Computer News 80

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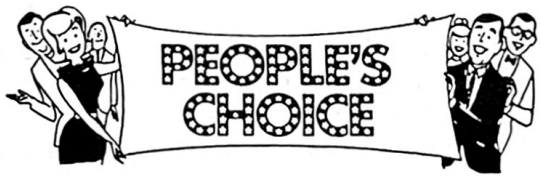
Don't miss your chance to get a copy of SuperUtility from Misosys for $24.95

EDITORIAL COMMENT

Long program listings have added pages to this month's edition. It has been our policy in the past to not print exceptionally long programs, the ones that take four or five pages to print. But rather to print the documentation and then make the programs available on our disk series. That way good programs don't get shuffled off to never-never land because of lack of space in the publication. Also, in keeping with our promise to never print a program in reduced type, so that you needed fourfocals and a magnifying glass to read them, we will continue to print all programs in full size type, 12 pitch , six lines to the inch. We, the over 50 crowd need that anyway.

But lately we have been getting some flack that we didn't print enough programs for those who just love to type in their own programs, debug their typing errors and play with the programming before having the program up and running, doing the job that it was designed to do. So for them we have, in this issue at least, given them lots to work with. How long we keep this up is up to you. Let us know how you feel by telling us how you would rank the following in importance.

News Items - New Product Announcements
Hints and Tips
How To Do It Articles
Program Reviews
Problem Solving Articles
Hardware installation & upgrade instructions
Open Forum
Program Listings
Product Advertising
Other (write in your choice if we didn't list it above).



Drop us a card telling us how you would rank the above 1 to 10, number one being the most important to you and descending in order of importance. We will publish the results in the May issue, so get out your postcard or letter and do it now. Your guidance and help means a lot to us.

Two more small things have to be mentioned here. First our greatest appreciation to all those contributors of articles for this issue and all the other issues. We still need some Model 100 fans to let us know more about that lap top and how they use it. Secondly we want to thank those who have been sending in their old software for the archives. Space does not allow for a listing of all the names, but you know who you are and our sincere thanks to you. We do find a good home for your pet programs. -CN80

THE FILE CABINET LIBRARY DISK MD4BUS17 REVIEW
by Hugh P. Abrey

The File Cabinet Library Disk MD4 business disk number 17 is basically a home financial package.

This home finance program is made up of eight interrelated programs. It was designed to maintain up to three checking/savings accounts, plus a number of charge accounts. In the checking account it automatically shows the last seven entries and the checking account balance. The charge accounts are automatically updated as you enter checks written to that account.

You can review all transactions by the amount; name of account; purpose for which the check was written; the month in which each transaction occurred; the checks which have been cleared; by the type of transaction (such as deposits or service charges) or you can get a general listing of all transactions in sequence.

It has good documentation and built-in help screens.

When entering checks, pressing enter at the check number will automatically enter the next check number in sequence. If you are using today's date, it will also enter it for you.

It also allows one to set up a budget program and search any particular month to compare the actual amount spent to the budgeted amount.

It will print out reports from each account, sorting them by separate fields.

All in all, I feel this is a very good program for handling financial transactions. It is easy to use after working with it for a short period of time.
-Hugh P. Abrey

NEWS ITEM
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ROY SOLTOFF OF MISOSYS ANNOUNCES A NEW UPGRADE TO LS-DOS 6.3

The new updated version of LS-DOS 6.3 now called LS-DOS 6.3.1 is available as a stand alone replacement disk for your old 6.3 system disk for $ 15.00 plus $2 S&H in the US. Those who do not have a 6.3 version will get the new version complete with documentation for $39.95 plus $2 S&H.

Roy has finally laid to rest the "alleged" protection scheme, that had so many users worried about the old 6.3, by plainly stating that LS-DOS 6.3.1 "has no anti-piracy protection!"

The new version will carry your dating through December 31, 2011. 21 more years of using your Model 4, (and CN-80 expects to be right in there helping you enjoy those years).

Just some of the additional features of the new version are: the enabling or disabling of the printer time-out and system error generator. LIST command for Ascii files and hexadecimal display output is paged a screen at a time. You mean - no more pecking on shift @, hoping that the screen would stop where you wanted it to!

See Misosys' display ad in the Product section for more details. The small $17 cost for those who already own LS-DOS 6.3 to have the enhanced features of this new version is really a bargain.

NEWS ITEM
==========

ANITEK SOFTWARE ANNOUNCES A NEW 384K RAM EXPANSION FOR UNDER $100 for TRS-80's

The HYPERMEM memory expansion kit is a dramatic price break-through in memory expansion for the TRS-80 Model 4/4D/4P that is being introduced this month by Anitek Software Products. Now you can expand a 128K Model 4/4D/4P to 384K for only $99.95. This incredible cost savings is made possible by the Very-Large-Scale-Integrated chip (VLSI) used in the kit. Further savings are passed on to to you by the fact that you assemble the kit yourself. Why pay someone else money to assemble the kit for you when you can do it yourself and save $$$$$?

HYPERMEM uses the same bank-switching technique that Tandy designed into your 128K Model 4/4D/4P, but expands your memory beyond where Tandy left off, giving you access to as much as 1 Megabyte of internal memory. A must for the serious computer user, and now at an unbelievably low price.

HYPERMEM takes up almost no space inside your computer and does not interfere physically or electronically with other circuitry. HYPERMEM is guaranteed to be compatible with any graphics boards, speed-up kits, or any other upgrade that you might already have in your computer that isn't using the RAM chip sockets.

HYPERMEM expansion kits can be purchased in any of the following configurations:

HYPERMEM kit only (no RAM) $64.95
384K HYPERMEM $99.95
640K HYPERMEM $134.95
832K HYPERMEM $169.95
1Meg HYPERMEM $199.95

Each HYPERMEM kit comes with easy-to-follow step-by-step instructions and a thorough memory test diagnostic disk to ensure a perfect installation. All of the above kit configurations come with enough RAM chips to expand a 128K Model 4/4D & 4P to the corresponding sizes listed above. Any HYPERMEM configuration can be further expanded to 1 Megabyte using your own 41256 RAM chips, available every where.

HYPERMEM can be used to increase the text buffer size of LeScript 2.01. With 384K of HYPERMEM, you have enough memory for the DOS, the LeScript program, the entire 70,000-word spelling checker dictionary, and about 130K of text buffer.

With the HyperDrive RAM disk emulator driver, HYPERMEM can also be used as one or more super-fast RAM "disk drives". These RAM "disk drives" look like regular disk drives to the DOS but are 50 times faster than a floppy drive and 10 times faster than a hard drive. This can drastically cut the processing time of all your disk-intensive programs and save you several hours of work every week. HyperDrive is only $19.95, plus $3 s/h; works with LS-DOS, TRSDOS 6, and LDOS.

FIRST EXTRA BONUS - Order your HYPERMEM kit before March 31, 1990, and mention that you read about it in the CN-80 New Products Announcements, and we'll throw in the HyperDrive RAM-disk emulator software absolutely FREE! It is our way of saying thank you for giving HYPERMEM a try.

SECOND EXTRA BONUS - Place an order for 2 or more HYPERMEM kits before March 31, 1990, and mention that you read about it in the CN-80 New Products Announcements, and we'll knock 10% off the total of your entire order. Even if you order other items at the same time, we'll still apply the 10% discount to everything on that order.

Prices guaranteed through March 31, 1990. Please add $4 per kit for shipping and handling. Please specify the 26-10xx model number of your computer when ordering. VISA and MasterCard accepted. To order your HYPERMEM memory expansion kit or receive more information call:

407-259-9397
Anitek Software Products
PO Box 361136
Melbourne, FL 32936

DOING IT ON A MODEL 4P

by David Goben

BOOTING UP IN THE MODEL III MODE

Got a Model 4P, huh? So do I. In fact, it was my first Model 4. Those of you new to the Model 4P and trying to boot up a Model III DOS disk may have the computer telling you that it could not find the ROM image. What the heck is that?

The Model 4P is a lot like the MAX-80 computer, a Model III work-alike produced a few years ago, which was a 100 per cent RAM-based computer. What this means is that there was no built-in BASIC ROM.

The Model 4P ROM is 12K in length, with 4K used for video, keyboard, printer and disk control. This is why you could only manage to install just 48K of RAM. A Model 4, on the other hand, boasts of 64K RAM, but like the Model III it requires some of this space in the lower memory region to hold the system control routines.

As you may probably know from possible experience on a Model I or Model III, or even on a desk-top Model 4 or 4D working in the Model III mode, those computers featured ROM chips that contained a BASIC interpreter and most of the system input/output functions, such as keyboard, printer and video management. The Model 4P contains none of this. When operating in the Model 4 mode using a Model 4 DOS, it runs ok since the DOS contains all of the required input/output functions. This was never the case with the standard Model III DOS systems. Thus for it to operate as a Model III it must first load an image of the data stored in ROM on the other computers. It does this by loading a program off disk called MODELA/III. What this program consists of is basically the very same data stored in ROM on the desktop model computers.

When a Model 4P boots up, it checks the disk in drive zero to see if it is a Model III or Model 4 disk. To check for a Model III disk it looks at the boot sector of the disk (track zero, sector 1), and checks for the hexidecimal codes CD xx 00, where "xx" can be any code. If it does not find this sequence it tries to boot the disk in the Model 4 mode, unless the user is also holding down the F3 function key which will force it to try to boot up in the Model III mode. If the F3 key is held down or if the CD xx 00 sequence is found on the boot sector then the computer will try to boot up in the III mode. To do this it looks for the disk directory and searches for a program file called MODELA/III. If it cannot find it, it will report that the ROM image was not found and will wait for you to reset the computer.

If MODELA/III was found then it will load the program file into memory, lock the lower memory into read-only mode (emulating ROM in this manner), and then boot the computer as a Model III.

Where do you find MODELA/III? You will find this program on a TRSDOS 6.1.1, TRSDOS 6.2.x, or LS-DOS 6.3 disk. Right. But how do you use it?

Easy. Insert the TRSDOS 6 disk into Drive 0, turn the computer on and hold down the "F3" (for Model III mode) and the "P" key (for pause) until the computer starts reading the disk. Once it has loaded the MODELA/III program you can load the Model III DOS disk of your choice and press <ENTER> to boot up the Model III disk. After that you can use a normal reset to reboot in the Model III mode, unless of course you boot up a Model 4 DOS or turn the power off. In this case you will have to go through the same special booting process all over again.

CREATING SELF-BOOTING III DISKS

If you are using LDOS you can copy MODELA/III right onto your booting LDOS disk. After that you no longer need to go through a complicated procedure to boot up. Simply insert the LDOS disk, turn the computer on, and it will do everything for you. The same goes for Multidos (be sure to copy the file FROM Multidos, as trying to copy from TRSDOS 6 -to- Multidos will be a disaster). DOSPLUS can do the same after you patch it, as outlined on pages 10-11 of CN-80, Vol 1 number 5, which shows how to set up MULTIDOS, DOSPLUS, and NEWDOS80 so they can boot up automatically. See pages 14 and 15 for the program listings for DOSPLUS and NEWDOS80.

Except for the first Model 4P's, they all came with a TRSDOS 1.3 format data disk

that contained a copy of MODELA/III. The purpose of this disk was to make it easier for you to boot up. Because it was already on a Model III format disk you no longer had to also hold down the F3 key to tell the 4P that you were booting in the Model III mode. You simply inserted the disk, turned on the computer (or rebooted using the RESET switch) and held down the "P" pause key until the computer began reading the disk. But what happens if you got the 4P second hand and you did not receive a copy of the disk? No problem, as long as you have one of the fore-mentioned Model 4 DOSes.

To create a stand-alone boot-up disk, you can do so in one of two ways: using an LDOS type disk or a TRSDOS 1.3 type disk. I will show you how to do both.

Boot up the Model 4 DOS and format a blank disk in drive 1 as single density, 35-track (cylinders). To do this, boot up TRSDOS 6 (or LS-DOS 6), answer the date prompt (lie if it does not go beyond 1987). If a time prompt appears, simply press <ENTER>. Now insert a blank disk into drive 1 and enter FORMAT :1. Answer <ENTER> for the diskette name and master password prompts. When you are asked to select single or double density, type "S" and press enter. "IF" you are prompted for the number of sides, answer with 1 <ENTER>. When asked for the number of cylinders, answer with 35 <ENTER>. If the disk contained any old data that is readable, it will prompt you. Answer its prompt (if it appears) with Y <ENTER>. The disk will be formatted.

When the formatting is done, from the TRSDOS READY prompt enter COPY MODELA/III :0 :1. This will copy the (invisible) MODELA/III file onto the formatted disk.

Remove this disk and put a temporary label on it, marking it as a single density data disk. Next format another disk in Drive 1, but this time format it using the command FORMAT :1 (Q=N,ABS). This command will format the disk in Drive 1 as a 40-track (cylinder), double-density data disk. When the formatting is over, copy the MODELA/III program over onto it by entering COPY MODELA/III:0 :1.

Finally we need to patch the boot sector so that it will contain the CD xx 00 sequence to tell the boot ROM that it will be a Model III disk. We do this by entering
PATCH BOOT/SYS.LSIDOS:1 space
(DØ1,FØ=CD:FØ1,FØ=ØØ) <ENTER>

Please be aware that there are only zeroes inside the parenthesis and the patch is written as one line.

Now remove the data disk from Drive 1 and label it as LDOS MODEL III BOOT DISK. Insert it into Drive 0 and press the reset button, then immediately hold down the "P" pause key. When you are prompted to press <ENTER> or BREAK, place a TRSDOS 1.3 DOS disk into Drive zero and press <ENTER> to boot the 1.3 DOS. Answer the date prompt. Next insert the previously formatted single-density data disk into drive one, then enter CONVERT :1 :0. Answer "Y" to the prompt asking you if you wish to convert the MODELA/III file.

After the file is copied you can now "cold boot" the TRSDOS 1.3 disk without holding any keys down, or you can hold down the "P" key if you wish to use a different DOS that is not set up for automatically loading MODELA/III, or you can use the LDOS MODEL III BOOT DISK the same way.

THE "A" IN MODELA/III

You may be wondering what the "A" stands for in MODELA/III. You may well see it as standing for AMERICAN, as there is also a MODELF/III for French Model 4P's, and MODELG/III for German versions. Actually, you can copy the MODELA/III to another file with any letter from A through G, modify it as you desire, and boot that. The only thing you will have to remember is that you must hold the appropriate keyboard letter key down when booting. Thus if you have a modified version of MODELA/III called MODELB/III, when you press reset, you can hold the "B" key down in order to force the computer to load MODELB/III instead of MODELA/III. What this means is that if you got really creative you could write a whole new operating environ for the Model 4P based upon the MODELx/III file you created, which is stored in a file in the same load-module format as a /CMD type file, which can be created on a disk editor assembler, such as CN-80's DEA Disk

Editor/Assembler for the Models I, III and 4/4P/4D (plug, plug, plug).

THE MODEL 4P AND OLDER TRSDOS 6

Suppose you have Model 4 VisiCalc. You try to boot the original VisiCalc DOS disk up on the Model 4P and what does it do? It tells you it cannot find the ROM image. What? Why should it want that? After all, we're trying to boot up in the Model 4 mode, right?

VisiCalc and many other programs that were supplied on TRSDOS 6 disks were distributed on a DOS disk with a DOS version previous to 6.1.1. For example, my version of VisiCalc was distributed on a TRSDOS 6.1.0 disk. The Model 4P requires that the DOS be 6.1.1 or LATER (higher). What to do?

The reason for the problem is that the boot sector on TRSDOS 6.0.x and 6.1.0 disks used a low memory call to X'33', in the hexidecimal form CD 33 00. Since this format follows the CD xx 00 template that the 4P boot ROM uses to check for a Model III disk, it assumes that the pre-6.1.1 disk is in fact a Model III disk and tries to load the ROM image, which, by the way, was not supplied on the DOS disk simply because they were released previous to the Model 4P.

The best way around this problem is to upgrade the DOS. How do you do this? Easy. The best way is to ignore what the manuals say for upgrading and do this:

If the application program consists of only one or 2 files, make a backup of your usable 6.1.1 or later version DOS disk, remove enough files from the backup to make room for the new files and then copy them from the application disk onto the new disk. Please be aware that password protection may foil this approach. In this case you will either have to patch your DOS to ignore passwords, or use the second approach outlined next.

The second approach: Boot up the DOS that you will be using, such as TRSDOS 6.2 or LS-DOS 6.3. At the DOS READY prompt enter DIR :0. After the DRIVE :0 text on the top line of the directory display you will see the disk name. Copy this disk name down on a piece of scratch paper for later use.

Now place a blank diskette into Drive 1 and enter FORMAT :1 (NAME="xxxx",Q=N,ABS), replacing the xxxx data with the name you copied down, such as LSDOS63L, or whatever it was. This will format the diskette to be double density with 40 cylinders (0-39 tracks) and giving it the same name as the new DOS disk. When the format is complete, enter BACKUP /SYS:0 :1 (S). This will copy the DOS system over onto the new disk. After this is complete, enter COPY BACKUP/CMD.UTILITY:0 :1 to copy the backup program to the new disk.

Next place the NEW disk into drive 0 and reboot. Place the "old" application disk, such as the VisiCalc disk into drive 1 and enter BACKUP :1 :0 (I). This will backup all the work files from the application disk onto the new disk.

The next step is to make sure that the utility files that may have been copies over were the LATEST versions. We do this by placing the MASTER DOS disk for the new DOS in drive 1 and enter BACKUP:1 :1 :0 (I,OLD). Notice the BACKUP:1 command, which makes sure we are using the BACKUP/CMD program from the new DOS, in case the application disk copies an older version of BACKUP/CMD over the top of the copy on the new disk. Notice that by using the OLD parameter that only common files that exist on the new disk and the master DOS disk will be updated.

The next to last step is to place the application disk back into drive 1 and enter AUTO ?:1. This will display any possible auto data on the disk in drive 1. If there was no text displayed, then you are done with this step, otherwise you will need to reset this data for the new disk. Do this by entering AUTO, followed by a space, and then the text. For example, if the text was APPL, you would enter AUTO APPL to reset it.

A final step is sometimes tricky. With the old application disk in drive 1, enter DIR CONFIG/SYS:1 (I). If a file called CONFIG/SYS is found, you will need to find out what was configured. In cases such as DESKMATE, COM is configured into *CL. Others have FORMS configured into *FF.

You will need to consult your applications manual to check this. If it requires COM, you could reset it by entering SET *CL COM, and then entering SYSGEN. If FORMS, you could enter SET *FF FORMS, and then SYSGEN. If it is possible to boot the DOS up (ie, it being 6.1.1 or later), then boot it up and enter DEVICE (B) to see if *CL or *FF are displayed. You will normally see *KI, *PR, *SI, *SO and *JL, but anything beyond these are user-installed devices. Again, consult your manual to determine what they are and how to install them.

SPECIAL MODEL 4P FEATURES

For fun, if you hold the "V" key down and press the reset switch on the 4P, you will see the boot ROM version number. If you hold down the period key "." and press reset, you will get a continuously running diagnostic test program, which will check the RAM in the computer by using several different methods and masks. According to the technical reference manual, by re-booting and holding the F1 key down, you should be able to boot from the hard disk, although this will not work when using LS-DOS 6.3 or LDOS 5.3. Holding down F2 forces a floppy disk boot. If the right shift key is held down during a reboot, the boot ROM tries to load from the RS-232 port. I suppose this might have applications somewhere.

If the Model III ROM image is scrambled and you cannot seem to reboot a Model III disk, you can reload the ROM image from MODELA/III by also holding the "L" key down during reboot, which forces a new copy of MODELA/III to be loaded. "L" can be seen as LOAD.

If you have a special version of MODELA/III loaded that does not conform with what the boot ROM understands as being a proper ROM image present (a process it checks during each reboot into the Model III mode — thus bypassing the need to each time reload the MODELA/III file), you can hold the "N" key down to force the boot ROM NOT to load the ROM image file.

Instead of holding the F1, F2 or F3 keys down, you can hold the normal 1, 2 or 3 keys to get the same results.

For you experienced users who don't have time to wait the 2 1/2 seconds for the keyboard timer to wind down before trying to access the disk after you turn the computer on or press reset, you can press the <ENTER> key to skip the timer routine and force immediate action. Thus you can reboot your system just as quick as a desktop Model 4 by pressing <ENTER> while doing a system RESET.

FOR EXPERIENCED USERS

If you are into machine language and want to see exactly what the boot ROM does, you can switch the boot ROM in by sending a 1 out to port 9CH. Since doing so might simply reboot your system, you may wish to write a machine language program that disables interrupts, sends 1 through the A register out to port 9CH, dumps memory X'0000' through X'0FFF' to higher memory, such as starting at X'8000', then sending zero out port 9CH, and then turning interrupts back on. Then from DOS you could dump addresses X'8000' through X'8FFF', with a transfer address of X'8007', to a disk file, perhaps use a relocation program such as CMDFILE on LDOS 5.3 to relocate the code back down to X'0000', and then disassemble it using the DISASM and XREF programs in the DEA package.

From this information a person experienced in EPROM programming could create a custom boot ROM. My older brother once modified his own 4P via a new custom ROM and changed circuits to instantly "switch in" a copy of the Model III ROM, stored on a prom, when it detects a Model III disk, thus his 4P boots just like a desktop Model 4. I guess the guy who has it now probably doesn't realize that all Model 4P's don't do this. Now my brother is so engrossed in the CoCo that I can't "force" the how-tos out of him. But I'm sure there are more people like him out there. Perhaps one of you could make a good chunk of change marketing such a custom modification through CN-80. How about it?

CONCLUSION

This ends this installment of "Doing It On a Model 4P". If you have any further questions or suggestions, please send them to me in care of Computer News 80. If there is enough of a response then you will

see Doing It On a Model 4P II: "The Wrath of ROM".
Happy Computing!
-David Goben

GRAFDISK REVIEW
by Frank Gottschalk

I've been spoiled with my Megabyte RAMDISK's in my Model III's and 4's for a long time now. Recent acquisition of a Hard Drive and running my system off it gives me a "start" at every command as it hesitates to react, compared to my RAMDRIVES.

Model 4 users with 128K have the option to use their second bank of memory for a 64K System RAMDRIVE by using "MEMDISK", loading in System files and then swapping it to drive :0. This makes system operation really FAST. By judicial omission of some system files, one can squeeze in a program or two to run fast also. I have several Boot disks, each for a special purpose, that AUTO load via a JCL into Memdisk and then becomes the system drive :0. Each of these take 1 minute and 5 to 30 seconds to boot.

Now I have Model 4 Hi-Res boards from David Galager in Texas, and find out they have 32K of memory on them that can be used as a RAMDRIVE also, but how?

Along comes GRAFDISK by Bill Bowman. At first, the ten pages that printed out from the /DOC file were a bit imposing, but they read very easily and lightly. Included was interesting background information, easy to follow precise step by step instructions to get it to work.

What does it do? It can use the 32K ram on the R.S. Hi-Res board (20K on Micro-Lab board) and add it to the 64K Memdisk to give you a 96K RAMDRIVE. (System type B) Now there's room for several extra utility or program files of your choice, as long as they're not Hi-Res programs, and they'll run FAST!

Hold on now. No Hi-Res board? That's too bad, your missing a lot of fun, but GRAFDISK is still for you. It does something I didn't think could be done. It will take your 64K Memdisk (system type A) and dump its "image" to your Boot disk. Now you can Boot and AUTO load your System RAMDRIVE in 20 seconds! You can even have it initialize the program of your choice.

Just think, you can re-boot your system and have your system and program loaded in RAMDRIVE :0 and running in 20 seconds flat, and it will all run amazingly fast. No more waiting for overlays to load from disk.

I'm using it now as a type A system with my HIRES program in it and still use my Hi-Res board.

You'll love it, I do!.

HI-RES Vs. FDC
The following may also, be of interest to you who are new to graphics boards.

After installing six Hi-Res boards in Model III's and 4's, two had display problems. They had bars across the screen, wouldn't clear properly, and erratic dots instead of pictures.

I isolated the problem eventually by putting a partial system, Hires program and a picture in Memdisk, then disconnecting the Floppy Disk Controller. Beautiful picture! These two FDC's were the "tall" ones with an MI and logo on them. The other machines had "short" R.S. FDC boards.

Solution: Replace "tall" FDC's with "short" R.S. boards and enjoy your Hi-Res pictures.
-Frank Gottschalk

Note: The GRAFDISK program will be available on our disk series number eight, which should be available for mailing by the time you receive this issue.-CN80.

This computer guru's Rate Schedule was sent to us by Len Brockwill of The Import Outlet, Monticello, AR

ANSWERS..... $1.00
ANSWERS THAT REQUIRE THOUGHT..$2.00
CORRECT ANSWERS..... $4.00
DUMB LOOKS .....ARE STILL FREE

ASSEMBLY LANGUAGE TUTOR Part 14

by Christopher Fara (Microdex Corporation)

Relocatable routines

We have emphasized many times that a machine program sits in the computer's memory as a contiguous block of numbers (bytes) starting at the address determined by the ORG instruction in our "source" code. If a program does not LD, CALL or JP to any fixed addresses within itself, then that block of numbers can be copied from one location to any other place in memory, and the program will always work without the need to re-assemble it with a new ORG. Our ALFA and VIDEX routines from the last two months are good examples: they didn't have any fixed buffers or messages within themselves.

One reason for our interest in relocating is to improve memory management. For example our subroutines for BASIC in the last two essays were assembled with ORG 64000 to avoid conflict with high memory. That forced us to protect too much memory from BASIC. An alternative was to find the top of free memory and length of the routine, and change ORG to fit the routine right below the top. But whenever that top address is different (for example some other routines are already installed there) we would have to re-assemble our routine with a new ORG, adjust the call addresses in the BASIC program, and so on. In other words a lot of "menial" busy work.

A traditional BASIC trick bypasses this problem. Machine routines can be stored in string variables or in integer arrays. Once stored this way, they are safely embedded in the variables and no special memory protection is needed on entry to BASIC. The method of putting an assembled machine code into a string or array is essentially the same as for creating such variables from the DATA statements published in magazines. However, instead of READing a DATA list, we first load an assembled machine routine into protected memory, and then PEEK starting at the known ORG address. After the code is retrieved from memory and stored in a string or array, we save those variables in random or sequential files. Later any BASIC program can input such strings or arrays and execute the embedded code by defining the entry address for USR or CALL as the VARPTR of the string or array. The details of using strings and arrays for machine code are described in "Mod-III by Chris" and "Mod-4 by Chris" and the interested reader may wish to consult those books. Here we want to study a more "sophisticated" method.

Memory modules

Mod-III LDOS and Mod-4 TRS/LSDOS often puts various drivers and filters in high memory, and protects them by lowering the so-called HIGH$ address which is the end of free memory, never trespassed by DOS or BASIC. Mod-III TRSDOS 1.3 does not do that, except for the little known and rarely used LPC command which actually is a small printer filter. However, the LDOS/LSDOS scheme can be used to great advantage with any routine and any DOS. The general idea is this. A relocatable, self-protecting /CMD routine consists of three parts:

1. Loader
2. Header
3. Actual routine

When such routine is executed from DOS, the "loader" copies the "header" plus the "actual routine" from wherever its ORG initially located them, to another place right smack against the very top of free memory. Then it lowers the HIGH$ address to just below the entry address of the relocated module. After those operations the loader is abandoned, control returns to DOS and the routine now sits protected in the high memory. Any next routine can be stored in the same manner right below the previous one, and so on.

The header

A standard header goes right before the first executable instruction of the routine. The format is the same for Mod-III and Mod-4. For one of our VIDEX routines from last month it might look like this:

```
;-----------------------------------------
HEAD:   JR    EXE         ;to routine
LAST:   DEFW  0           ;end address
        DEFB  5           ;name length
        DEFM  'VIDEX'     ;module name
        DEFW  0           ;reserved
        DEFW  0           ;reserved
;-----------------------------------------
```

```
;-----------------------------------------
EXEC: ... actual routine starts here
;-----------------------------------------
```

The first JR simply skips over the header data to the first executable instruction of the actual routine. At the label LAST we reserve a blank "word" space. The loader will put here the address of the end of the actual routine after it's relocated. The name of the module and its length are stored next. The remaining two "words" are used in DOS drivers and filters, but even though our routine won't need them, the header should reserve those bytes to maintain the standard module format.

T h e l o a d e r

The loader goes right before the header. There are small differences between Mod-III and Mod-4. As usual, let's look at Mod-III first, but Mod-4 programmers please pay attention, because most of it applies to you as well.

```
;-----------------------------------------
        ORG   32000        ;pretty low
RUN:    LD    HL,(17425)   ;get high$
        LD    (LAST),HL    ;put in header
        LD    DE,DONE      ;present end
        EX    DE,HL        ;swap end,high$
        LD    BC,DONE-HEAD+1  ;length
        LDDR
        EX    DE,HL        ;HL=new high$
        LD    (17425),HL   ;store it
        RET                ;exit to DOS
;-----------------------------------------
HEAD:   ...      header goes here
        ...
EXEC:   ...      actual routine goes here
        ...
DONE:   RET                ;last byte
        END   RUN
;-----------------------------------------
```

Notice that at the end of this improved VIDEX we must write END RUN (not just END like we did last month) because we will run it from DOS. When such combined /CMD file (loader, header, routine) is executed, the first instruction at the label RUN finds the current end-of-memory address which in Mod-III is stored in the locations 17425 and 17426 (compare with MEMEND program in CN80 12/89:5, or Z80 Tutor I:34). We store this address in the "word" space reserved at the label LAST in the header. We will be relocating the routine in such a way that its last byte will sit at the very end of free memory. Therefore the current HIGH$ stored at the label LAST will be the future address of the last byte of the relocated routine. This information will be very useful, as we'll see later today. Next we put in the register pair DE the present address of the final RET instruction in the actual routine (labeled DONE). Then EX swaps DE and HL, so that now HL is the present address of DONE, and DE is its future address (its "destination").

If you read our essay last month, you surely can guess what this is leading to. All we need now is the length of the module to be relocated. This length is the difference between the present address of DONE minus the present address of the header start (label HEAD) plus one, and we put it into register pair BC. At this point the registers are ready for the instant LDDR copy of our routine to the high memory. As you recall, after LDDR register pair DE points to the memory location just below the relocated "destination" block. This, of course, will be the new end of free memory. So we EX again to put it in HL and copy it back to the same location where we got the previous HIGH$ from. That's it. Our VIDEX routine now sits protected in high memory and its entry address is just one byte above the new HIGH$.

Mod-4 loader differs slightly from Mod-III version because normally we get and store HIGH$ not in a fixed memory location, but via a SuperVisor Call. This SVC number 100 expects two "entry conditions". Register B is a "function code" and must be 0 if we wish to deal with HIGH$. Register pair HL must be also set up before entry to this SVC. If HL=0 then the SVC will return the current HIGH$ in HL. If HL>0 then the HIGH$ will be changed to whatever value we pass in HL. The rest of the loader works the same way as in Mod-III above.

Famous last words.

"I'll make this program work before I go to bed if it kills me."

```
;-----------------------------------------
        ORG   32000.        ;pretty low
RUN:    LD    HL,0          ;find
        LD    B,0           ;high$
        LD    A,100         ;SVC number
        RST   40
        LD    (LAST),HL     ;put in header
        LD    DE,DONE       ;present end
        EX    DE,HL         ;swap end,high$
        LD    BC,DONE-HEAD+1  ;length
        LDDR
        EX    DE,HL         ;HL=new high$
        LD    B,0           ;store it
        LD    A,100         ;SVC number
        RST   40
        RET                 ;exit to DOS
;-----------------------------------------
HEAD:   ...     header goes here
        ...
EXEC:   ...     actual routine goes here
        ...
DONE:   RET                 ;last byte
        END   RUN
;-----------------------------------------
```

Notice, by the way, that in both versions we have ORG much lower than our usual 64000. If HIGH$ happens to be pretty low, we don't want to encroach on it with our loader. In any event, the method assures that the actual routine will be relocated as high as possible near the top of the available memory. The loader could be embellished by adding a displayable message "VIDEX is now installed" or some such, but for now let's not get distracted.

Calling the module

Edit the VIDEX routine from last month and assemble it now in the loader and header format, as outlined above. Make sure to use Mod-III or Mod-4 versions, depending on your machine. Let's say the assembled file is named VIDEX/CMD, so from DOS enter VIDEX which will instantly put the routine in high memory. When DOS READY reappears, enter BASIC, but don't protect any memory this time: the routine is already automatically protected behind the lowered HIGH$ address. To call the routine from BASIC, we only need to know its "entry" address. In the past we knew the ORG was at 64000 so that was the address for USR or CALL. Now the situation is different. The entry address is one byte higher than the HIGH$. In Mod-III we find HIGH$ the same way our "loader" found it at the memory locations 17425 and 17426. For example:

```
L% = PEEK (17425) 'low byte
H% = PEEK (17426) 'high byte
Z% = L% + 256*H% - 65536 + 1
```

We know that the HIGH$ address is more than 32767, so we "assemble" it from its Low and High bytes into a "signed" integer by subtracting 65536 as usual. Then we add "one" and now Z% is the entry address to our subroutine. The rest is the same as last month. For example to store the screen in an array

```
DEF USR = Z%
DIM V%(512)
V%(0) = 6
X% = USR ( VARPTR ( V%(0) ) )
```

Restore the saved screen using V%(0)=5.

We have noted above that in Mod-4 the HIGH$ address is found by calling SVC 100. This could be also done from BASIC, especially from the BASIC which comes with LSDOS 6.3 and includes special direct USR11 call to SVC. If you are interested then review this in the LSDOS 6.3 update pages or in "Mod-4 by Chris". But we can cheat a little here, because Mod-4 HIGH$ address can be also found directly from BASIC in memory locations 1038 and 1039:

```
L% = PEEK (1038) 'low byte
H% = PEEK (1039) 'high byte
Z% = L% + 256*H% - 65536 + 1
```

and to store the screen

```
DIM V%(960)
V%(0) = 6
CALL Z% ( V%(0) )
```

Then restore it using V%(0)=5.

Similarly you could assemble our ALFA routine (CN80 1/90, Z80 Tutor I:37) in the "module" format and try it from BASIC. The format is pretty similar for most routines. We could keep it in a standard "source" file and edit it for any new routine we want to create in the module format. Just make sure that all labels match, etc.

A side benefit of routines assembled in the "memory module" format is that they can be "SYSGENed" in Mod-4 (and Mod-III LDOS, but not TRSDOS 1.3) just like DOS drivers or filters. Every time such "sysgened" system disk is booted-up, the routine is automatically restored into protected high memory. Our /CMD file which loaded the module in the first place is not needed on this disk anymore.

Many modules

Suppose our BASIC program needs several machine subroutines. So from DOS we execute VIDEX, ALFA, etc, one after another, and enter BASIC. Only that routine which was loaded last has its entry address just above HIGH$. We know how to find that, but where are the entry addresses of the other pre-loaded routines?

Look again at the "header" format. At the label LAST the "loader" has stored the address of the last byte of the relocated routine. Therefore the entry address to the next higher (previously loaded) module is one byte higher than that. Also notice that LAST is located 2 bytes higher than the entry address to the module, because we know from previous essays that a JR instruction generates 2 bytes of machine code. So it's easy to compute the entry addresses of all modules, starting from the lowest one. Suppose we have found the entry address to the lowest module and stored it in a variable Z1%. Then the entry address of the next higher module could be found like this:

```
L% = PEEK (Z1% + 2)
H% = PEEK (Z1% + 3)
Z2% = L% + 256*H% - 65536 + 1
```

Next take Z2% and compute Z3% the same way for any next module, and so on. This procedure can be easily standardized as a loop in a BASIC program. Of course the BASIC program must "know" the sequence in which the modules sit in the high memory, from the lowest (loaded last) to the highest (loaded first).

Note: Z80 Tutor I:37 etc, refers to the pages in the revised collection of our CN-80 1989 tutorial series, now available in book form ($9.95).

A VISIT WITH DAVID GOBEN

by David Goben

VIDX AND PROTECT PROBLEMS

I could pull my hair out trying to keep track of everything. If you typed in the program listings for VIDX or PROTECT in the January 1990 issue (Vol 3 Number 1), on pages 26 and 27, you may have been puzzled why the programs had a ZERO length. Well, somewhere along the line after I had created the the BASIC creation programs using my DATAPOKE program, I had accidentally removed an important statement in line 70 of both programs. For some reason or another the PRINT#1,CHR$(A);: statement was removed. This should precede the GOTO 50 at the end of line 70 in either program. Thus you should replace :GOTO 50 with :PRINT#1,CHR$(A);:GOTO 50 at the end of line 70 in both program listing number one and two. Most of you figured out what was going on and fixed it, but the non-programmers were understandably lost. Sorry for the confusion. Fortunately the disk series stores copies of the /CMD versions of my programs which work OK, and are untouched by my trying to make them usable in the magazine. ARGH!

One more accident to report and that is when I was writing the article for the January (Vol 3 No. 1 pg. 14) issue I inadvertently told you the Model I scroll protect address was 16428, it should have been 16543. This error came from my looking at some old notes where I had used 16428, later to discover that that address would conflict with the other Models and then changed to 16543. So much for old notes not being updated.

Anyway, I forgot to mention something in that issue that a few of you may have already discovered. By simply sending the ASCII code 7 (PRINT CHR$(7) from BASIC), the computer will BEEP on the Model 4 in the III mode. On the Model I or III, you will need to have an amplifier attached to the cassette cable's output jack (the larger of the 2 grey plugs). I used code 7 because this is the BELL code used on the old teletype machines and other computers, such as the PC's. This was an added feature since the Model 4 has the SOUND command, which is lacking on the Model I and III.

REVERSE VIDEO IN MOD-4 DEBUG

Recently I have been working on a major project for the Model 4 in machine language that uses reverse video as the standard operating environment. This can be a real pain when using DEBUG to trace program flow and find errors. It ended up that I had to patch the debug system module (SYS5/SYS) in order to display things correctly. There were 2 obstacles that stood in my way. The first was that each screen update cause the HOME code, CHR$(28), to be printed, which also turns reverse video off. Thus I applied a patch which simply positioned the cursor at the "home" area without printing the CHR$(28) code. A side effect of this patch was that the cursor was not turned off. I like it better this way anyway. The second part of the patch was to allow the ASCII data printing portion of the program (where it shows what is represented by the codes while in debug) to display the reverse video alphabetic codes. The problem here is that debug also uses tabs. Thus my solution was to apply a patch that would itself patch the DOS area back and forth so that tabs and reverse video alpha codes could be used simultaneously.

To install these patches, build a file called REVDEBUG/FIX and enter the following lines:

```
.Patch TRSDOS 6.2 and LS-DOS 6.3 DEBUG
.to allow Reverse Video debugging
.David Goben. Nov 1989
X'1ED5'=21 00 00 06 03 3E 0F EF 00 00
X'2198'=18
X'219D'=BD 23
X'23BD'=F5 3E 18 32 BC 0B F1 CD
X'23C5'=42 06 3E 38 32 BC 0B C9
```

Install the patch by entering PATCH SYS5/SYS.LSIDOS REVDEBUG. Remember, NEVER use a patch unless you need it -- some people are patch crazy and have to install every patch they see, even if it will interfere with how they like to use their programs. So use them only if you need them.

WHAT CAN READ WHAT?

So you have your favorite DOS running away and you get a disk from so-and-so and they tell you it is in such-and-such DOS format, which differs from your own. How do you know if your DOS can read that disk without going through some elaborate procedure? I am trying to ease the problem by providing some information on what can read what. In this presentation I am making use of some special keys. 1D means Single-Density, 2D means Double-Density, 1S means single-sided (1-sided disk), and 2S means double-sided (2-sided disk). Thus a references such as LDOS 1S 1D means LDOS single-sided single-density. If a special procedure is first required, it will follow the reference, such as "Use CONV/CMD". You will of course have to refer to the respective "Read from" DOS manual to see how to use such a program.

This presentation is of course incomplete and you are encouraged to share your expertise where information is lacking by notifying CN-80 in writing (and in an ASCII-saved file on disk if you can), informing them of DOS compatibility or solutions to such problems.

To start such a list off I will begin with TRSDOS 6.x, LS-DOS 6.x, and LDOS, which are 100% media compatible with each other. Needless to say they will read all formats of each other's disks. What I mean by this is that no matter if you format a disk single density or double density or single-sided or double sided under Model I or Model III LDOS, or Model 4 TRSDOS or LS-DOS, they can easily read any of the other's disk formats.

TRSDOS 6, LS-DOS 6 and LDOS can read:

TRSDOS 2.x (Model I) after using REPAIR
TRSDOS 1.x (Model III) by using CONV
DOSPLUS (Model I) 1S 1D after using REPAIR
DOSPLUS (Model III & 4) 1S 1D 2D
NEWDOS80 1S 1D after using REPAIR
ULTRADOS 1S 1D after using REPAIR
TRSDOS 6 all formats
LS-DOS 6 all formats
LDOS (both Model I and III) all formats

Notice that TRSDOS 6 and LS-DOS 6 can read ALL formats of NEWDOS80 2.0 "IF" they use a public domain program called ND2TRS6, which I have had the opportunity to enhance to allow the reading of all possible NEWDOS80 formats for both Model I and Model III. This program can be found on the T62DOSXT disk from CN-80, plus on many BBS systems such as GENIE.

You should stay away from reading MULTIDOS disks from LDOS, TRSDOS 6 and LS-DOS 6! The format of the Multidos disks is such that TRSDOS 6, LS-DOS 6 and LDOS will think it is 2-sided, whether it is or not. Multidos can read these other formats OK. So if you need to transfer programs from Multidos to the LDOS family of DOSes, format a 1-sided disk in either 1D or 2D using LDOS, TRSDOS 6 or LS-DOS 6, then boot Multidos and copy the files to the disk, then boot the other DOS to read it. By the way, I noticed that Multidos, like TRSDOS 1.3, will not boot on a computer using the XLR8er speedup and memory expansion board. This is due to the DOS using undocumented Z80 instructions (a no-no for operating systems). As such they would have to be patched to be usable. See CN-80 Vol 1 num 6, page 13 for the patches needed for TRSDOS 1.3 so it can work with the XLR8er. I don't know the patches needed for Multidos. Does anyone?

TRSDOS 1.x for the Model III can read 1S 1D disks that have the disk directory on track 17 (standard for 35 track disks, such as TRSDOS 2.x) when using the CONVERT command.

If you have more (or better) information concerning these or other DOSs and/or how to overcome compatibility problems, then please let CN-80 know. They will pass this info on through this magazine and to those who need it most.

THE FIX FOR MOST XLR8ER PROBLEMS

If you have obtained the excellent XLR8er Board from MISOSYS with the 256K extended memory for your Model 4/4P/4D, you have a suddenly VERY powerful machine that acts almost like a -new- computer. With the new patches by Michel Houde, it is even more super. Of course all is not roses with -some- few Model 4's. There have been some of you who have obtained this product, but because you couldn't get it to operate correctly, you gave up and sent it back. My Model 4D had such a problem, but the fix was unbelievably EASY!

No matter if you have a 2.5" cable or a 6" cable, sometimes Radio Frequency (called RF) interference generated from the ribbon can cause problems. The problem was usually a sudden system reset or even a freeze-up. Let me tell you, I was one puppy going nuts chasing my own tail. Stan can attest to this. Finally, after I had eliminated all other causes, the fact of -knowing- it was RF noise and not something else resulted in a quick solution consisting of a plan to use ordinary household aluminum foil as a shield. To check with my deductions I called Roy at MISOSYS and he said that someone had once reported fixing it by wrapping the XLR8er cable in foil. Bingo!

I laid the ribbon flat and placed two sheets of aluminum foil -neatly- around the cable, completely covering the cable without an over- or under-lapping. I then used 2" wide strips of masking tape that were about 5" long (2" plastic packing tape works just as well) and neatly covered the aluminum to prevent any shorting (the wrapping and taping operation took me all of 1.5 minutes — part of that time being spent looking for scissors to cut the foil and tape). I then installed the XLR8er per instructions. My computer suddenly went from constant problems (usually within 30 seconds) to -none-, even after several days of continuous operation.

Some few other Model 4's -seem- to get along OK with the XLR8er, but for "some reason" freeze up or reboot within 5 minutes of initial operation, and then work fine thereafter. This is also caused by the RF problem and can be fixed as described above. Of course, MOST (read as generally ALL) Model 4's -never- have any problem with the XLR8er. I have since learned that the cause for the RF noise in some computers, such as mine, can be due to the purity of the solder used to assemble the motherboards. It seems that impurities in the solder can have a lot to do with the noise. Hm.

But whatever the case, with the quick shielding job my XLR8er hasn't since given me a microsecond of trouble.

By the way, if you are checking the memory chips in your computer to insure that they are 150-nanosecond types (the 64K extended memory upgrade is required to use the XLR8er with the extended 256K), most manuals state that they should have a -15 or -5 at the end of their part number (top line — the bottom line is simply a batch

code). This is not always true. Some 150-types are marked as 8040665, although I've found that the key to all this seems to be the common appearance of 665 at the end on others, at least on ones of Motorola manufacture. Perhaps a chip-wiz can clear this up?

By the way (again), has anyone installed the Alpha Technologies memory expansion board from Anitek? 1 meg of memory sounds tempting. I think I might get one for one of my other Model 4's if I knew more about it.

ENHANCED VERSION OF DEA AVAILABLE

Yep, a special edition version 2.0 enhancement to the DEA Disk Editor Assembler is now available. It is be offered as a "separate" item to owners of DEA 1.x -only- for an enhancement upgrade fee of $15. Version 2.0 is different from version 1.x in that it will not accept lower case labels, opcodes and operands, although lower case strings and comments are of course allowed. The big NEW feature of DEA 2.0 is that it will operate TWICE as fast as the standard version 1.x. Additionally, it will report when it closes an include/referece file and also graphically shows you the depth of each include/reference file. Obviously, support of 1.x will continue to be provided as it is the -main- version for DEA; it is just that some of you who are assembling "huge" programs are looking for some additional speed, and Version 2.0 has been written for just that reason.

If you are considering obtaining DEA and want the Version 2.0 upgrade as well, simply state your desire in your order and add $15 to the cost. If you already have DEA 1.x, you can obtain Version 2.x by simply sending $15 to CN-80. Your name will already be registered as being an owner of Version 1.x.

If you are satisfied with the operation of DEA 1.x, you should not consider obtaining 2.x. In fact, I prefer 1.x simply because I usually leave my computer in the lower-case mode and program that way, which version 1.x works with easily. Besides, for most programming applications the standard version is -plenty- fast enough even for my standards (I want everything -yesterday-).

While I am on the subject of DEA, some have asked why I bother with a 3-pass assembler, and why not go with a 2-pass version? It is true that I could go and write a 2-pass version, but I have come across too many programs that just to assemble all values correctly REQUIRE a 3rd pass; otherwise a thing called a "phase error" occurs, which crops up when there is a forward reference to a forward reference (something you spreadsheet users know all about). If you want the program to assemble faster, be sure to use the /NL/NS switches, which turn off the listing and the symbol displays. Besides, converting DEA to a 2-pass assembler would make the /NE (no error) assembler switch useless, which in its present form is worth a king's ransom.

NEW MODEL 4 SPREADSHEET

As the spreadsheet market is drying up for the Model 4 by the big-name producers, and as more and more new people are acquiring Model 4 computers to do their work, there have been a lot of people looking for a serious spreadsheet program. Unfortunately, about the only such program left on the open market is the spreadsheet in Deskmate, which is almost a laugh to work with as it is too weak to be considered a useful financial calculation tool.

Well, once again Computer News 80 is coming through for you. They will soon be marketing a program called Busy-Calc; a very powerful spreadsheet program that supports 98% of the VisiCalc features, plus many, many others that a lot of people wished that VisiCalc had provided. Busy-Calc has been written by yours truly, and it is now being tested by a select group of CN-80 readers for bugs (this is the part where the author's ego must be made of steel). The manual for Busy-Calc is being written with the new user in mind, introducing them to spreadsheets, showing them how to load it and take advantage of it. It even includes a large, 2-part tutorial to get their feet really wet.

If you are familiar with VisiCalc, you will already be familiar with Busy-Calc; that is how similar they are. Of course I have added many friendlier features, such as pop-up menus with plain-english command prompts. I have also added many new functions to speed you on your way to obtaining answers rather than spending your time trying to figure out how to obtain

them.

Also to follow up Busy-Calc, a tutorial manual based upon Busy-Calc is in the planning stages and will be written by CN-80 reader Ed Osenbaugh; my best friend from the days of early grammar school, who writes documentation for a company that produces super-power main-frame programs, to include spreadsheets. Ed also teaches people how to use spreadsheets and has already written manuals on this subject. He has been looking for the opportunity to "go public" for some time. Karen, his wonderful wife will probably kill me for getting this particular ball rolling, but what are best friends for if you can't get in trouble with their wives?

So stay tuned to CN-80 to hear about its progress. Until then, HAPPY COMPUTING!
-David Goben

ULTIMA REVIEW
by Henry A. Blumenthal

Ultima is a powerful, versatile data base program, with a 1989 copyright date, that might serve a small business well. But in a home setting the user might find himself or herself jumping through many hoops just to achieve some rather simple, straightforward results. However, this is no indictment of Ultima; it's what you choose to make of it.

Whereas PFS:File, for example, allows you to compose a screen of fields by moving your cursor to the desired spot and typing, Ultima needs to know which fields will be protected, which will contain only numbers, and the maximum number of characters each field will allow. But there's a reason for this interrogation: PFS:File is a passive data base program; it simply sorts things for you. Ultima, on the other hand, can keep running totals on your payables and receivables and otherwise actively participate in your business record keeping. In that regard, it also can interface with VisiCalc and Multiplan data interchange files and with some word processing files. Up to 75 math formulas can be cranked into a file system.

Remember, too, that simple programs like PFS:File need to be run with a report generator like PFS:Report, whereas all this stuff is included in Ultima.

Because of Ultima's sophistication, there are a couple of dozen control-key and clear-key combinations to become familiar with, but you can create your own help screen to help you in your navigation.

The minimum computer power you must have is a 64K Model 4 with two single-sided floppy drives and LS-DOS; Ultima comes with a single-sided Run disk, a single-sided Define disk, and a Convert disk for handling files created by the Profile and DBS data base programs. None of these Ultima-supplied floppies contains system files, however. Therefore, double-sided drives or a hard drive would be a big help, so that you can consolidate operations without disk-swapping and give yourself a work area with at least a reasonable amount of space available. In addition, you need BASIC and one of its overlays. Since I have a hard drive, everything I need is at hand and all operations can be evoked via a single menu screen, a nice touch.

It's a bit irksome to have to install a forms filter before Ultima will load. What does the forms filter need to do? Nothing that most programs can't already do without needing to install a filter. The Ultima manual calls for simply putting the filter on line, without parameters, as a conduit for instructions to the printer. Normally, the only time I evoke a forms filter is when I plan to list BASIC code and would like a left margin for hole punching along with a perforation skip. In addition, the manual suggests SYSGEN'ing the forms filter, so that it doesn't have to be installed as an extra step each time Ultima is loaded. But I wouldn't advise it on a hard drive, as many applications don't work right with the forms filter installed. Use a simple JCL program instead.

A forms filter also is needed with Profile for the Model 4, but at least you can load it without having the filter installed. PFS:File does not require a forms filter. I have no experience with other data base programs for the Model 4.

I came across some inadequacies with the

manual, the result, I suspect, of a desire by its author to make things as simple as possible. Let's start with installation of Ultima: To install it in my system, I created a subdirectory (what Roy Soltoff of MISOSYS calls a subdisk) to hold the files of both the Run and the Define diskettes. The manual doesn't acknowledge this approach to installation; instead, it calls for the user put all Ultima files on drive 0, but I'm sure owners of hard drives with subdirectory software are aware of that installation option -- and will use it.

And in actual implementation, I occasionally encountered some confusingly constructed sentences and imprecise choices of words. But unless you're a dunce — in which case you'd have no need for Ultima -- you can surmount these aberrations. Interestingly recent correspondence I had with its developer shows him to be an excellent wordsmith in clarity and organization.

But I have never seen a manual or documentation of any sort that couldn't have been improved on, and its developer pledges to keep the manual responsive to needs and suggestions. However, this isn't a review of the manual; it's a review of Ultima. And the bottom line on Ultima is that it has the potential to keep up with your most complicated data as it weaves interrelationships.

I use the word "potential" because I don't run a business; it needs the acid test of someone who does. Ultima's developer, Business Data Control Systems, would do well to add an introductory page to the manual that suggests a broad range of uses, and to include in the manual a wider array of practice sessions that can show the user how his or her data makes its its way through the Ultima system. I also would suggest that the practice sessions be moved closer to the front of the manual, so that the user can learn by doing without feeling that he or she has to master every bit of the syntax and structure before using Ultima for the first time.

But we, as faithful users of the Model 4, should feel grateful for software developers like BDCS, who have picked up the ball and are running with it after Tandy put it down and walked off the field. Ultima deserves your consideration if you are in the market for a full-service data base system. Give it a try; at $99.95 it's a superb investment.
-Henry Blumenthal

ULTIMA is available from
Business Data Control Systems
PO Box 8534
Clearwater, FL 34610-8534
(813) 443-7151

PACK: A REVIEW
by Mark Allen Reed

David Goben's PACK utility packs, unpacks, and compresses BASIC program listings. PACK is distributed by Computer News 80.

PACK comes in two disk formats: one for Model I, III, and 4 computers, and the other for IBM PC's and compatibles. For this review, I used the Model 4 version of PACK, revision 2.1.

THE PROGRAM
BASIC programs run fastest when they are compressed into as little space as possible. Extra spaces and remark statements may help programmers understand the flow of logic, but they also slow the computer down. Pack utilities let you write programs with extra spaces and remarks (for readability), and compress them later (for speed).

PACK is a very capable program compressor that does the job quickly and reliably. Also, PACK's variety of options is impressive.

By default, PACK "packs" BASIC programs by removing extra spaces and combining short lines into long ones, ensuring that no line exceeds 255 characters in length. PACK can also "super pack" programs. Super packing works identically to packing except that there is no limit on line length. Super packing can reduce a program's size and execution time, but super-packed programs cannot be edited from BASIC.

Packing and super packing renumber programs according to values you can specify, but if you would like your line numbers to be unchanged, select PACK's "compress" option. Compressing removes

extra spaces and remark statements without combining lines.

PACK can also "unpack" programs by expanding them so that each statement occupies a separate line. Unpacked program listings are usually easy to understand and modify.

No matter which option you specify, PACK is smart enough to leave lines containing IF/THEN statements alone. As PACK's instruction manual states, "These are complex commands and it is best to leave them as is."

DOCUMENTATION
PACK's ten-page instruction manual includes a table of contents and is very thorough in its descriptions. David Goben's conversational writing style is very easy to read, and he explains complicated concepts simply without sounding patronizing.

However, you will probably never need to use the manual, because typing PACK from the DOS prompt without any parameters will display a small help screen containing all the information you need to know. When I first received PACK, I read the instruction manual to familiarize myself with its features; then I put the manual away. I have never had to refer to it again.

CONCLUSIONS
If you are a BASIC programmer, you know the value of a good pack utility. Unless you already own one that satisfies all your needs, you should buy PACK as soon as possible. At $17.95, plus $4.00 for shipping and handling, PACK could be the most cost-effective programming utility you will ever buy.

Mark Allen Reed
Reeds' House of Color
Glen Road Plaza
West Lebanon, NH 03784

Time to renew? Check the last date on your mailing label. If it is 90/03 this is your last issue. It's Time to renew.

PATCH UTILITY PROGRAM for TRSDOS 1.3 REVIEW

by Christen M. Jespersen

It has now been more than a year since I utilized the series of patches which Henry Herrdegen has assembled on one disk as PUP 1.3. No one up to this point has made much mention of the ease of installation or the useful features which this program contains, so I thought it would be of service to other TRSDOS 1.3 users to bring it to their attention.

The package consists of a disk which contains all the patches as well as an installation program and a very comprehensive manual with step by step instructions on exactly what must be done modify your original TRSDOS 1.3. The manual contains a complete listing of all the patches with full explanations of their purpose. Finally, there is a series of patches for those who are using SUPER SCRIPSIT and/or PROFILE III PLUS.

As was stated previously, the installation could hardly be made any more simple. The manual instructs us to make backups of our original TRSDOS 1.3 and PUP 1.3 disks and use these backups for the modifications. The PUP 1.3 disk, hereafter referred to as the PATCHSC disk, is placed in 0 drive, the TRSDOS 1.3 in 1 drive, and the RESET button hit. This results in the AUTO command going to BASIC and putting all patches up on the screen along with their corresponding numbers.

The operator must now select either single patches to be installed one at a time by pressing <S> or a group by pressing <G> and indicating the first and last numbers of the group. Since all the necessary particulars are clearly stated in the manual I won't be any more specific.

There are eighteen patches in the program, some of which are multiple in nature. The first five are taken from bulletins which were issued by Tandy to correct bugs and errors in the original TRSDOS 1.3, and the balance are to make changes for the sake of speed, convenience, or to add desirable features.

Although I did enter all the patches with the exception of the last one there are

some which I feel are more important to me. These consist of shortening the initial banner screen, paginating the DIR screen, repeating the last DOS command, unlocking DEBUG below 55FF (allows one to show memory down to 00), deleting the password requirement for PURGE, and eliminating the disk name requirement from FORMAT. The pagination of the DIR screen is particularly useful since it eliminates the uncontrolled scrolling of a directory which is greater than one page. With this patch installed the screen will be filled at the DIR command, pause, and then continue scrolling one page at a time with each pressing of the <ENTER> key.

The last patch in the series allows for deletion of password protection which the author feels not everyone would consider wise. The installation of this patch would eliminate the frantic searching for the forgotten password that seems to happen all too often, but at the same time destroys the protective feature which the password provides. It is the user's decision to make.

As indicated previously, a patch is included to upgrade SUPER SCRIPSIT 1.2 to 1.2.8 as well as another group to make corrections in PROFILE III PLUS. Since I do not have either of these programs I am in no position to comment on them.

For those who are interested in availing themselves of some excellent improvements and additions to TRSDOS 1.3 this package is without a doubt the easiest, most complete, and economical way to accomplish this purpose. The Patch Utility Program For TRSDOS 1.3 which includes the disk and manual can be ordered from CN80 for the very nominal price of $10 including mailing.
-Christen M. Jespersen

Programmers Ego Syndrome? Never heard of it.

But - let me TELL you about MY new program.....

USING VISICALC TO PREPARE DATA FOR PLOTTING ON xT.CAD

By Robert L. Mensch, PE

Work fascinates me. I can look at it for hours hoping to find an easier way to get it done. Those who have used xT.CAD to plot survey data may find it quite cumbersome, specially if there are some preliminary steps you would like to perform, such as verify the closure of a traverse before plotting, change from magnetic bearing to true north or make adjustments to force a closure.

Here comes Visi-Calc to the rescue. Using a traverse survey for example, I have set up a spreadsheet, performed the customary checking of the survey data and transposed that data into a file that can be read by my xT.CAD system so I won't have to type the data a second time. On the spreadsheet below, the raw field data is in block B8 to E17. Customary calculations, which you older engineers once did with a slide rule, convert the bearing- distance data to grid coordinates in block F9 to I17 to check closure of the traverse.

The data is then transposed to the coordinate system used in xT.CAD data files where all values are positive integers at 200 increments per inch. Thus to plot on a 24 x 36 inch drawing the limits are 7200 for X and 4800 for Y. The results needed for your xT.CAD file are in block K11 to O17. If at this point you find the data within the box area is outside of the range allowed, you can adjust the scale and X and Y origin at the top of the spreadsheet.

We're lazy, so we let the computer even count the number of lines in our new data file, put this number at K11, then xT.CAD can read the file.

For spreedsheet layout see program listing number one.
-Robert L. Mensch, PE

Note: xT.CAD is the Computer Aided Drafting Program, developed by Microdex Corporation. CN80 has just become the exclusive distributor of the MICRODEX programs including xT.CAD. Support will still be provided directly by MICRODEX for more details see the MICRODEX ad in the display advertising section.

SINGLE COMMAND SYSTEM RESET PROGRAM

by Rex A. Basham

TRSDOS/LS-DOS 6.x provides you with an excellent method to setup and save a desired system configuration via the Sysgen command. However, it does not provide you with an easy method to reset the system after exiting an application program which has altered your original setup.

The items I find most annoying are a blinking cursor, the caps lock, and a disabled break key. Of course you can always reboot the system to regain the desired configuration, but this has some disadvantages.

Installed filters and drivers which are not sysgened for one reason or another are lost and have to be reinstalled. I frequently install certain filters for one application and a totally different set of filters for another. Installed drivers and filters which can't be sysgened such as Memdisk and the printer Spooler are also lost and must be reinstalled. You must also reenter the current time if you are running with the SYSTEM (TIME=Y) option. All things considered, rebooting is not really a viable option.

Another method to recover your sysgened configuration is to issue the necessary commands to reset the altered items. For example, SYSTEM (BREAK=Y), SYSTEM (BLINK=N), TIME (CLOCK=N), hit the caps key, etc.

I am not an exceptionally great typist so this method also left me with much to be desired. Finally, a JCL file could be built containing the desired setup commands but JCL is not known for its blazing execution speed and the keyboard caps lock can't be directly accessed from a JCL file.

THE SOLUTION

I wrote the RST/CMD program to provide me with a single command which returns the system to it's startup configuration.

Most of the work done by this program is accomplished via the @FLAGS supervisor call (SVC Number x'65') in line 206. This SVC points the IY register at the base of the system flag table and gives you access to various system functions and attributes. In lines 214 - 222, IY+3 points to the device flag and allows you to select graphics print capability and the keyboard type-ahead buffer. IY+10 is the keyboard flag which lets you turn the caps lock on or off. The system flag at IY+18 in lines 229 - 237 will enable or disable the break key and select extended or normal error messages. Finally, IY+21 in lines 239 - 247 is where you choose a solid or blinking cursor and turn the clock display on or off.

The @VDCTL SVC (Number x'0F') in lines 249 - 253 lets you select any displayable character as your default cursor. I use the underscore (x'5F') which is the normal cursor character for LS-DOS 6.3. Alternate selections might be the dollar sign (x'24') or the pound sign (x'23').

You can assemble and execute the program as listed for TRSDOS/LS-DOS 6.2 and up. If you are running a version prior to this, you should view the comments in lines 22 - 32 and lines 257 - 266. This is due to the fact that versions of TRSDOS prior to 6.2 don't have access to the @CLS SVC (Number x'69') which clears the video screen.

I could have written the program to check the version ID byte at IY+27 from the @FLAGS SVC and then execute the @CLS SVC or display the home cursor (x'1C') and erase screen (x'1F') characters depending on the version number it found there. Since I was after a short fast reset routine and I only run TRSDOS 6.2 or LS-DOS 6.3, I saw no reason to have to load and execute the extra bytes of code required for this option. Also note that the program exits to the operating system via a RET instruction instead of the more usual LD HL,0 and the @EXIT SVC (Number x'16'). If you save the registers on entry to a routine and restore them just prior to exiting that routine, the calling program is returned to its previous state of execution. In this case, the calling program is the operating system and this method of exit saves an additional 5 bytes. When assembled as listed, the resulting load module is only 65 bytes in length.

BASIC VERSION

For those of you not having access to an editor/assembler, I have included a Basic program (see listing 2) which will build the

RST/CMD file. You should view the comments in this program to determine the appropriate replacement values for the xx's in the DATA statements (lines 1000 - 1440). This listing will generate a command file which is executable under all versions of TRSDOS/LS-DOS 6.x.

The load module resulting from this program is 72 bytes long.

To create RST/CMD from Basic, type in the program as listed and be sure to save it as RST/BAS before you run it. Notice that the the program exits to the operating system after executing. If you have errors in the data statements or want to choose a different set of options, you will have to retype the program if you haven't saved it prior to running it.
-Rex A. Basham

BAR GRAPHS WITHOUT A HI-RES BOARD
by Elton Wood

I have not found a real need to view bar graphs on my computer just for my own amusement or edification, consequently I had never acquired a Hi-Res board, nor any graphic programs. However in December 1988 I determined that bar graph printouts would be of great value in the administrative management of our small culinary water system. After reviewing back issues of numerous publications, the only suitable bar graph program that I found was "By the Numbers" which was published in the August 1985 issue of 80 Micro, but was written for the Model III. Since I considered the 16 line and 24 column limitation of the Model III screen to restrictive for my needs I set upon adapting and enhancing the concepts contained in "By The Numbers" for use in the Model 4 mode and to be printed on a DMP 200 printer.

The program entitled GRAPH420/BAS (See Program Listing Number Three) is a result of this effort and is submitted and released into public domain.

Lines 20 thru 60 of the program provide cross references to the specific articles, authors and publications which were used in the development of the program and which references are intended to give due credit to the respective authors, for it was their knowledge and expertise which enabled the writing of the program. A review of the referenced articles will provide for an understanding of the mechanics of the program.

Perhaps David Goben can lend his expertise and speed the screen graphics up, reference his "PSR4/CMD" in CN80, October 1989. Or perhaps someone is aware of a Public Domain program for the Model 4 which is faster or superior.
-Elton L. Wood

MENU CREATOR FOR MODEL III
by R. Joseph McCarthy

How many times have you seen the ubiquitous phrase, "Please press 1-4 to make your selection."? While this gets the job done, it doesn't look or feel very professional. I felt that something better must be available to TRS-80 users.

The IBM world is better equipped to write and use nice menus in BASIC than we are. The arrangement usually involves the use of the arrow keys to scroll a reverse video block cursor through the options. When the desired choice is highlighted the <ENTER> key is pressed and the appropriate selection is branched to.

To simulate this style of menu on the Model 3 or Model 4 in 3 mode I have written a program called "The Menu Creator". Much more than an example, "The Menu Creator" (see MENU/BAS; program listing number four and MENU/SAM a sample menu program; program listing number five,) generates a menu in BASIC from questions it asks the user. These questions are beginning line number, line number increment, the title of the menu, the number of options, and what each option is called. Every prompt is explained and the program will let you know if you are trying to do something beyond its limits. The beginning line number and line number increment both default to 10 if no other value is entered. The maximum number of

options a menu can have is eight, but this can be circumvented by nesting. By far one of the nicest features of "The Menu Creator" is that it vertically and horizontally centers menus on the screen. This prevents menus with only two or three choices from looking bunched up at the top of the screen. After a menu is generated the program will ask for the file name to save it under. The file is written to disk in ASCII where it can be merged with any other BASIC program saved in ASCII.

When a generated menu is loaded and run you will see how it is different from the typical one using the INKEY$ function. As on an IBM, use the up and down arrows to move the pointing hand to the option you wish to execute then press <ENTER>. The number of the selected option is stored in the variable B. An ON B GOTO statement should be used to control branching. The two other variables in a generated menu are A and C. These three variables should be avoided elsewhere in the main program or unpredictable results could occur.

I have used this program extensively and find that I can define and merge a menu more quickly than it use to take me to calculate just the screen positions. My wife loves it because she can just point to a program's name and run it without having to remember specific commands.
-R. Joseph McCarthy

OPEN FORUM

A: R.L.M. of Fairmont, MN suggests a way to remove formulas in Multiplan. (Vol. 3, #1, pg. 25) There is another way! Check out the XTERNAL command--you can copy a NAMEd area of a worksheet to a different sheet (just the data is transferred, not the formulas!) And, for added speed, avoid formatting individual cells. Instead, where possible, change the overall default.
-J.K.B. Rangely, CO

LTR: I'd like to thank you for your efforts at supporting the lowly, TRS-80. I'm sure you've heard of it, the machine that can do a little work if you push it real hard.

I have worked on a project for a while that involves our machine. The Saguaro Astronomy Club released a data base of deep sky objects and double stars for the IBM and Mac. With the help of a program by Luis Garcia-Barrio and much scutt work, I converted it to run on Profile 4+. Some changing of the screens, and it could run just as well on Profile 3+. Actually, any data base program that can read fixed length, undelimited ASCII text can use the data, all 2 megs worth. I placed it on Louis' TRSLink BBS (215-848-5728), and I believe Tim Sewell took it from there. I broke it into smaller chunks useable by any single sided, double density floppy drive. Those with larger capacity can APPEND the data files together.

Those that own telescopes, and want to find more star clusters, nebulae, and galaxies will find this the best data base of its kind ever produced. It contains over 10,000 objects and is complete to 15th magnitude. Best of all, it is public domain, and it runs well on a TRS-80. Profile seems especially well suited to tackle it. With indexes, it will find any of the 10,368 objects instantly. I have seen people use it with Appelworks and a large memory card. Profile handles the data far better. Ultima, the new data base for the TRS-80, also will convert the data, reports, and screens for its own use.

If anyone has any questions, they can give me a call at 314-329-3344. Steve Coe, one of the organizers of the data base, has given me essentially a free hand in adapting and distributing the data base for the TRS-80 world. Like his, my efforts are presented free. Call or write to:
Rev. Peter Besenbruch
29 Williams Street
Ft. Leonard Wood, MO 65473

Q: I converted my GBASIC program disk used with the Grafyx Hi-Res board to LS-DOS 6.3; I also converted the Biorhythm and U. S. Geography programs that use

Hi-Res and GBASIC. Problem is - the GBASIC error says to use 6.1.2, and it will not run unless I do so. I tried the DESKMATE date fix from your "Hints and Tips" on page two of the February issue, as a shot in the dark, but it did not work.

Maybe one of your readers can help me.
-R. K. Somers Point, NJ

A: A couple of hints that may be of value. These are not original with me as the one relating to oxidized contacts was inspired by an article somewhere in my past. As we all know that the Model I especially is prone to this problem.

There is on the market, usually found at businesses that cater to the TV repair trade and to Ham operators, a contact cleaner that solved the Model I oxidation, at least for months as opposed to days by other methods. This product is made by GC Electronics of Rockford, Illinois. Its name is DE-OX-ID contact cleaner. It's Government approved for subs and missiles so it must have some merit. I have used it on the Model I and Model IV with excellent success. I have not tried it on the RS-232 interface, but the cable contacts work fine. One other thing, read the label as it is toxic.

The other hint has to do with sometime problems that occur with new as well as old disks. When formatting some tracks are locked out. The solution is simple. I found out that using my cassette tape demagnetizer to erase the disk prior to formatting that I virtually eliminated this problem.
-G. R. Hales Corners, WI

A: I believe I can answer the question in your February FORUM from W. M. Sanford, NC regarding how to change from the default "YES" in the Option Recalc in Multiplan.

First go to the options menu from the main screen in any spreadsheet by typing in "O" or by using the F3 key to move the highlighted cursor to the word Options in the main menu and then pressing <ENTER>.

The disk drive will whir for a moment and the Options menu will appear with the default for the "recalc" section "YES" highlighted. Tap the "N" (for no) key and the highlight will move to the word "NO". Press Enter and you will return to the main menu.

Now you can change any cells (whether alphabetical, numeric or formula) without waiting for multiplan to recalculate all cells after each entry.

To return to the default and have the spreadsheet recalculate all cells, press "O" for the Options menu and then "Y" for yes, then <ENTER> to return to the spreedsheet. Multiplan will then recalculate all cells before allowing you to make any more entries.

If you forget to return to the default for recalc, Multiplan will recalculate all cells before saving the spreedsheet.

Another nuance of Multiplan which took me a long time to discover: when entering information in any cell (whether alphabetical, numeric, or formula), you can backspace to correct an entry error by pressing the left arrow key while holding down either SHIFT key. Pressing any arrow key without holding down a SHIFT key down a SHIFT key causes your entry (correct or erroneous) to be entered into the designated cell and causes the highlighted cursor in the spreadsheet to move to the adjacent cell in the direction of arrow.

Of great help also is the ability to ask for help at any time by pressing the question mark. (Don't forget to hold down the SHIFT key when you press the question "?" mark key.)
-C. G. Plainfield, IN

NEXT MONTH WILL FEATURE an "Auto Maintenance Support Program" by Henry R. Leno Jr., Look for it. We think that you will find a real use for this one.-CN80

VISI-CALC SPREADSHEET USED TO TRANSFORM SURVEY DATA TO MAKE AN xT.CAD FILE
PROGRAM LISTING NUMBER ONE by Robert L. Mensch, PE

```
   A    B    C    D    E    F    G    H    I    J    K    L    M    N    O
1
2                    Scale 1"=    50 ft          -
3                    Xo Origin     5 inches       Remember origin is at
4                    Yo Origin     4 inch         upper left on screen
5                    Constant    200              and on xT.CAD drawing.
6
7   Field data----------Calculated Data-----     Data for xTCAD file------
8   Camp Wahdoon  Jan90                          Save data in box in PRF
9   "Traverse Survey"                             Line    Xo   Yo   Xe   Ye
10  STATIONS    BRG. DIST  Xo   Yo   Xe   Ye    ****************************
11  From   To   N-E   ft.  ft.  ft.  ft.  ft.    *    6                     *
12     1    2    60   125    0    0  108  -63    *    5 1000  800 1433  550 *
13     2    3   120   250  108  -63  325   62    *    5 1433  550 2299 1050 *
14     3    4   180   375  325   62  325  437    *    5 2299 1050 2299 2550 *
15     4    5   240   125  325  437  217  500    *    5 2299 2550 1866 2800 *
16     5    6   300   250  217  500    0  375    *    5 1866 2800 1000 2300 *
17     6    1   360   375    0  375    0    0    *    5 1000 2300 1000  800 *
18                     Traverse closed OK.       ****************************
19                                                Range 0<X<7200 0<Y<4800
20                                                for a 24"x36" drawing.
```

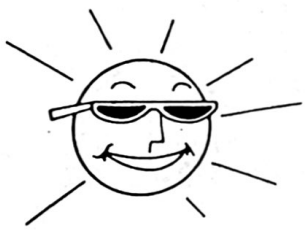
The important formulas to build the spreadsheet are: F13:(+H12); G13:(+I12); H12:(+F12+(E12*@SIN(D12*0.0174532)); I12:(+G12-(E12*@COS(D12*0.0174532); K11: (@COUNT(K12...K100 or as long as necessary for your table of data); K12-K17 use the xT.CAD code for type of line desired; L12:/FI (((F12/G2)+G3)*G5); M12: /FI (((G12/G2)+G4)*G5); N12:/FI (((H12/G2)+G3)*G5); O12:/FI (((I12/G2)+G4)*G5). Besure that all data within the box is in integer form. The data in this box then must be SAVEd as a PRF file with extension /TC so xT.CAD can read it. Be sure to save the entire spreadsheet as a /VC file.

RST/BAS RESET BASIC PROGRAM LISTING NUMBER TWO by Rex A. Basham

```
100 '*****************************************************************
110 '
120 '  RST/BAS: Used to generate RST/CMD for TRSDOS/LS-DOS 6.x only.
130 '
140 '  Programmer: R. A. Basham   Date written: August 30, 1987
150 '
160 '*****************************************************************
170 '
180 CLS: PRINT "Building 'RST/CMD'"
190 RESTORE: OPEN "O",1,"RST/CMD"
200 READ A$
210 WHILE A$ <> "EXIT"
220    A = VAL("&H" + A$)
230    PRINT# 1, CHR$(A);
240    READ A$
250 WEND
260 CLOSE: SYSTEM
```

con't on next page

```
1000 '
1010 'Select the desired options by replacing the xx's in the
1020 'following data statements with the appropriate values.
1030 '
1040 'For example: To turn type-ahead on, line 1160 should read...
1050 '
1060 '1160 DATA FD,CB,03,CE
1070 '
1080 'and to turn type-ahead off, it should read...
1090 '
1100 '1160 DATA FD,CB,03,8E
1110 '
1120 DATA 01,43,00,26,F5,C5,D5,E5,DD,E5,FD,E5,3E,65,EF
1130 '
1140 'Type-ahead:      On = CE, Off = 8E
1150 '
1160 DATA FD,CB,03,xx
1170 '
1180 'Printer graphics: On = FE, Off = BE
1190 '
1200 DATA FD,CB,03,xx
1210 '
1220 'Keyboard caps:   On = EE, Off = AE
1230 '
1240 DATA FD,CB,0A,xx
1250 '
1260 'Break key:      Enabled = A6, Disabled = E6
1270 '
1280 DATA FD,CB,12,xx
1290 '
1300 'Error messages:   Extended = F6, Normal = B6
1310 '
1320 DATA FD,CB,12,xx
1330 '
1340 'Clock display:   On = E6, Off = A6
1350 '
1360 DATA FD,CB,15,xx
1370 '
1380 'Cursor:        Solid = F6, Blinking = B6
1390 '
1400 DATA FD,CB,15,xx
1410 '
1420 'Cursor character: Underscore = 5F
1430 '
1440 DATA 06,08,0E,xx
1450 DATA 3E,0F,EF,0E,1C,3E,02,EF,0E,1F,3E,02,EF
1460 DATA FD,E1,DD,E1,E1,D1,C1,F1,C9,02,02,00,26
1470 DATA EXIT
```



GRAPH420/BAS GRAPH MAKING PROGRAM FOR THE MODEL 4 - PROGRAM LISTING THREE
by Elton L. Wood

```
10 REM ****************** GRAPH420/BAS ******************    ****** ADAPTED & ENHANCED
FOR MODEL 4 *********     ***************** BY ELTON L. WOOD ****************
20 REM ***** ORIGINAL PROGRAM CONCEPT FOR MODEL III *****    ************* "BY THE
NUMBERS" ****************     ********** ARNOLD E. VAN BEVERHOUDT, JR. *********
************* 80 MICRO FEBRUARY 1985 *************
30 REM ********** VIDEO RAM ROUTINE (LINE 80) ***********    ********* "HUNTING FOR
BURIED TREASURE" **********     ********** TIM SEWELL & LANCE WOLSTRUP ***********
************ TRSTIMES NOVEMBER 1988 **************
40 REM * CURSOR (LINES 240,770,1260,1530,1690,1900,2230)*    ********* "HUNTING
FOR BURIED TREASURE" **********    ***************** LANCE WOLSTRUP ******************
************ TRSTIMES JANUARY 1988 ***************
50 REM ** POINT/RESET/SET ROUTINE (LINES 100 THRU 170) **    ************ "UPGRADED
GRAPHICS" **************     ******************* ALAN D. SMITH ******************
************** 80 MICRO AUGUST 1985 **************
60 REM * DMP 200 PRINTER ROUTINE (LINES 1060 THRU 1190) *    ***** "HOW TO USE YOUR
RADIO SHACK PRINTER " *****     *************** WILLIAM BARDEN, JR.***************
********* MICROTREND/VALLEYWARE BOOK 1985 ********
65 CLS
70 REM *** VIDEO RAM ROUTINE ***
80 CLEAR ,&HF7FF: POKE &H78,134: OUT &H84,134
90 REM *** POINT/RESET/SET MACHINE LANGUAGE ROUTINE ***
100 DEFINT P,R,S:
    PXLCODE$="<------10*--------20*--------30*--------40*--------50*--------60*
    -------70*-------80*--------90*-------100*--->"
110 DATA 175,24,6,62,1,24,2,62,2,245,229,221,225,221,43,221,110,1,221,94,2,14,3,
         62,93,239,103,203,61,6,1,48,1,4,175,221,119,1,221,119,2,187,40,7,203,
         32,203,32,29,24,246,197
120 DATA 6,1,62,15,239,193,203,127,40,4,203,119,40,2,62,128,79,241,254,1,121,56,
         18,40,8,176,6,2,79,62,15,239,201,79,120,47,71,121,160,24,241,160,200,
         221,54,1,225,221,54,2,255,201
130 PXLPTR!=VARPTR(PXLCODE$): PXLPTR!=PEEK(PXLPTR!+1)+PEEK(PXLPTR!+2)*256
140 FOR PXLINDEX=0 TO 103: READ PXLBYTE: POKE PXLPTR!+PXLINDEX, PXLBYTE: NEXT
150 DEF FN POINT(X%,Y%)=USR 7(X%+Y%*256): DEF USR 7=PXLPTR!
160 DEF FN RESET(X%,Y%)=USR 8(X%+Y%*256): DEF USR 8=PXLPTR!+3
170 DEF FN SET(X%,Y%)  =USR 9(X%+Y%*256): DEF USR 9=PXLPTR!+7
180 REM *** MAIN PROGRAM ROUTINE STARTS HERE ***
190 REM *** INITIALIZE VARIABLES & ARRAYS ***
200 G$="": MB=24: MG=10
210 DIM Y0(MB),X$(MB),F$(MG),XE$(MB),YE$(MB)
220 REM *** MAIN MENU ***
230 SW$="": H$="*** MASTER GRAPH ***": GOSUB 2390: PRINT: PRINT
240 POKE &HB97,1: CLS:
250 H$="MAIN MENU": GOSUB 2390: PRINT: PRINT
260 PRINT TAB(29)"1 - CREATE New Graph"
270 PRINT TAB(29)"2 - EDIT Current Graph"
280 PRINT TAB(29)"3 - PRINT Current Graph"
290 PRINT TAB(29)"4 - LOAD Graph From Disk"
300 PRINT TAB(29)"5 - PRESENT Slide Show"
310 PRINT TAB(29)"6 - END Program"
320 PRINT: PRINT
330 H$=" Enter Your Choice (1 TO 6)": GOSUB 2390
340 Z$=INKEY$: IF Z$="" THEN GOTO 340 ELSE Z=VAL(Z$)
```

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```
350 IF Z<1 OR Z>6 THEN GOTO 230
360 ON Z GOTO 380, 730, 990, 1240, 1440, 1620
370 REM *** CREATE NEW GRAPH ***
380 CLS: H$="CREATE NEW GRAPH": GOSUB 2390: PRINT: PRINT
390 H$="GRAPH MENU": GOSUB 2390: PRINT: PRINT
400 H$="1 - BAR Graph ": GOSUB 2390: PRINT
410 H$="2 - LINE Graph": GOSUB 2390: PRINT
420 H$="3 - MAIN MENU ": GOSUB 2390: PRINT
430 PRINT: PRINT
440 H$="Enter Your Choice (1 to 3)": GOSUB 2390
450 Z$=INKEY$: IF Z$="" THEN GOTO 450 ELSE Z=VAL(Z$)
460 IF Z<1 OR Z>3 THEN GOTO 380
470 IF Z=1 THEN G$="B" ELSE IF Z=2 THEN G$="L"
480 ON Z GOTO 500, 500, 230
490 REM *** BAR or LINE GRAPH ***
500 CLS: IF G$="B" THEN H$="BAR GRAPH" ELSE H$="LINE GRAPH"
510 GOSUB 2390: PRINT: PRINT
520 B=1
530 INPUT "Enter MAIN HEADING";H1$: PRINT
540 INPUT "Enter SUB-HEADING";H2$: PRINT
550 INPUT "Enter X-AXIS HEADING";HX$: PRINT
560 INPUT "Enter Y-AXIS HEADING";HY$: PRINT
570 INPUT "Enter MAXIMUM VALUE of Y-AXIS";M1: PRINT
580 INPUT "Enter NUMBER of VALUES to be used";N
590 IF N>MB THEN PRINT: PRINT "Maximum number of values allowed is";MB: GOTO 410
600 FOR T=1 TO N: CLS
610 PRINT "Enter X-AXIS TITLE for value #";T;: INPUT X$(T): PRINT
620 PRINT "Enter Y-AXIS VALUE for value #";T;: INPUT Y0(T)
630 IF Y0(T)>M1 THEN PRINT "Value is too Large": GOTO 620
640 PRINT: NEXT T
650 PRINT: H$="Press <ENTER> to DISPLAY GRAPH": GOSUB 2390
660 Z$=INKEY$: IF Z$="" THEN GOTO 660
670 IF G$="B" THEN GOSUB 1690 ELSE GOSUB 1900
680 PRINT @1861,"Do you want to SAVE this GRAPH (Y/N) ?";
690 Z$=INKEY$: IF Z$="" THEN GOTO 690
700 IF Z$="Y" OR Z$="y" THEN GOSUB 2210 ELSE IF Z$="N" OR Z$="n" THEN GOTO 380 ELSE
    GOTO 680
710 GOTO 230
720 REM *** EDIT GRAPH ***
730 CLS: H$="EDIT GRAPH": GOSUB 2390: PRINT: PRINT
740 IF G$="" THEN H$=" There is no GRAPH currently in memory": GOSUB 2390: FOR
    T=1 TO 3000: NEXT: GOTO 230
750 GOTO 770
760 REM *** BAR OR LINE GRAPH ***
770 POKE &HB97,1: CLS: H$="EDIT GRAPH": GOSUB 2390: PRINT: PRINT
780 PRINT "MAIN HEADING: ";H1$: INPUT H1E$: IF H1E$<>"" THEN H1$=H1E$
790 PRINT "SUB-HEADING: ";H2$: INPUT H2E$: IF H2E$<>"" THEN H2$=H2E$
800 PRINT "X-AXIS HEADING: ";HX$: INPUT HXE$: IF HXE$<>"" THEN HX$=HXE$
810 PRINT "Y-AXIS HEADING: ";HY$: INPUT HYE$: IF HYE$<>"" THEN HY$=HYE$
820 PRINT "MAXIMUM VALUE OF Y-AXIS:";M1: INPUT M1$: IF M1$<>"" THEN M1=VAL(M1$)
830 FOR T=1 TO N: CLS: PRINT "VALUE #";T: PRINT
840 PRINT "X-AXIS TITLE: ";X$(T): INPUT XE$(T): IF XE$(T)<>"" THEN X$(T)=XE$(T)
850 PRINT "Y-AXIS VALUE: ";Y0(T): INPUT YE$(T): IF YE$(T)<>"" THEN Y0(T)=VAL(YE$(T))
860 NEXT
870 CLS: H$="Press <ENTER> to DISPLAY GRAPH": GOSUB 2390
880 Z$=INKEY$: IF INKEY$="" THEN GOTO 880
```

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```
89Ø IF G$="B" THEN GOSUB 169Ø ELSE IF G$="L" THEN GOSUB 19ØØ
9ØØ PRINT @186Ø,"Do you want to do more EDITING (Y/N) ?";
91Ø Z$=INKEY$: IF Z$="" THEN GOTO 91Ø
92Ø IF Z$="Y" OR Z$="y" THEN GOTO 73Ø ELSE IF Z$="N" OR Z$="n" THEN GOTO 94Ø
    ELSE GOTO 9ØØ
93Ø GOTO 9ØØ
94Ø PRINT @186Ø,"Do you want to SAVE this GRAPH (Y/N) ?";
95Ø Z$=INKEY$: IF Z$="" THEN GOTO 95Ø
96Ø IF Z$="Y" OR Z$="y" THEN GOSUB 221Ø ELSE IF Z$="N" OR Z$="n" THEN GOTO 23Ø
    ELSE GOTO 94Ø
97Ø GOTO 23Ø
98Ø REM *** PRINT GRAPH ***
99Ø CLS: H$="PRINT GRAPH": GOSUB 239Ø: PRINT: PRINT
1ØØØ IF G$="" THEN H$="There is no GRAPH currently in memory": GOSUB 239Ø: FOR
     T=1 TO 15ØØ: NEXT: GOTO 23Ø
1Ø1Ø H$="Prepare PRINTER then press <ENTER>": GOSUB 239Ø
1Ø2Ø Z$=INKEY$: IF Z$="" THEN GOTO 1Ø2Ø
1Ø3Ø IF G$="B" THEN GOSUB 169Ø ELSE IF G$="L" THEN GOSUB 19ØØ
1Ø4Ø FOR X=Ø TO 179: DUMMY=FNSET(X,71): NEXT X: Y=Ø
1Ø5Ø REM *** DMP 2ØØ PRINTER SUBROUTINE ***
1Ø6Ø CH$(Ø)=" "
1Ø7Ø CH$(1)=CHR$(18)+CHR$(28)+CHR$(3)+CHR$(255)+CHR$(28)+CHR$(3)+CHR$(128)+CHR$(3Ø)
1Ø8Ø CH$(2)=CHR$(18)+CHR$(28)+CHR$(3)+CHR$(128)+CHR$(28)+CHR$(3)+CHR$(255)+CHR$(3Ø)
1Ø9Ø CH$(3)=CHR$(18)+CHR$(28)+CHR$(6)+CHR$(255)+CHR$(3Ø)
11ØØ FOR ZY=Ø TO 23
111Ø FOR ZX=Ø TO 79
112Ø ZP=&HF8ØØ+ZX+ZY*8Ø
113Ø IF PEEK(ZP)<128 THEN ZZ$(1)=ZZ$(1)+" ": ZZ$(2)=ZZ$(2)+CHR$(PEEK(ZP)):
ZZ$(3)=ZZ$(3)+" ": GOTO 115Ø
114Ø ZZ$(1)=ZZ$(1)+CHR$(PEEK(ZP) AND 3): ZZ$(2)=ZZ$(2)+CHR$((PEEK(ZP) AND 12)/4):
ZZ$(3)=ZZ$(3)+CHR$((PEEK(ZP) AND 48)/16)
115Ø NEXT ZX
116Ø FOR ZX=1 TO 3
117Ø FOR ZZ=1 TO LEN(ZZ$(ZX)): IF ASC(MID$(ZZ$(ZX),ZZ,1))>3 THEN LPRINT
     MID$(ZZ$(ZX),ZZ,1); ELSE LPRINT CH$(ASC(MID$(ZZ$(ZX),ZZ,1)));
118Ø NEXT ZZ: LPRINT CHR$(18): LPRINT CHR$(3Ø);: ZZ$(ZX)=""
119Ø NEXT ZX,ZY
12ØØ PRINT @1861,"Do you want another COPY (Y/N) ?";
121Ø Z$=INKEY$: IF Z$="" THEN GOTO 121Ø
122Ø IF Z$="Y" OR Z$="y" THEN FOR X=Ø TO 179: DUMMY=FNSET(X,71): NEXT: GOTO 1Ø4Ø
     ELSE IF Z$="N" OR Z$="n" GOTO 23Ø ELSE GOTO 12ØØ
123Ø REM *** LOAD GRAPH ***
124Ø CLS: H$="LOAD GRAPH": GOSUB 239Ø: PRINT: PRINT
125Ø H$="Insert DATA DISK in DRIVE 1 then press <ENTER>": GOSUB 239Ø: PRINT:
     PRINT @345,;: INPUT "Enter FILE NAME";F$
126Ø POKE &HB97,Ø: CLS
127Ø ON ERROR GOTO 241Ø
128Ø OPEN "I",1,LEFT$(F$,12)+":1"
129Ø INPUT #1,G$
13ØØ IF G$<>"P" THEN GOTO 132Ø
131Ø REM *** BAR or LINE GRAPH ***
132Ø INPUT #1,N,M1,H1$,H2$,HX$,HY$
133Ø FOR T=1 TO N: INPUT #1,Y Ø(T),X$(T): NEXT
134Ø FOR P=&HF8ØØ TO &HFF7F
135Ø INPUT #1,CH
136Ø POKE P,CH
```

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```
137Ø NEXT P
138Ø CLOSE 1
139Ø IF SW$="SS" THEN PRINT @1867,"Press <ENTER> to Continue";: GOTO 141Ø
14ØØ PRINT @1867,"Press <ENTER> for MAIN MENU";
141Ø Z$=INKEY$: IF Z$="" THEN GOTO 141Ø
142Ø IF SW$="SS" THEN RETURN ELSE GOTO 23Ø
143Ø REM *** SLIDE SHOW ***
144Ø SW$="SS"
145Ø CLS: H$="PRESENT SLIDE SHOW": GOSUB 239Ø: PRINT: PRINT
146Ø PRINT "How many GRAPHS do you want to use (maximum is";MG;")": INPUT NG: PRINT
147Ø IF NG>MG THEN GOTO 144Ø
148Ø FOR T=1 TO NG
149Ø PRINT "Enter FILE NAME for GRAPH #";T;: INPUT F$(T)
15ØØ NEXT
151Ø PRINT: H$="Insert DATA DISK in DRIVE 1 then Press <ENTER>": GOSUB 239Ø
152Ø Z$=INKEY$: IF Z$="" THEN GOTO 152Ø ELSE GOTO 153Ø
153Ø POKE &HB97,Ø: CLS
154Ø FOR G=1 TO NG
155Ø ON ERROR GOTO 241Ø
156Ø OPEN "I",1,LEFT$(F$(G),12)+":1"
157Ø INPUT #1,G$
158Ø GOSUB 132Ø
159Ø NEXT
16ØØ SW$="": GOTO 23Ø
161Ø REM *** END PROGRAM ***
162Ø CLS: H$="END PROGRAM": GOSUB 239Ø: PRINT: PRINT
163Ø H$="Do you want to CANCEL this command (Y/N) ?": GOSUB 239Ø
164Ø Z$=INKEY$: IF Z$="" THEN GOTO 164Ø ELSE GOTO 165Ø
165Ø IF Z$="Y" OR Z$="y" THEN GOTO 23Ø
166Ø IF Z$="N" OR Z$="n" THEN CLS: END
167Ø GOTO 162Ø
168Ø REM *** BAR GRAPH ***
169Ø POKE &HB97,Ø
17ØØ CLS: FOR X=Ø TO 159: DUMMY=FNSET(X,Ø): DUMMY=FNSET(X,71): NEXT
171Ø FOR Y=Ø TO 71: DUMMY=FNSET(Ø,Y): DUMMY=FNSET(1,Y): DUMMY=FNSET(158,Y):
DUMMY=FNSET(159,Y): NEXT
172Ø PRINT @81,;TAB((8Ø-LEN(H1$))/2)H1$;
173Ø PRINT @162,;HY$;TAB((8Ø-LEN(H2$))/2)H2$;
174Ø PRINT @1762,HX$;
175Ø L=M1: N1=INT(132/N)
176Ø FOR I=1 TO 18: PRINT @162+8Ø*I,
1762 IF M1=>1ØØØ THEN GOTO 1763 ELSE GOTO 1765
1763 PRINT USING "##,###";L-M1/18*(I-1);: GOTO 178Ø
1765 IF M1=>1Ø AND M1<1ØØØ THEN GOTO 1766 ELSE GOTO 177Ø
1766 PRINT USING "###.##";L-M1/18*(I-1);: GOTO 178Ø
177Ø PRINT USING "##.###";L-M1/18*(I-1);
178Ø PRINT "  -";CHR$(149);STRING$(66,"-");: NEXT I
179Ø PRINT @1686,Ø;TAB(12)CHR$(141);
18ØØ PRINT @1692,STRING$(66,14Ø);
181Ø FOR I=24 TO 158 STEP N1: DUMMY=FNSET(I,65): NEXT I
182Ø FOR I=Ø TO N-1: PRINT @1773+I*N1/2,X$(I+1);: NEXT I
183Ø FOR D=Ø TO N-1
184Ø FOR Y=Ø TO INT(YØ(D+1)/M1*54+.5)
185Ø FOR Z=Ø TO N1-2: DUMMY=FNSET(N1*D+Z+25,64-Y)
186Ø NEXT Z: NEXT Y: NEXT D
187Ø PRINT @1867,"Press <ENTER> to Continue";
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```
188Ø Z$=INKEY$: IF Z$="" THEN GOTO 188Ø ELSE RETURN
189Ø REM *** LINE GRAPH ***
19ØØ POKE &HB97,Ø: CLS:
191Ø FOR X=Ø TO 159: DUMMY=FNSET(X,Ø): DUMMY=FNSET(X,71): NEXT
192Ø FOR Y=Ø TO 71: DUMMY=FNSET(Ø,Y): DUMMY=FNSET(1,Y): DUMMMY=FNSET(158,Y):
    DUMMY=FNSET(159,Y): NEXT
193Ø PRINT @81,;TAB((8Ø-LEN(H1$))/2)H1$;
194Ø PRINT @162,;HY$;TAB((8Ø-LEN(H2$))/2)H2$;
195Ø PRINT @1762,HX$;
196Ø L=M1: N1=INT(132/N+.5)
197Ø FOR I=1 TO 18: PRINT @162+8Ø*I,;
198Ø PRINT USING"####.#";L-M1/18*(I-1);
199Ø PRINT "  -";CHR$(149);STRING$(66,"-");: NEXT
2ØØØ PRINT @1686,Ø;TAB(12)CHR$(141);
2Ø1Ø PRINT @1692,STRING$(66,14Ø);
2Ø2Ø FOR I=24 TO 158 STEP N1: DUMMY=FNSET(I,65): NEXT
2Ø3Ø FOR I=Ø TO N-1: PRINT @1773+I*N1/2,X$(I+1);: NEXT
2Ø4Ø I=1: YØ=YØ(I)
2Ø5Ø FOR X2=24+N1 TO 158 STEP N1
2Ø6Ø IF I=N THEN GOTO 2Ø9Ø ELSE YØ=YØ(I)
2Ø7Ø I=I+1: X1=X2-N1: Y=YØ
2Ø8Ø GOSUB 211Ø: NEXT X2
2Ø9Ø PRINT @1867,"Press <ENTER> to Continue";
21ØØ Z$=INKEY$: IF Z$="" THEN GOTO 21ØØ ELSE RETURN
211Ø Y1=64-INT(Y/M1*54+.5): Y2=64-INT(YØ(I)/M1*54+.5): IF X1<>X2 THEN GOTO 214Ø
212Ø IF Y1<Y2 THEN S=1 ELSE S=-1
213Ø FOR Y=Y1 TO Y2 STEP S: DUMMY=FNSET(X1,Y): NEXT: RETURN
214Ø M=(Y2-Y1)/(X2-X1)
215Ø IF ABS(M)>1 THEN S=ABS(.25*N*(1/M)) ELSE S=1
216Ø IF X1>X2 THEN S=-S
217Ø FOR X=X1 TO X2 STEP S
218Ø DUMMY=FNSET(X,M*(X-X1)+Y1)
219Ø NEXT X: RETURN
22ØØ REM *** SAVE GRAPH ***
221Ø CLS: H$="SAVE GRAPH": GOSUB 23Ø9: PRINT: PRINT
222Ø H$="Insert DATA DISK in DRIVE 1 then press <ENTER>": GOSUB 23Ø9: PRINT: PRINT
223Ø PRINT @345,;: POKE &HB97,1: INPUT "Enter FILE NAME";F$: POKE &HB97,Ø
224Ø PRINT: H$="Wait a few moments please!": GOSUB 23Ø9
225Ø OPEN "O",1,LEFT$(F$,12)+":1"
226Ø PRINT #1,G$
227Ø IF G$<>"P" THEN GOTO 229Ø
228Ø REM *** BAR GRAPH ***
229Ø PRINT #1,N;",";M1;",";H1$;",";H2$;",";HX$;",";HY$
23ØØ FOR T=1 TO N: PRINT #1,YØ(T);",";X$(T): NEXT T
231Ø IF G$="B" THEN GOSUB 17ØØ ELSE IF G$="L" THEN GOSUB 19ØØ
232Ø FOR X=Ø TO 179: DUMMY=FNSET(X,71): NEXT
233Ø FOR P=&HF8ØØ TO &HFF7F
234Ø PRINT #1,PEEK(P);: POKE P,128
235Ø NEXT P
236Ø CLOSE 1
237Ø GOTO 23Ø
238Ø REM *** CENTER HEADINGS ***
239Ø PRINT TAB((8Ø-LEN(H$))/2)H$;: RETURN
24ØØ REM *** DISK INPUT ERROR ROUTINE ***
241Ø IF ERR=53 THEN CLOSE: RESUME 242Ø
242Ø PRINT @272,"FILE NOT FOUND": PRINT @43Ø,"AVAILABLE FILES ARE"
243Ø PRINT: PRINT: SYSTEM "CAT :1": PRINT @17Ø8,"Press ENTER to Continue"
244Ø Z$=INKEY$: IF Z$="" THEN GOTO 244Ø ELSE GOTO 23Ø
```

MENU/BAS PROGRAM LISTING NUMBER FOUR for Model III by R. Joseph McCarthy

```
10 REM ***************************************
20 REM *** RELEASED INTO THE PUBLIC DOMAIN ***
30 REM ***          BY          ***
40 REM ***     R. JOSEPH MCCARTHY     ***
50 REM ***************************************
60 CLEAR 5000
70 CLS
80 FORX=39TO30STEP-1:SET(X,0):NEXT:FORY=1TO3:SET(30,Y):SET(31,Y):NEXT:FORX=30
TO39:SET(X,4):NEXT:FORY=5TO7:SET(38,Y):SET(39,Y):NEXT:FORX=39TO30STEP-1:SET(X,8):
NEXT:REM *** S ***
90 FORX=45TO54:SET(X,0):NEXT:FORY=1TO8:SET(49,Y):SET(50,Y):NEXT:REM ** T **
100 FORY=0TO8:SET(60,Y):SET(61,Y):NEXT:FORX=62TO69:SET(X,0):NEXT:FORX=62TO67:
SET(X,4):NEXT:F ORX=62TO69:SET(X,8):NEXT:REM *** E ***
110 FORY=0TO8:SET(75,Y):SET(76,Y):NEXT:FORX=77TO84:SET(X,0):NEXT:FORX=77TO82:
SET(X,4):NEXT:F ORX=77TO84:SET(X,8):NEXT:REM *** E ***
120 FORY=0TO8:SET(90,Y):SET(91,Y):NEXT:FORX=92TO99:SET(X,8):NEXT:REM *** L ***
130 X=11:FORY=12TO20:SET(X,Y):SET(X+1,Y):X=X-1:NEXT:FORX=13TO16:SET(X,12):
NEXT:SET(16,13):SET(17,13):SET(17,14):SET(18,14):SET(17,15):SET(16,15):FORX=9TO16:
SET(X, 16):NEXT:SET(12,17 ):SET(13,17):SET(13,18):SET(14,18):SET(13,19):SET(12,19)
140 FORX=5TO12:SET(X,20):NEXT:REM *** B ***
150 X=32:FORY=12TO20:SET(X,Y):SET(X+1,Y):X=X-1:NEXT:FORX=34TO37:SET(X,12):NEXT:
SET(37,13):SET(38,13):SET(38,14):SET(39,14):SET(38,15):SET(37,15):FORX=30TO37:
SET(X,16):N EXT:X=31:FOR Y=17TO20:SET(X,Y):SET(X+1,Y):X=X+1:NEXT:REM *** R ***
160 X=53:FORY=12TO20:SET(X,Y):SET(X+1,Y):X=X-1:NEXT:FORX=55TO62:SET(X,12):NEXT:
FORX=51TO56:S ET(X,16):NEXT:FORX=47TO54:SET(X,20):NEXT:REM *** E ***
170 X=76:FORY=12TO20:SET(X,Y):SET(X+1,Y):X=X-1:NEXT:FORX=78TO85:SET(X,12):
NEXT:FORX=74TO79:S ET(X,16):NEXT:FORX=70TO77:SET(X,20):NEXT:REM *** E ***180
FORX=91TO98:SET(X,12):NEXT:X=99:FORY=12TO20:SET(X,Y):SET(X+1,Y):X=X-1:NEXT:
FORX=93TO100: SET(X,20):NEXT:REM *** Z ***
190 X=114:FORY=12TO20:SET(X,Y):SET(X+1,Y):X=X-1:NEXT:FORX=116TO123:SET(X,12):NEXT:
FORX=112TO 117:SET(X,16):NEXT:FORX=108TO115:SET(X,20):NEXT:REM *** E ***
200 PRINT@537,"P R E S E N T S"
210 FORX=1TO220:NEXTX
220 CLS
230 X=52:Y=100:Z=808
240 W=RND(50)+136
250 PRINT@0,STRING$(92,W);:PRINT@868,STRING$(92,W);
260 PRINT@Y,STRING$(X,W);:PRINT@Z,STRING$(X,W);
270 X=X-8:Y=Y+68:Z=Z-60:IFX>4GOTO260
280 PRINT@472,"The Menu Creator";
290 FORU=1TO55:NEXT
300 V=V+1:IFV<5GOTO230
310 DIM LN$(100),LN(100)
320 CLS
330 INPUT"What is the title of this menu";NA$
340 PRINT
350 PRINT"How many options will ";NA$;" have";
360 INPUT OP
```

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```
37Ø IF OP>8 THEN A$="Please limit the number of options to eight or less.": PRINT: PRINT
TAB(32-LEN(A$)/2); A$: PRINT: GOTO 35Ø
38Ø PRINT
39Ø BL=1Ø
4ØØ INPUT"What is the beginning line number";BL
41Ø PRINT
42Ø IC=1Ø
43Ø INPUT"What is the line number increment";IC
44Ø LN=(BL+IC*3)-IC
45Ø CLS
46Ø GOSUB 127Ø
47Ø HC=32-LEN(NA$)/2
48Ø IF HC<>INT(HC)THEN HC=INT(HC+1)
49Ø LN$(CU)=LN$(CU)+"PRINTTAB(" +STR$(INT(HC))+");" +CHR$(34)+NA$+CHR$(34)
5ØØ GOSUB 127Ø
51Ø LN$(CU)=LN$(CU)+"PRINT STRING$(64,61)"
52Ø FOR N=1 TO OP
53Ø PRINT"What is the name of option";N;"";
54Ø INPUT A$(N)
55Ø IF LEN(A$(N))>CL THEN CL=LEN(A$(N))
56Ø NEXT N
57Ø H2=(32-CL/2)-1
58Ø IF H2<>INT(H2)THEN H2=INT(H2+1)
59Ø FOR N=1 TO OP
6ØØ GOSUB 127Ø
61Ø LN$(CU)=LN$(CU)+"PRINTTAB(" +STR$(H2)+");" +CHR$(34)+STR$(N)+". " +A$(N)+CHR$(34)
62Ø C1=C1+1
63Ø NEXT N
64Ø GOSUB 127Ø
65Ø LN$(CU)=LN$(CU)+"PRINT"
66Ø GOSUB 127Ø
67Ø LN$(CU)=LN$(CU)+"PRINT STRING$(64,61);"
68Ø GOSUB 127Ø
69Ø LN$(CU)=LN$(CU)+"PRINT" +CHR$(34)+"Please select an option by using the
<ARROW-KEYS>," +CHR$(34)
7ØØ GOSUB 127Ø
71Ø LN$(CU)=LN$(CU)+"PRINT" +CHR$(34)+"and then press <ENTER>." +CHR$(34)+";"
72Ø C1=C1+7
73Ø VL=(15-C1)/2
74Ø IF VL<>INT(VL)THEN VL=INT(VL+1)
75Ø PN=(VL+3)*64+H2-1+1536Ø
76Ø IF OP=8 THEN PN=PN+64
77Ø IF INT(PN)<>PN THEN PN=INT(PN+1)
78Ø GOSUB 127Ø
79Ø LN$(CU)=LN$(CU)+"A=" +STR$(PN)+":" +"B=1"
8ØØ GOSUB 127Ø
81Ø LN$(CU)=LN$(CU)+"POKEA-3,143:POKEA-2,244:POKEA-1,245:POKEA,246"
82Ø GOSUB 127Ø
83Ø LN$(CU)=LN$(CU)+"POKE A-64,128:POKE A+64,128"
84Ø GOSUB 127Ø
85Ø LN$(CU)=LN$(CU)+"POKEA-65,128:POKEA+63,128"
86Ø GOSUB 127Ø
87Ø LN$(CU)=LN$(CU)+"POKEA-66,128:POKEA+62,128"
88Ø GOSUB 127Ø
89Ø LN$(CU)=LN$(CU)+"POKEA-67,128:POKEA+61,128"
9ØØ GOSUB 127Ø
```

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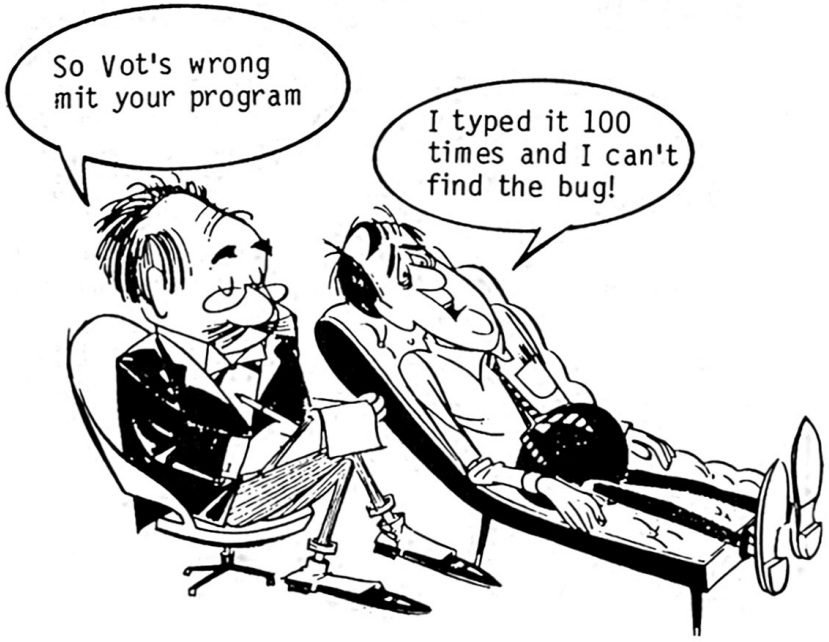
```
910 LN$(CU)=LN$(CU)+"IF PEEK(14400)=16 THEN B=B+1:A=A+64"
920 BB=VAL(LN$(CU))+IC*2
930 CC=VAL(LN$(CU))+(IC*3)
940 GOSUB 1270
950 LN$(CU)=LN$(CU)+"IF B>" +STR$(OP)+"THEN A="+STR$(PN)+":B=1:FOR C=0 TO 3:POKE
A+"+STR$(OP-1)+"*64-C,32:NEXT C"
960 GOSUB1270
970 LN$(CU)=LN$(CU)+"IF PEEK(14400)=8 THEN B=B-1:A=A-64"
980 GOSUB 1270
990 LN$(CU)=LN$(CU)+"IF B<1 THEN A=" +STR$(PN+((OP-1)*64))+":B="+STR$(OP)+":FOR C=0 TO
3:POKE A-"+STR$(OP-1)+"*64-C,32:NEXT C"
1000 GOSUB 1270
1010 SS=VAL(LN$(CU))+IC+IC
1020 LN$(CU)=LN$(CU)+"IF PEEK(14400)=1 THEN GOTO" +STR$(SS)
1030 GOSUB 1270
1040 LN$(CU)=LN$(CU)+"GOTO " +STR$(LN-IC*10)
1050 LN=BLN-IC
1060 GOSUB 1270
1070 LN$(CU)=LN$(CU)+"CLS"
1080 FOR N=1 TO VL
1090 GOSUB 1270
1100 LN$(CU)=LN$(CU)+"PRINT"
1110 NEXT N
1120 CLS
1130 PRINT TAB(14)"Your menu program has been completed."
1140 PRINT
1150 PRINT"What is the name of the ";NA$;" file";
1160 INPUT FS$
1170 PRINT
1180 A$="Please press <ENTER> to record " +FS$+" on disk."
1190 PRINT TAB(32-LEN(A$)/2); A$
1200 IF PEEK(14400)<>1 THEN 1200 ELSE 1210
1210 OPEN"O",1, FS$
1220 FOR ZX=1 TO CU
1230 PRINT#1, LN$(ZX)
1240 NEXT ZX
1250 CLOSE
1260 END
1270 LN=LN+IC
1280 CU=CU+1
1290 LN$(CU)=STR$(LN)+" "
1300 RETURN
```



MENU/SAM PROGRAM LISTING NUMBER FIVE for Model III Sample Menu Program.
by R. Joseph McCarthy

```
10 CLS
20 PRINT
30 PRINT
40 PRINTTAB( 27);"Sample Menu"
50 PRINT STRING$(64,61)
60 PRINTTAB( 25);" 1. Option One"
70 PRINTTAB( 25);" 2. Option Two"
80 PRINTTAB( 25);" 3. Option Three"
90 PRINTTAB( 25);" 4. Option Four"
100 PRINTTAB( 25);" 5. Option Five"
110 PRINT
120 PRINT STRING$(64,61);
130 PRINT"Please select an option by using the <ARROW-KEYS>,"
140 PRINT"and then press <ENTER>.";
150 A= 15704:B=1
160 POKEA-3,143:POKEA-2,244:POKEA-1,245:POKEA,246
170 POKE A-64,128:POKE A+64,128
180 POKEA-65,128:POKEA+63,128
190 POKEA-66,128:POKEA+62,128
200 POKEA-67,128:POKEA+61,128
210 IF PEEK(14400)=16 THEN B=B+1:A=A+64
220 IF B> 5THEN A= 15704:B=1:FOR C=0 TO 3:POKE A+ 4*64-C,32:NEXT C
230 IF PEEK(14400)=8 THEN B=B-1:A=A-64
240 IF B<1 THEN A= 15960:B= 5:FOR C=0 TO 3:POKE A- 4*64-C,32:NEXT C
250 IF PEEK(14400)=1 THEN GOTO 270
260 GOTO  160
```

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- 10 printout formats per data base
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TRS-80 Model I/III/4 Language Software

MRAS ($59.95+$4S&H): An advanced Z80 assembly package for the programmer who wants a powerful and flexible development system. Includes a macro assembler which generates either **relocatable object code** modules or CMD files directly, a linker, a cross reference tool for directly generated CMD files MLIB, our REL module librarian, and our **SAID** advanced **full screen text editor** .

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MC ($79.95+$5S&H): a complete C compiler which adheres to the standards established by Kernighan and Ritchie. The package is supplied with the compiler, pre-processor, an optimizer, assembler macro files, C libraries, a Job Control Language file, the header files, and a 400+ page user manual. MC requires the use of either M-80 or MRAS (available separately), 2 disk drives, and upper/lower case.

EnhComp ($59.95+$4S&H): handles most of Microsoft BASIC; floating point **single and double precision** functions; random file access ("X" mode reclens to 32767), turtle graphics, pixel graphics, keyed array sort, multi-lined functions, user commands, REPEAT-UNTIL, line labels, and more. Built-in **Z80 assembler** to easily create hybrid programs of BASIC and in-line assembly code .

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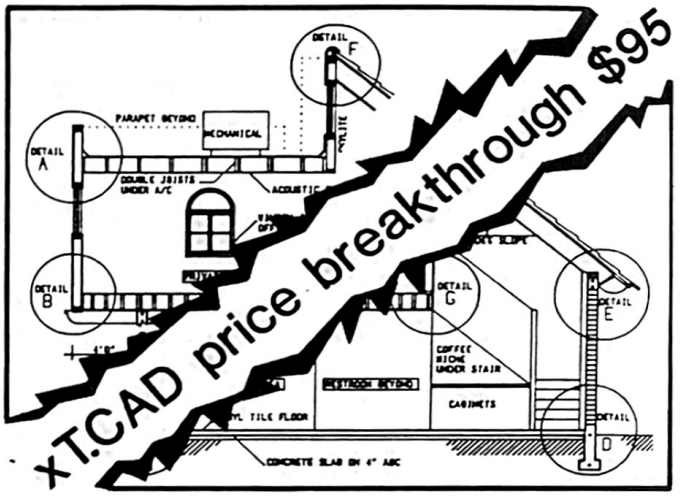

xT.CAD PROFESSIONAL by Microdex. Computer Aided Drafting software for technical production and education. Create, edit, modify precise drawings, details. Features include overlays, grids, cursor snap, zoom, pan, block copy, enlarge, reduce, rotate, mirror, clip, merge, text labels, more. Requires hi-res screen and RS-232 interface. Output to pen plotters. Input from keyboard, or optional digitizer. Friendly, competent support since 1984. Software is backup-free. Was $345 in 1986 catalog.
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xT.CAD BILL of Materials by Microdex. Software utilizes text labels from xT.CAD drawings to automatically generate invoices, parts requests, shipping lists, etc. Includes a mini-editor for customizing line printer output.
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S/XT software by Microdex. Enables disk directory review and special character printing from within standard Scripsit.
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MICRODEX

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Computer News 80

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HERE'S SOME *Exciting* NEWS!

xT.CAD PROFESSIONAL software by Microdex (Models 4/4P/4D and MSDOS)

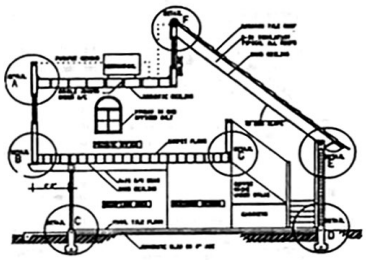
xT.CAD

xT.CAD is a software package for general purpose, two dimensional, precisely scaled technical Computer Aided Drafting. It runs on simple, inexpensive, generally available hardware. It **saves time and money** for anyone who produces technical drawings, plans, diagrams, schematics, details, flow charts, shop drawings be it in their work, study or hobby. The savings accumulate fast as you create, modify and save on disk your drawings, templates, commonly used parts or symbols. Then copy them to your next drawing, same size, reduced, enlarged, rotated or mirrored. Often it is possible to produce a complete new drawing within minutes by simply editing and merging your previous work. Two overlays are always resident in memory for quick manipulation, but you can have as many overlays as you wish on the disk. You can zoom in and out between the entire 24"x36" sheet and 1/100-th of an inch detail. You can also pan (shift) the view across the drawing in any direction. xT.CAD is **easy to learn and use**. Most of the functions are executed instantly upon pressing a single mnemonic key (for example the slash key creates a line between two points). Of course you can also create desired shapes by entering numerical data. xT.CAD has been used since 1984 by several hundred professionals. It has been called "draftsman's delight" in a review in 80-micro, a "serious tool for the professional" in Computer Shopper, and "certainly worth the cost" in PCM-magazine. It is a fully productive tool for **manufacturers, architects, engineers, contractors,** but it is also an excellent training resource for **educators and students.**

Drawing sizes up to 24" x 36"
Full size overlays
Direct and auto zoom and pan
Decimal and 'customary' scaling
Full inch and fractional grids
Cursor snap to grid or intra-grid
Variable cursor speed control
Single key functions from keyboard
Single operating mode at all times
On-line help and memory alert
Accuracy up to 1/100 of an inch
Digital (coordinate) input functions
Block copy and erase any time
Block reduce / enlarge 1% - 9999%
Mirror / rotate 1 - 360 degrees
Merge, rotate, rescale drawings
Save / load drawings to / from disk
Cut out and save parts of drawings
Text labels full ASCII set
Two text sizes, two directions
Text duplication saves memory
Left justified 'typewriter' option
Hardcopy reduce / enlarge 1% - 9999%

INPUT: xT.CAD is designed for easy cursor control from the keyboard, but you may also use a **mouse.** MSDOS packages support selected mice such as Microsoft, Logitech or Tandy. However, depending on hardware and operating system the mice may not always work with MSDOS versions of xT.CAD. TRS/LSDOS packages support Micro-Labs mouse interface for Models III/4/4p/4D.

All packages support the following optional **digitizers:**
Houston Instrument True Grid series 1000 and 8000, Kurta Series One, and Tandy GT-2000.



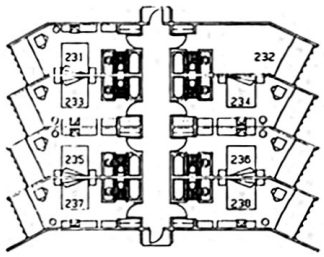
OUTPUT: xT.CAD is specifically optimized for precision scale drafting and text labeling on pen plotters. All packages include user-selectable drivers for the following plotters:

Hewlett-Packard HP-7470A, 7475A, Colorpro, Draftpro, etc, and 100% compatible
Houston Instrument DMP-29 or higher and PC-595, 695, and 100% compatible
IBM plotters models 6180, 6184, 7371, 7372, etc.
Roland DXY-101, 800, and Hewlett-Packard compatible Roland models
Tandy PC-695 multipen plotter Cat. 26-2830, Tandy 6-pen plotter Cat. 26-1191

Also, any serial plotter 100% compatible with current **Hewlett-Packard HP/GL** language, or current **Houston Instrument DM/PL language, should also** work with all current versions of xT.CAD.
Screen-print utility for selected dot-matrix printers is included in all TRS/LSDOS packages. On MSDOS computers use the MSDOS "GRAPHICS" function if printer is compatible. However, screen print does not support text labels. Scale, proportion and line quality are more or less acceptable.

TRS/LSDOS package: **Models 4/4p/4D** require 64K memory, 2 disk drives, floppy or hard, RS-232 interface and a high-resolution graphics board, Tandy or Grafyx Solution from Micro-Labs. Runs in fast machine language under TRSDOS 6.2 or LSDOS 6.3.

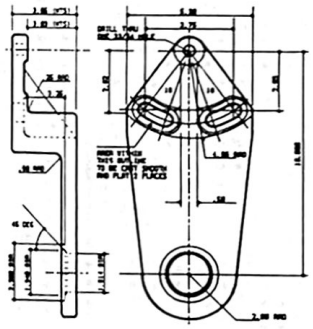
MSDOS package: **PC/XT/AT** or compatibles such as Tandy 1000/1200/3000 require 256K memory, 2 disk drives, floppy or hard, RS-232 board and IBM-CGA compatible 640 x 200 'color' graphics adapter. Monochrome monitor recommended, color monitor OK but xT.CAD uses only background/foreground. Runs under MSDOS 2.11 or higher. Now also available on optional 3½" disks!



ALSO AVAILABLE

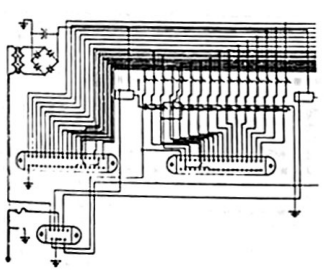
xT.CAD DEMO disk: self-tutoring 15-minute auto-demo shows and explains main functions of xT.CAD. User may switch any time to a 'live' version of the program which allows hands-on experimenting with xT.CAD (except output). Requires same computer system configuration as the full xT.CAD program.

xT.CAD BILL of Materials software by Microdex (Models 4/4p/4D and MSDOS)
Generates alphabetized listings of items by matching text labels embedded in drawing files created by xT.CAD with descriptions and optional unit prices in user's master files. Several drawings and master files can be scanned automatically in one pass and reports such as parts lists or invoices with optional cost and totals calculations can be printed on line printer. Mini-editor allows easy customizing of report formats. Runs in fast machine language under TRSDOS 6.2, LSDOS 6.3, MSDOS 2.11 or higher.



GRAFYX SOLUTION by Micro-Labs for Models 4/4p/4D
Clip-on, easy to install board (card) provides 640 x 240 'pixels' high resolution, same as the Radio Shack hi-res board. In addition to xT.CAD, the board supports many other graphic applications. Includes popular GBASIC graphics software which adds hi-res functions to standard BASIC, plus installation and programming manual (no programming needed for xT.CAD).

CASH Professional software by Microdex (Models 4/4p/4D and MSDOS)
Small business, professional or personal book-keeping based on cash method and calendar year accounting period. Transactions are recorded and edited as single line entries on a word-processor-like screen. CASH automatically distributes debits and credits and creates a self-balancing 'double-entry' ledger. Any number of 'jobs' or 'profit centers' each with up to 144 journal lines per month, 48 main accounts and any number of sub-accounts can be maintained. Reports can be printed in any combination and range of periods, accounts, sub-accounts and projects. Utility is provided for customizing of output for various line printers. Runs in fast machine language under TRSDOS 6.2, LSDOS 6.3, MSDOS 2.11 or higher.



S/XT software by Microdex (Models III and 4/4p/4D)
Modifies original Scripsit to display disk directory and print special characters or codes such as underline or superscript. For Scripsit 3.2 (TRSDOS 1.3) and Scripsit 1.0 (TRSDOS 6.2 or LSDOS 6.3).

xT.CAD w/manual	was $345.00	$ 95.00
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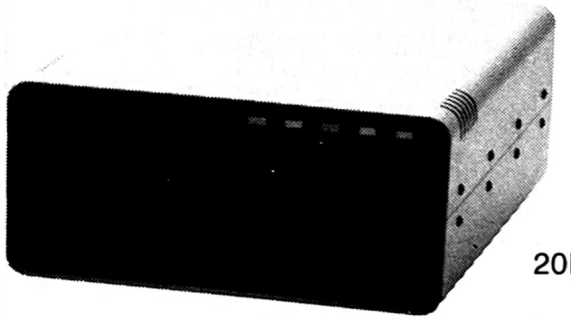

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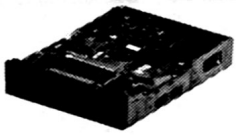

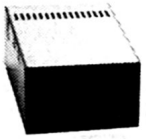

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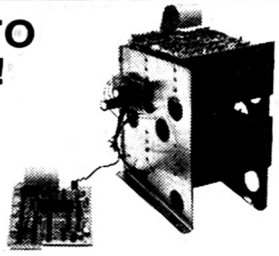

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CP/M System Prog. Manual, Model 4	5
Monte's Mail (newsltr), Vol. 1 #1, Vol. 2 #1	
Specify Volume ..... Each Volume	1

TRS-80 SOFTWARE

BASIC Faster & Better Library Disk	$2
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BASIC I/O Demonstration Disk	2
TRSDOS 6.2 Utilities with Manual	9
Electric Pencil Word Processor	9

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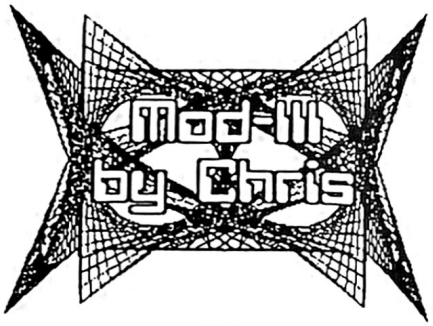

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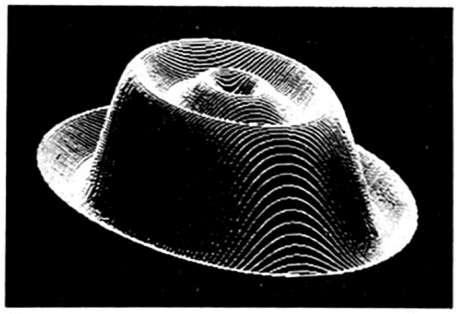

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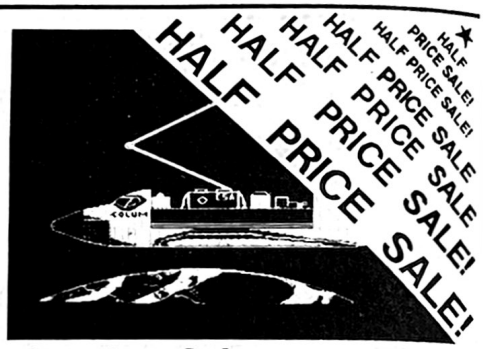

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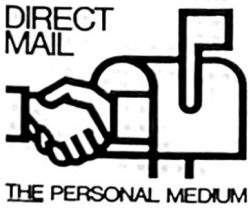

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February 1990 Vol 3 No 2	Jan 15	Jan 29
March 1990 Vol 3 No 3	Feb 12	Feb 26
April 1990 Vol 3 No 4	Mar 12	Mar 26
May 1990 Vol 3 No 5	Apr 16	Apr 30
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August 1990 Vol 3 No 8	Jul 16	Jul 30
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