter "f" refer to items in: TRSDOS 2.1 FACT SHEET—August 30, 1978
 Page numbers preceded by the letter "m" refer to items in: "More Things You Should Know"—August 30, 1978
 When an item is preceded by a "*", it is a command which can be used only when the TRS-80 is in the TRSDOS mode. Note that one command, LOAD, can be used in both TRSDOS and DISK BASIC modes and means different things in both modes. Page numbers followed by "+" indicate that the item continues beyond the page indicated.

—JOHN STRONG

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LEVEL II CONVERSION—Drawing which accompanied Dr. Thomas Perera's article, "You can convert own TRS-80 with Level II ROM kit", in TRS-80 Computing 1:2, was unintelligible at certain key places. We've reconstituted it, and here is another try.

Level II Basic Reference Manual Index

By JOHN STRONG

Note: This index applies to both the first and second printing of the final black cover Reference Manual. Most items are on the same page in both manuals. When they are not, page numbers followed by the symbol * apply to the first printing only. The same item appears one page later in the second printing. Page numbers followed by ** indicate items which exist only in the second printing. Page numbers followed by + indicate items which extend for one or more pages beyond the page numbers listed.

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