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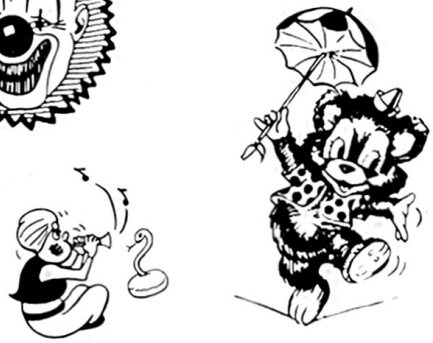
TIME TO RENEW - CHECK YOUR LAST ISSUE DATE ON YOUR LABEL

That extra week in our publishing cycle - where did it go! Plenty to do between now and our next issue. But we are on schedule. Check the mailing date schedule in the display ad section. We'll be as close to those mailing dates for 1990 as humanly possible.

If you were wondering, all the picture cuts in our last issue were taken from the File Cabinet and printed on a dot matrix printer, using a computer without a hi-res grafix board. Yes we do have a hi-res board. But the Hi-Res/MacPaint utility disk which has several hi-res graphic development programs has a direct-to-printer program which allows you to print out the picture files without a hi-res board. The picture just doesn't come up on the screen. Many of these cuts fill a full 8-1/2 x 11 sheet and lost some of their beauty in the reduction process to the size we published. Some of the pictures really are outstanding. Seeing is believing.

This issue again, is pretty crowded so it does not leave much room for wordy comment - aren't you glad. One thing we should squeeze in again is that we still have a lot of 80 Micro magazines left. So if you are looking to fill that collection send in your list. No money we will ship what we have and bill you at $3.00 each to cover our costs of having them shipped to us and then to you. Now, on with the show. -CN80.



NEWS ITEMS

Look for the Model 4Ds to be on sale again in February at half price. It has been reported that Tandy has a warehouse full of Model 4Ds and two warehouses full of unassembled parts. So we can expect the Model 4Ds to be available for sometime. Their annual half-price spring sale should make it easy to get that back-up machine. Again check the mail order independent dealers for the best price. ie. David Waldrip at Nocona Electronics 817-825-4027, PO Box 593, Nocona TX 76255.

HINTS AND TIPS

DESKMATE™ DATE UPGRADES

Several readers have asked why they could not update the DeskMate programs with LS-DOS 6.3 instructions. Some using Model 4P thought that the difference in the way the Model 4P and the Model 4 work was the problem. It has been reported that it would make no difference which machine was used. But the key to the upgrade is to make sure you use the OLD command in your parameters.

Place LSDOS 6.3 or T62DOSXT by David Goben in drive zero.

Place a working backup of DeskMate in drive one and at DOS ready type

PURGE SYS13/SYS:1 (S,I) <ENTER> to make room on your disk. Then type

BACKUP :0 :1 (S,I,OLD) <ENTER>

Remove your LS-DOS or T62DOSXT disk from zero, and move the DeskMate disk from one to zero. Do not hit reset, then type

SET *CL COM <ENTER>
SYSGEN <ENTER>

This should update the DeskMate files to accept the Date past Dec. 31, 1987

Or you could purge all unnecessary files from a backed up working copy of your (creating a "Minimum System Disk" see Vol 2 No. 4 pg. 3) LS-DOS 6.3 disk and then copy the DeskMate CMD files to it. But the first method would be easier and create more disk space on the DeskMate disk.

MOD 4 BY CHRIS Review

by Henry H. Herrdegen

He has done it again !! When I got Christopher Fara's Model III Owners Manual for review, I thought that there was hardly any room for improvement left (Vol. 2, # 10), but Chris found some anyway. And he has based the manual on the so much superior LS-DOS 6.3, not on the obsolete TRSDOS 6.2.

The arrangement and printing is superb, as in the MOD III, and the subject titles of all chapters are now on the bottom line of all pages. This book is a MUST for all you Model 4 users who have by now converted to LS-DOS 6.3. For you who have not, I can only say: Please, do not hesitate any longer to bury the awful TRSDOS 6.2 where it belongs. Chris mentions at the ends of chapter 1, 3 and 5 the differences between the two, and also to TRSDOS 6.1. As has been written before in this publication, LS-DOS 6.3 is not just an update of TRSDOS 6.2, but a complete, stand alone DOS with a vastly improved BASIC and some additional, very handy utilities, all covered by Chris.

The book is nicely organized, with a DOS Outline as chapter 1, explaining the terminology and function of the various words and files. Again, as I mentioned in the MOD III review, The Start Up procedure is not quite what my machine, and maybe yours, want. There must be quite a variety of Model 4 systems out there. Mine does not bother with any message after power up and the about 3 seconds before the drive stops. And, after loading the disk and closing the latch, gently or otherwise, nothing happens by itself, as implied in step 4. I do have to press the reset button, as Chris say's under (if not . . .). But did the

Tandy manual tell us anything about start up, right, wrong or ambiguous? No Sir, not a word! One up for Chris.

He found one important point, which Tandy has kept a deep secret: the fact that you can use the oh so convenient period key on the number pad as the separator for the date and time entries! (besides about a dozen other, ASCII codes 32-39 and 41-47!) He also tells us the key sequence for several ASCII characters not available on the keyboard, such as square brackets, braces, caret etc. And if you do not know what the 14 SYStem files are doing, and which ones you may purge without impairing the use of a particular disk, page 1-7 will tell you. And I am certain that there are more little gems hidden in those pages, I have just not stumbled over them yet.

Chapter 2 is an alphabetical list of all the DOS Commands, again with explanations and samples. All topics are with large bold headings on one page, or pages facing each other, some short ones 2 or 3 to a page. None, except the 3 page long DEBUG and SYSTEM sections, requiring a page flip while reading up on a command.

Chapter 3, despite Chris's disclaimer, is a concise, 'almost' Tutorial for the BASIC language. With the samples given in Chapter 4, one could learn the language from this book, maybe not as easy as from some of the books written specifically for that purpose, but it is all there. One addition to pg. 3-2: I do not have to type <SYSTEM> <ENTER> to get back to DOS, a fact with annoyed me working on an IBM machine, just <!> <ENTER> will do! I am getting insecure making such statements, never knowing if it is applicable to all varieties of Model 4 machines, or just to mine? Try it anyway, you may like it.

At the end of this chapter, Chris gets a bit technical on 2 pages, with BASIC BITS and BYTES, which the average BASIC programmer probably won't need. A very good instruction for Sequential and Random files is there too, with samples side by side for both, to show the difference. It concludes with a grouped list cum explanation of all the BASIC Keywords.

Chapter 4 now treats these Keywords the same as chapter 2 does the DOS Commands, with explanations, notes and samples. And does it much better than the original-Tandy manual did.

Chapters 5 and 6 are the technical addenda, explaining the "Z80 Connection", listing and explaining the SuperVisor Calls. Chris explains the Z80/DOS and Z80/BASIC interface, once more with easy samples, lists the SVC calls, with their explanation in chapter 6.

These two chapters go way beyond what the TRSDOS manual provided. In the 16 page "Update" from LSI, a couple of pages mention SVC's, some changes, and even a sample program. But, here we go again. With these 16 pages of additions and updates, documentation for the new BASIC reference program BREF and the text editor TED, you wind up with two 'manuals' again, not as bad as the Model III situation, but still...
Thanks to Chris, we now have it all in one book.

The Appendices start wit a drawing of the machine, pointing to all the connections, switches, etc, as well as the connector pin arrangements, which Tandy neglected to provide. Error Code lists, ASCII Code list, Glossary, extensive index and a Bibliography conclude the Volume.

By the way, did you realize that pg. A-58 in the original manual does not show the Special Characters 0-31 for the Mod 4, but the ones provided in the III !? Chris does not give us the (not quite natural looking anyway) pictures, probably causing printing difficulties, but gives us a short 6 line BASIC program to display all special characters on the screen, to see how they really look like.

Bye, bye Model 4/4P Disk System Owner's Manual, join your Model III counterparts, welcome "MOD 4 BY CHRIS"!
-Henry H. Herrdegen

ASSEMBLY LANGUAGE TUTOR Part 13

by Christopher Fara (Microdex Corporation)

Block copy

A frequent need in assembly programming is to copy an entire block of data from one memory area to another. A simple loop using familiar instructions could do it. For example suppose the starting address of the "source" memory area is in HL, the starting address of the "destination" area (where we want to put the copy of the block) is in DE, and the length of the block (number of bytes to be copied) is in the "counter" register B.

```
;-----------------------------------------
COPY:   LD      A,(HL)      ;get byte
        LD      (DE),A      ;to destination
        INC     HL          ;next source
        INC     DE          ;destination
        DJNZ    COPY        ;more?
;-----------------------------------------
```

Nothing wrong with it, except normally we wouldn't want to use it, because Z-80 has an instruction which is like a small routine in itself, and does the job with the speed of a lightning. The above 5-byte loop can be replaced by one single 2-byte instruction:

LDIR

Load, Increment, Repeat. Before writing this instruction we set up registers like this:

HL = starting address of source block
DE = starting address of destination
BC = counter (number of bytes to copy)

After the copy is made, HL points to the byte right above the end of the source block, DE above the end of the destination block, and BC=0.

Unlike our clumsy loop which could only copy up to 256 bytes (the counter was in the single register B), the LDIR instruction can copy much larger blocks, because the counter is in the register pair BC. To remember which registers are used for what, we can think of DE as DEstination, and recall that register B (in the BC pair) is called "counter".

A similar instruction makes the block copy "backwards", starting from the end of the source and destination areas.

LDDR

Load, Decrement, Repeat. Before writing this instruction we set up registers like this:

HL = ending address of source block
DE = ending address of destination
BC = counter (number of bytes to copy)

After the copy is made, HL points to the byte just below the start of the source block, DE below the start of the destination block, and BC=0.

LDDR is handy when we want to copy a block to a higher address located within the source block. For example a "shift up" of 10 bytes by 4 memory locations using LDIR would overwrite the last 6 bytes of the source block before all bytes were copied. But LDDR copies the tail-end bytes first, and so overwrites the last 6 bytes of the source block after those bytes have been safely copied to the new location. Similarly to "shift down" to an area overlapping the source block we must use LDIR. If the areas do not overlap then either LDIR or LDDR will do.

LDIR and LDDR copy the entire block instantly, non-stop. Sometimes, however, we would like to copy one byte at a time, and do some other things in between. Two instructions serve this purpose.

LDI

Load, Increment. Before writing this instruction, we set up registers the same way as for LDIR (HL start source, DE start destination, BC counter). LDI copies one byte from location (HL) to location (DE). Then HL and DE are incremented (ie. point to next location) and BC is decremented.

For example, suppose we want to copy a block up to, but not including any carriage return byte 13. A routine could use LDI like this:

```
;-----------------------------------------
        LD      HL,SOURCE
        LD      DE,DESTIN
        LD      BC,LENGTH
COPY:   LD      A,(HL)      ;get the byte
        CP      13          ;carriage ret?
        JR      Z,CONT      ;yes, done
        LDI                 ;else copy
        JP      PE,COPY     ;more?
CONT: ... program continues here
;-----------------------------------------
```

The last JP is conditional on the Parity flag which is "set" (PE Parity Even) by the LDI instruction as long as the BC counter is not zero. When all bytes have been copied then BC becomes zero, the Parity flag is reset (PO Parity Odd), and the program "falls through" to a next instruction. Notice that although it is a "short" jump, we can't use JR here, because JR can be only conditional on Zero or Carry flags, but not on other flags.

To make such byte-by-byte copies "backwards" (like LDDR) we can use:

LDD

Load, Decrement. Before writing this instruction, we set up registers the same way as for LDDR (HL end source, DE end destination, BC counter). LDI copies a byte from location (HL) to location (DE). Then HL and DE are decremented, and BC is also decremented.

Parity flag is used like with LDI to check if BC has been yet decremented to zero or not.

Screen magic

Perhaps you have seen those "help" or "menu" screens that seem to pop up instantly from nowhere. The way it's done is to store the screen image in a "buffer". When needed, it's copied to the video memory. It's a convincing demonstration of the speed of the LDIR instruction. Let's look at Mod-III first (Mod-4 programmers please study it anyway, the idea will be useful later). To store the screen, the "source" address in HL will be the beginning of "video RAM" which in Mod-III starts at 15360. There are 16 rows and 64 columns on the screen, so the register DE will be the address of a 1024-byte holding buffer area reserved somewhere in memory.

```
;-----------------------------------------
        LD      HL,15360    ;video RAM
        LD      DE,HOLD     ;buffer address
        LD      BC,1024     ;counter
        LDIR                ;do it
;-----------------------------------------
```

To get the screen back to video display, the same sequence of instructions is used, but the contents of HL and DE obviously must be reversed

```
        LD      HL,HOLD
        LD      DE,15360
```

Mod-4 uses a similar procedure, but it's a bit complicated by the fact that the video RAM is "hidden" in high memory behind "normal" RAM, and must be bank-switched for the copy. Fortunately there is a SuperVisor Call which does it for us. This SVC number 15 expects the address of the holding buffer in HL. Mod-4 screen has 24 rows and 80 columns, so the size of the buffer must be 1920 bytes. Register B must contain the desired "function" code:

B=6 copy screen to buffer
B=5 copy buffer to screen

For example to copy screen to buffer:

```
;-----------------------------------------
        LD      HL,HOLD     ;buffer address
        LD      B,6         ;function code
        LD      A,15        ;SVC number
        RST     40          ;do it
;-----------------------------------------
```

As you can see, the routines are short and sweet, but the dazzling screen swaps cost some memory for the holding buffers. If we want to instantly swap between two screens (eg. a help screen, and a current working screen) then two holding buffers must be reserved. Still, it's the kind of fancy that makes any program look extra professional.

BASIC screen swaps

One place in BASIC where a screen may be safely stored could be an integer array. As you may know, in an integer array all elements are stored in memory in one contiguous block of 2-byte values. Such array could then be saved in a disk file and recalled for any program which might need it. Each integer element has 2 bytes, so we need, for example

```
DIM V%(512) ;mod-III
DIM V%(960) ;mod-4
```

This actually gives us 513 or 961 elements (1026 or 1922 bytes) but we'll use V%(0) to pass to the subroutine an indicator of the "direction" of the desired copy (to or from the buffer). To keep it uniform for Mod-III and Mod-4, we will use V%(0)=6 to store screen, and V%(0)=5 to restore it. But the subroutines must be quite different. This is for Mod-III.

```
;-----------------------------------------
;VIDEX3 video exchange subroutine mod-3
;-----------------------------------------
        ORG   64000
EXEC:   CALL  2687        ;varptr V%(0)
        LD    A,(HL)      ;direction
        INC   HL
        INC   HL          ;varptr V%(1)
        LD    DE,15360    ;video RAM
        LD    BC,1024     ;screen size
        CP    6           ;store screen?
        JR    NZ,COPY     ;no, restore
        EX    DE,HL       ;else reverse
COPY:   LDIR              ;do it
DONE:   RET
        END
;-----------------------------------------
```

Once the routine is loaded into protected memory, as discussed last month, Mod-III BASIC calling sequence could be

```
DIM V%(512)
DEF USR = 64000-65536
V%(0) = 6 ... store screen, or
V%(0) = 5 ... restore it
Z% = USR ( VARPTR ( V%(0) ) )
```

Here is what happens. In the USR call we pass to the routine the address of the first array element. The initial CALL 2687 is a call to a ROM subroutine which puts that address into register pair HL. Next we LD A,(HL) which puts the low byte of the integer V%(0) into register A (we'll need it in a moment). Since the value in V%(0) is either 5 or 6, it fits in the low byte, and we can ignore the high byte portion of this integer. Then we increment HL twice to skip V%(0) and advance to the address of V%(1) which is the beginning of 1024 bytes of storage area for the screen. Next we set up DE and BC for the LDIR instruction, assuming for now that the copy will be made from the buffer (HL) to video (DE). But then we compare the value of V%(0) which has been saved in register A, with 6. If it's not 6 (Not Zero flag) then our assumption was correct and we jump to LDIR and do it. But if A=6 then we use the EX instruction discussed last month to swap the "source" and "destination" addresses and copy from screen to buffer.

Mod-4 routine is much simpler because SVC takes care of most of the needed steps, and the BASIC command CALL is more direct than USR.

```
;-----------------------------------------
;VIDEX4 video exchange subroutine mod-4
;-----------------------------------------
        ORG   64000
EXEC:   LD    B,(HL)      ;get V%(0)
        INC   HL
        INC   HL          ;varptr V%(1)
        LD    A,15        ;SVC number
        RST   40          ;do it
DONE:   RET
        END
;-----------------------------------------
```

The sequence of BASIC commands would be

```
DIM V%(960)
Z = 64000
V%(0) = 6 ... store screen, or
V%(0) = 5 ... restore it
CALL Z ( V%(0) )
```

The CALL command passes the address of V%(0) to register pair HL, and so the value of V%(0) can be copied directly to register B as the "function" code for SVC 15. As in Mod-III we increment HL twice to address the storage buffer beginning at the element V%(1), and then execute SVC 15 as usual.

In the above two examples the labels EXEC and DONE are not used for anything, but we'll need them next month, so keep it in mind.

Memory saving?

No doubt the speed of machine subroutines such as the above, or the ALFA routine discussed last month, is breath-taking in comparison with BASIC. But the next question is: are we also saving any memory? We should with those short routines, but not the way we've been doing it. With our ORG 64000 we must protect from BASIC some 1500 bytes of high memory, yet the routines need only a dozen bytes or so. One way to improve this situation is to find out how long a routine is and edit ORG so the routine fits right near the top of memory. The length of an assembled routine is displayed on most assemblers along with other statistics (how many errors, how many lines of source code, etc) at the end of assembly listing. This listing usually appears on the screen when we execute the "Assemble" command. The memory end can be found on Mod-III with our MEMEND program (CN-80 Dec'89 page 5), on Mod-4 (and Mod-III LDOS) with the DOS command MEMORY. Subtract the length of the subroutine from the memory end and use the

result as the new ORG. For BASIC specify memory limit one byte below that ORG. This way the routine will be "tucked in" right near the top, without any wasted space.

Another, more flexible approach is to have "relocatable" subroutines which protect themselves in a minimum of space and let BASIC use any memory that's left over. We'll look at it next month.

Refresher course...

A revised collection of our CN-80 1989 tutorial series is now available in book form for those readers who missed past issues, or would like to have a permanent reference volume in their library. Order from CN80 "Z-80 Tutor Vol. I" ($9.95, S&H Included).

THE WHY AND HOW OF GRAFDSK SYSTEM
by William R. Bowman

This discussion is a tutorial on ramdisks, written specifically to cover the installation and use of a GrafDISK, (for use on the Model 4 only, using LS-DOS 6.3) which is the same as a Memdisk except the 32K graphic memory of a Radio Shack graphics board is used in addition to banks 1 and 2, thereby increasing the size from 14 cylinders to 21 cylinders. We will also be discussing the use of GDsave and GDload which are utility programs to save a complete GrafDISK including the docs and driver to a disk file for very fast creating and loading of the GrafDISK at boot up. For those who do not have a Radio Shack graphics board installed, a type A GrafDISK may be installed which does not use the graphics memory, thus creating the smaller 14 cylinder GrafDISK similar to a Memdisk. The GDload and GDsave programs will handle a type A GrafDISK, but may NOT be used with a Memdisk. Patches are supplied at the end of this file to make it work with an 18 cylinder disk on the Micro Lab board.

Maybe you are wondering, 'why would I want to consider using a GrafDISK'? The GrafDISK being a simulated disk drive installed in MEMORY, is extremely fast when reading or writing files or data to that drive. It can be used exactly like any disk drive (except it is smaller) to hold programs or data files. About the only real disadvantage is that when the computer is turned off, everything on the GrafDISK is lost. The GDsave and GDload overcome this disadvantage to a great extent by allowing all the data to be replaced on the GrafDISK very quickly without going through a long backup or copying procedure. Though considerable time may be required to prepare the files on the original GrafDISK and save it with GDsave, the GDload program will then be able to configure and load that specific complete 21 cylinder GrafDISK in about 15 seconds. I think you will agree, the disadvantage has nearly been eliminated.

The two main uses for a GrafDISK (or any ramdisk) are: 1) To add another disk drive to the system for use in copying or temporarily storing data or files. 2) To utilize the speed capabilities of the GrafDISK (or any ramdisk) by using it with a program that makes a great many disk reads or writes to and from data files while the program is in use, thereby speeding up the program operation.

Probably the best use results in a combination of both of the above uses. The Dos itself, almost continuously reads overlay files from the system drive as it executes various commands. In many cases when a running application program issues a SVC call to the Dos, the Dos must read in an overlay to process the request. Consequently if the Dos is loaded into a GrafDISK, and the GrafDISK is then switched to be the system drive (drive 0), with the system running from the GrafDISK, the maximum gain in operating speed is obtained. When the system is switched to the GrafDISK, the previous drive 0 is released for use as a data drive, so we have an extremely fast operating system with two data drives free for any use desired, running on a standard two drive computer. Use of the GDload program will allow this complete setup to be made at boot up very quickly.

The rest of this discussion will describe the method of initializing a GrafDISK, preparing it as a system drive containing the operating system, saving it to a disk file with GDsave, and how to set up the computer to boot and load this file with GDload so as to come up running on the system GrafDISK with two disk drives free for use as desired.

It is very important that you start this process by booting your computer with NO filters or drivers set. If you have filters or drivers set that are SYSGENned, you must boot up with the [Clear] key pressed so as NOT to load the CONFIG/SYS file. Use the device (b) command to check your configuration to verify that the drives are enabled properly and NO filters or drivers are active. Since the GrafDISK driver must install in low core, you should NOT set many drivers or filters that may prevent GrafDISK from installing, however if you MUST have the forms filter or the Comm driver set, you may do so now. Remember you cannot have anything that uses banks 1 and 2 installed (such as Spool, Prowam or Double Duty etc.) as these would lock out banks 1 and 2 so as to prevent the installation of the GrafDISK. Once the GrafDISK is installed, it will lock out banks 1 and 2 so that any program trying to use these banks will not initialize them. Programs that use the high banks (like FastTerm II, Visacalc, XT4, LeScript etc.) will run without using these banks for their buffers. But... watch out, as you may find a program you are used to running with an 80K buffer now has a very small buffer, which could make it almost unusable. (Example: FastTerm II using the high banks has a 72K buffer, but with the high banks locked out it runs with ONLY an 8K buffer.)

When you have your system configured just the way you want it, sysgen it with SYSGEN [Enter]. Now when you boot up and the configuration file is read in, your system will be placed in this condition.

In all of the following discussion and instructions, it is assumed that you are running a two drive system with drives 0 and 1 enabled. If you have additional drives enabled, replace the drive 2 anywhere shown with the next UNUSED drive number.

You are now ready to initialize the GrafDISK. Do so with:

SYSTEM (DRIVE=2,DRIVER="GRAFDISK") [Enter]

Answer the prompts for a B type GrafDISK (if you have the graphics board installed. Answer A if not). Answer the Format prompt with Y. The GrafDISK will now install and return you to Dos Ready. Check out what you have with the DIR :2, FREE :2 and the DEVICE (B) commands so as become familiar with the responses to these commands.

The GRAFDISK package on this disk can be patched to work on the Micro Lab board. It will make an eighteen track disk instead of twenty one. The shorter version will work on both boards. Of course you are wasting 13.5K of the RS board if you do it this way, but it might be worth it for everything to work if you had both boards.
-William R. Bowman

(Editors Note) The above is a partial print of the information and installation document that is on the GRAFDSK program disk, which is twelve pages long, plus two more documentation files. There are eight command and implementation programs on the disk. Requiring 49.5K of disk space. But don't let the size of the documentation scare you, Mr. Bowman has written an excellent "walk you thru" set of instructions, complete with making a minimun systems disk for the final installation of GRAFDSK.

As yet these programs have not been added to the File Cabinet Collection, so we will make these program files available on the CN80 Disk Series #8. If you would like to have this program disk before the Disk #8 is ready. Which will be at the end of March. Drop us a note with $2.00 to cover postage and disk costs and we will send it to you. Hopefully we will have a full review of the program in a future issue. But for you who are interested, we thought that the above reprint of the documentation files would answer many of your questions. -Ed.

MODEL 4 HARDWARE EXPANSIONS

by Donald W. Ady

In a recent CN80 article (Vol 2 No.12) I told about installing in new double sided drives on the Model 4. The TRS-80 was opened up and stayed that way until a bunch of other stuff was added: speedup kit, 512K RAM expansion, and a HiRes GRAFYX card. Once open, it did not take long to get at the innards for the next transplant that was waiting in line. Trial runs were done with things open but connected. That way problems were easy to get at.

Costs: $35 for the speedup, $201 for the 512K RAM, plus $5 S&H. From Anitek Software Products, Melbourne, FL, 1-407-259-9397. For Grafyx Hires, $129.95, $4.50 for an adapter plug, plus $2.50 S&H. From Micro-Labs Inc., Dallas TX, 1-214-702-8654. Those are the prices when I bought, but could have changed by now.

There are often different versions of hardware and instructions for Model 4, 4P, or 4D. The 4 or 4P came in two production models called non-gate array (older) or gate array. Mine was the older Model 4 non gate array. To identify it: the serial number did not have an "A" in it as gate array editions do. Also, I found the floppy and printer card edges at the bottom, rear, right.

Turn off the power and unplug the computer first. Let it sit a little while - loses some high voltage from video tube. Turn it on its back. Remove the screws around the bottom edge. Note the different sizes and where they came from. Some cases may also have one screw on the back side surface. With the screws out, tip it right side up again. The PCB (printed circuit board) is enclosed in a boxlike vertical aluminum RF shield that is like a back wall. Lift the case carefully straight up very carefully; do not bump the video tube neck on the back wall!

Set the video down behind, with the screen facing the ceiling, and the connection still made. That's how it should be, still connected when you make installation tests with a temporary plug in and power up and diskette BOOT. Much of the time it would be in the way and needs to be unplugged and set down elsewhere. When moving it, always have power disconnected. And keep your hands off the tube and its high voltage.

To expose the board where all the changes go, remove a piece of the RF shield on the back side. It has screws at the top and sides. Some might have ground straps that may need to be put back without the cover for powered up tests. There are ID U-numbers on the board for IC chips, as the instruction tell. The numbers change with model runs. U57 is the Z80 chip on mine, but some other number on a 4P and so on.

All of the installations take some chip handling. Static sparks can destroy chips. In dry weather I use some wire solder wick or black conductive plastic on my wrist, and connect it to a grounded wall outlet by a bare metal cover plate screw. One or two small screwdrivers also work to gently pry up the ends of a chip before gently rocking it up and out. Better: inexpensive tweezers made for IC pulling. Be careful not to bend chip legs, because you might need to reuse them if things go wrong. Before taking a chip out, write down which end is marked to get the direction right for its replacement. One end has a small center vee notch, or else a small dimple or dot by one leg.

A new chip usually has its legs splayed out a little from side to side, not aligned for a straight plug in. Tilt it a little. Start one side slightly in. Push against the started legs with gentle force, just enough to line up the legs on the other side. Gently rock it down. Look to see that all the legs make it into the socket clips and don't get bent over.

Simple tests are mentioned in the kits and at the end of this article. Test each one as you do it. That way, if there is any problem, it was probably with the last kit installed.

The speedup kit for old M4 has just three replacement chips. Unplug three and plug in three new ones. For mine these were at U3, U71, and a Z80B chip replacing Z80A at U57.

The GRAFYX HIRES board was easy. It takes only one plug, one spring clip lead to go on a particular IC chip's leg, and one jumper to remove. A test installation was

made after the speedup kit was done, but before installing the memory board that would make things harder to see. When tested and working, I took it off, did the memory board, then replaced the GRAFYX board.

A long mounting screw is provided. The final installation if there is to be the memory board, puts the GRAFYX board beyond the reach of its plug. To make the distance a plug extender adapter is needed. With that setup, the corner mounting screw becomes too short, but is not needed. The RF shield makes a very tight fit that clamps it in like a rock. Also for mounting is one adhesive pad. Don't peel off the no stickum film until a final installation with the memory board in place.

The jumpers on the board slide over two straight pins. For possible reuse, just slide it back onto only one pin where you could find it again. I had a pin contact problem on the plug. Cured simply by unplugging and replugging. The pins that go into the plug are long thin wires. It is hard to see when they seat into their holes. The plug extender also misaligned a little and wanted to spring off of the board. Crimping it on once tightly with wide mouth pliers took care of that.

The memory board with 512K of RAM chips was a much easier job than for the 256K on the Model 1. Special circuits are on a little board, with 14 color coded wires coming out of it. The board plugs into the old Z80 socket, and the Z80 plugs back into the top of the board. Two of the fourteen wires are unused. Two others are only used for 768K or 1024K. The latter are beyond the range of my soldering skill - piggyback RAM chips required. Of the 10 wires to be used, all but three go to an easy to solder header - which replaces a socketed IC that is discarded. The instructions were written prior to provision of the solder header, which makes the whole job at least twice as easy. If you have moderate soldering skill with a 5 watt iron and fine solder, it should be easy. My skill is indifferent, and I got two shorting solder balls on the header. This is where an ohm meter comes in handy, to read the short. Solder wicking copper mesh helps to desolder the beads.

Besides the seven wires to the dip header, two wires solder directly on IC legs elsewhere on the board. One goes on a leg of a resistor. That's it, except for new RAM chips, and some cutting. There are 16 capacitors to cut out of the circuit with small end nippers. Only a skilled technician could solder the itty bitty things back in, so this a point of no return. Cutting one wire leg is enough. One final cut: a tiny trace on the circuit board. My board was a later production run where the trace had gone underground. Instead of running out in plain sight, it went back under its IC body. With an ohmmeter on visible contact points, I found it. A later call to Anitek revealed that they knew of this version. The traces are very close together, so it is easy to cut two of them. This one had one point of wider separation. A 1/16 drill in a pin vise that turns with the fingers worked just fine for the job. Metal chips were dabbed up so that they would not short out other IC legs.

RAM chips are rated in units of bits. Each memory location gets one bit apiece from eight chips to make a byte. So, for 512K, it takes 16 chips rated 256K bits. 64K machines have eight chips rated 64K bits, and eight other sockets unused. 128K machines use all the RAM sockets. For this installation, there were 16 RAM chips to exchange, all new for all old. This is only a guess, but I think bit0 for all memory but ROM comes from the chips at the top row of sockets, bit7 from the bottom.

The final reconstruction step is to button up the TRS-80. First, replace the back of the aluminum RF shield. The GRAFYX board interferes with the replacement of the cover. Some installers may have made changes on the shield such as cuts and patches to relieve the interference. I used an easier solution, no changes whatever. Put all the screws back on EXCEPT the one in the lower corner that was impossible to force all the way into position. The one screw was left off. The shield clamps the GRAFYX board firmly in place, but rests on the ceramic IC body (not on any wiring). Be sure that no wires from the RAM board project out and get pinched if you do this! Also, you can repeat all the program tests quickly, before putting the computer cover & CRT back on.

Make sure the computer is unplugged and off when reconnecting the video or putting

the top on the computer. Reconnect the video. Raise up the top portion with the video and carefully lower it straight down. Do not bump the back neck of the CRT. If you have new drives with the projecting latches, then the case must be bent out a little to clear them, still without bumping the CRT neck. With the cover in place, replace all of the holding screws on the bottom of the case.

Testing with Computer Opened

The RF shield may be off, but with any ground straps in place and the video connected by its one flat plug and one ground strap. The video tube should point upward. Plug the computer in again and BOOT a disk. To get feedback from the video, step over an look down at it. Make the brief test that's require. Then turn off and unplug the computer when done.

To do a speedup, in BASIC in Model III mode:

```
10 A=16912: REM &H4210
20 B=PEEK(A): B=B OR 64:   OUT 236,B
:REM FAST
30 B=PEEK(A): B=B AND 191: OUT 236,B
:REM SLOW AGAIN
```

Most things you might do next are noticeably faster. For old M4, the speedup is nominally from 3.5 MHZ to about 5.5 MHZ. On newer ones, roughly from 4MHZ to 6MHZ. The achieved speed that I measure is a little slower, a little under 5MHZ on the older Model 4. Maybe there are hidden overhead losses from system interrupts that weight it down. Some operating systems do disk I/O OK on higher speeds. TRSDOS 1.3 does not, but a software patch is given to cure it. Some systems have FAST or SLOW commands built in. To make your own FAST/CMD, you can POKE this: DATA 62, 104, 50, 16, 66, 201. Use the location wanted and use a DOS DUMP to make the file. This version uses the BOOT value of address 16912, then adds the FAST bit.

The GRAFYX board comes with a generous supply of software and versions of modified graphic BASIC with their own special names to run specifically on: TRSDOS 1.3, TRSDOS 6.X, LS-DOS 6.3, LDOS 5.14, NEWDOS, DOSPLUS 3.4, and DOSPLUS 3.5. There are many demos and tips for programming in BASIC or at Z80 level, found in the manual or in demos. An initial test is easily done in the BASIC version for your DOS with a RUN of GTEST/BAS. This gives a comprehensive demo. Different resolutions are all usable, the highest being 640X240. The board itself has 20480 bytes of memory to store graphics. Displays can be pure graphic, or can overlay text. You can even scroll text through the graphics - they don't move.

The RAM expansion is tested by several short statements, using the new port 67. OUT 67,N switches a disconnected 32K bank into the top 32K of memory. When it is in, the former memory is lost until switched back in again. There are 16 banks in 512K, numbered N=0 to N=15. The lowest two numbers are the ones there at BOOT. Number one is at the top of memory, switched by OUT 67,N. N=INP(67) reports the bank number last switched. To swap the lower half of memory, normally where bank 0 is found, OUT 67,N+32 is used - but will usually crash the computer.

Most casual users will confine themselves to use of the extra memory using the provided RAM disk drive utility SUPERDRV/CMD. This works very well, though only on LDOS 5.1 or 5.3 or on Model
4 TRSDOS 6 or later.

Older RAM disk software also works, but only on the lower 128K. It has no switches for additional banks. Any program that runs the drives a lot can get tremendous zip from a RAM drive. It also can be a system disk to load DOS overlays, do DIR, load your program, data files, and so on. The extra memory is formatted and written exactly like a disk. Applications files or system files must be copied to it. Once the files are on it, I/O for them works like lightning. BOOT is no disaster. The RAM drive can be restored. But do NOT turn the power OFF until you have used finally done a COPY of changed files to a real disk. When the power goes OFF, RAM disk files are are lost and won't come back.

Most I/O on the memory drive seems instantaneous. Copies to or from real disks go almost twice as fast as usual. I/O that usually would make you very impatient can get done almost before you can start drumming your fingers.

Bank programming is tricky, and casual use will often crash the computer. The problem is that your next program instruction might be expected to come from the 32K bank that was just swapped out of memory. The memory test commands work OK in BASIC because the programs are short and don't happen to use any of the top 32K that may be switched out while they are running. Many Basic programs have many lines and variable tables or other necessities that do go into the top half. Swapping bank 0 out with the bottom half of memory takes all the system code and interrupts with it. A very tricky business.
-Don A. Ady

COVER THE ELECTIONS FOR FUN AND PROFIT
by Dick Houston

The elections last November reminded me of a computer project that may interest some CN80 readers. One of our local radio stations always provides "network-quality" coverage of elections. The general elections of 1984 came not long after I got my Model 4. Radio coverage was a complex affair, since the elections ranged from Reagan vs. Mondale through other federal, state, and local races. The station's chief engineer was on duty on election night to be sure that all went well, so he inherited the job of statistician, meaning that he had to keep track of vote totals, percentages, etc., on a desk calculator. Before long he was totally swamped with figures.

The engineer called me the next day to ask if it would be possible to write a computer program to keep track of the great amount of data. I was sympathetic to his problems because, you see, I had once been chief engineer of the same station and became swamped by exactly the same task! The job sounded exciting, so I told him to let me look into it a while.

It did take a while, but I came up with a simulation of the just-past election. It provided for vote entry by precinct, which is how the votes normally came in, and also by individual candidate or race for possible corrections. A number of printout modes were also available, including vote totals, voting by candidate, voting by precinct, and others. Some local issues were affected by precinct characteristics, so analysis by town vs. rural and by individual towns was also provided. To test the program I wrote another small program that assigned random votes to all of the candidates. This resulted in some surprises as to who got elected, but at least the program worked!

Another feature was the automatic storage on disk of all results each time a vote was entered, and a menu item to recall the current vote in the event of a power outage or other problem. This was my first attempt at using disk files from BASIC, something I do routinely now.

The engineer and I demonstrated the program to the station management and news department, and they "just had to have it" for the upcoming city elections. So I wrote a modified version and we set up shop at City Hall on election night. We hadn't been in business very long before other radio stations' staffs, the local TV people, the newspaper reporters, the candidates, and even the election officials were looking over our shoulders to see how things stood. In short, the project was quite successful!

We later did a school board election, which was a kind of free-for-all in which the top voters got the jobs regardless of their home precincts, and the news department wanted the printouts to be sorted with the winners on top. So I got my first experience with writing a sorting routine. On this election night we even reported to the election officials an error in the total official vote count!

My reason for this article is not to recount cherished memories but to suggest to other CN80 readers that they might like to try such a project for the next election in their areas. It might be a civic contribution, a for-profit operation, or just plain for fun. In my case I did the programming for fun and for the experience, but the station did pay me 25 bucks for each of the two election nights. Not much, but 25 bucks would get you CN80 for a year with enough left over to buy 25 floppy disks! You might do even better if you or the station could persuade

your local friendly Radio Shack store (or other business for that matter) to sponsor the computer portion of the election reporting. Radio Shack could truthfully say that the coverage was made possible by Radio Shack computers.

One word of caution -- you will encounter detractors. Our soon-to-be-defunct local computer club was looking for meeting programs, so I volunteered to show my election programs. Two of the "experts" who ran the club ridiculed the whole thing - "You can do that with just a spreadsheet" (Does that give you any clue as to why the club went defunct?). They were wrong, and were merely displaying their ignorance of the needs of the broadcaster.

To be sure, a spreadsheet would do a masterful job of tallying the votes, totalling them, figuring percentages, and other things. But the radio reporter trying to keep track of a bundle of things while talking on the air doesn't need an umpteen-by-umpteen-plus spreadsheet, especially one printed out in sections that somebody has to tape together. He or she needs just the specific information called for at the moment, with no extraneous stuff, and with everything arranged for quick and meaningful reading. That's what the programs did.

These election programs are, of course, not directly applicable to any other elections, but they would be good starting points for developing other such programs - at least for getting good ideas as to how to handle the various operations. They are also obviously too large and of probably too limited appeal for publication in CN80. However, if there is sufficient interest (meaning that if only one reader should write or call!) I will be glad to go through the programs and add comments, identify the subroutines, etc., and also prepare brief documentation of the programs' operations. If anybody is interested, please send a disk in a reusable carton, plus return postage, which is usually 65 cents. The address is 159 Sortais Road; Durango, CO 81301, and the phone number is 303-247-9159.
-Dick Houston

PAGE AFTER PAGE
by Helen Hillmann

After reading Dale Hill's enthusiasm for LOUD in the January 1990 issue of Computer News; I decided to get busy and learn how to use my copy of the program ....purchased some months ago thru CN-80 for very reasonable!!!!! After Dale's Dotwriter review in the December 1989 I figured I had the wrong graphic program for pure fun but that is not exactly true.

I encountered lots of problems getting to understand LOUD and I used an awful lot of paper before I came up with things in operating condition. It is not unusual for me to do the "Hit" & "Miss" routine with new material but by having plenty of blank disks available I can have lots of fun and spend an inordinate amount of time getting acquainted with something.....Remember that with LOUD, text can be represented by a single capital letter so long as the typeface is a number 5. Each time I succeed with something new I am thrilled that my introduction to computering started with the two-drive TRS-80 Model 4 and a dot matrix printer.

My two claims to fame in our neighborhood are that I motate by Scoota (I had a stroke some nine years ago) and that I have a computer. I enjoy children and so using "Loud" has made it possible for me to prepare page after page of material suitable for a rainy day activity with crayons for my little friends.

At first I assumed that "saving" menu settings they would appear on the data disk.....not so.....Loud/Def is on the Dos Disk used in Drive "0". However; once you get the hang of how to make a banner (or page after page of one page banners) you can do a duplication with ease.....so who needs to Save.....unless you want banners year after year for special occasions such as Christmas, Birthdays, etc.
-Helen Hillmann

VISIT WITH DAVID GOBEN
by David Goben

MODIFY MODEL 4 SCREEN OUTPUT
In my last column I provided Model I and III owners with a program called VIDX. Aside from the scroll-protection, which was its (original) theme, it allowed Model III users to, like Model 4 users, send a zero code to the display, and then display one of the special characters by sending the special character value as the second code.

After I had finished the program and prepared the article to send off to CN80, I discovered that on the Model 4 that codes 192 through 255 will "not" be displayed as special characters, even though they were led by a zero code, if TABS are enabled (they will be shown if tabs are disabled). Did I find a bug in LS-DOS 6?

No. As I re-read Appendix A in the Model 4 Disk System's Owners Manual under the ASCII CHARACTER SET heading, I found that leading a code with zero will only display the special characters for zero through 31. All other codes with a value of 32 on up to 255 will be handled normally. Bummer. Well, to me this seems like a cheat. After all, I did go to all the trouble to send the leading zero code out first. Why not allow all special characters to be displayed in this way, just as I did under VIDX?

After digging through The System Volume of THE SOURCE (which is the source code for TRSDOS 6.2, and available from Misosys), I discovered that to modify TRSDOS 6.2 and LS-DOS 6.3 to allow displaying the 192-255 special characters my way was as simple as a 1-byte poke.

If you want to be able to display all the special characters in zero-31 and 192-255 even with tabs enabled, you can do so in one of two ways. From the DOS level you can enter MEMORY (A=X'BB0',B=19). Or you can poke it by going into BASIC and entering POKE &HBB0,19. That's all there is to it. After that you can run the following sample BASIC program with the same results whether you have tabs enabled or disabled:

```
10 FOR X=0 TO 255
20 PRINT CHR$(0);CHR$(X);
30 NEXT X
```

What we did with our little poke is quite simple. In the low memory area is the video driver routine. In it, before it checks for tabs, it checks to see if a flag has been set which indicates if CHR$(0) has been sent out before the current code. If it has, it transfers around the tests for control codes. Unfortunately the routine it transfers to first checks for TAB value characters (192 - 255). If a possible TAB character is found, the TAB check routine is gone to, otherwise the byte is sent to the video as is. By changing the 9 code that was there at &HBB0 to 19 (13 hex), we will transfer control around this TAB check and go right into the display character routine. Of course, if CHR$(0) was "not" sent out previously then the TAB check is still performed, as expected. The only change we made is that the CHR$(0) flag will now respect all codes from zero-255 rather than just zero-191.

If you wish to change your DOS to reflect this little change permanently, apply the following patch:

```
PATCH SYS0/SYS.LSIDOS space
(D=09,B0=13:F09, B0=09)
```

note: Patch should be written on one line.

(To beat a dead horse, remember that no "OOOHs" are in hexidecimal values, only zeros 0000.)

SEEING DOUBLE
There are a lot of people out there who program for scientific and mathematical applications. Often for these applications you need to use double-precision values. Unfortunately, most of the trig functions in interpreted BASIC only return single-precision results. If you need double precision results, you had to dig around and find routines for this or that function. And even if you had a library of routines to support these functions, the derived functions were usually left out. If you look in your system's users manual's appendix section, you'll find a page listing these derived functions. Boy, these are great... if you are using single-precision.

Back in 1983 I wrote a set of double-precision subroutines that supported not only the trig functions in the computer,

but also all of the derived functions as well, plus powers and roots, to include polar-to-rectangular and rectangular to polar coordinate conversion (You'd never guess that I spent 7 years in the Army as a surveyor, would you?).

Well, in 1985 I updated the subroutines, and now I've updated them again. So now I am providing them for your use this month, along with a demo routine that flexes all of these features for both the Model 4 and for the I/III.

Program listing one is the double precision routines. Notice that it uses the following list of variables: I#, IA#, ID#, IX#, IY#, PA#, PD#, PX#, PY#, P#, P1#, P2#, P3#, P%, P1%, P2%, P3%, and P4%. The only variables of this list that you should alter are those beginning with the letter "I" (for INPUT). All others starting with "P" (for PRODUCT) should be no-no's for manipulation!

To use the routines is easy. To send a value to a routine that requires only one value, set variable I# to that value, do a GOSUB to the proper subroutine line number, and pick up the output in the variable P#.

Powers and roots are different. You should look at them as X to the power, or root of Y. Thus you set variables IX# and IY# to your required values, call the proper subroutine, and get the results from P#.

Polar to Rectangular conversion requires that you set the angle value to IA# and the distance into ID#, call the subroutine, and get the "northing" distance in PX# and the "easting" distance in PY# (notice that the unit of measure for these distances is relational to the distance used in ID# -- the routine will accept units of feet, yards, meters, etc, because all things will be only relative terms as far as the calculations are concerned).

Rectangular to Polar conversion is the opposite. You put the northing in IX#, the easting in IY#, call the subroutine, and get the angle in PA#, and the angular distance in PD#.

DOUBLE PRECISION ADDRESSES

Rather that spend a lot of time spitting out a lot of line numbers for the functions, it would probably be easiest for you to simply examine the program listing and find them. The first routine is a common routine used by several of the other routines and should never be called by itself. This is the Taylor Expansion routine. After that you'll see each routine headed by a comment line explaining exactly what each routine is. For example, in line number 65118 you see the comments for INVERSE SINE (ARCSIN). The code for that is below in line 65120. So, by setting the I# variable to the desired value, you execute a GOSUB 65120 and you'll find the result in variable P#.

Notice that often one routine will use or even "fall" into another. If you want to edit out the routines you don't think you'll need, then -be sure- that the ones you are deleting are not used by any of the ones you are keeping. For example, the routine for INVERSE SECANT (ARCSEC), at address 65180, "falls" into the INVERSE COSINE (ARCCOS) routine at 65190, which in turn uses the PI/2 routine at 65050 and the INVERSE SINE (ARCSIN) routine at 65120 (which uses the SQUARE ROOT (SQR) routine at 65040 and INVERSE TANGENT (ARCTAN or ATN) routine at 65270, which uses... etc).

A SPECIAL NOTE: please be aware that all values and angles are in radians! At the very end of the subroutine listing are two more routines which will covert the value in I# from degrees to radians, and another for converting radians to degrees.

DOUBLE DEMO PROGRAMS

If you have a Model 4, merge the lines in Program Listing Two with Program Listing One to create a demonstration program that will create a calculator type program, where you can enter functions and values and see their results. Model I and III users should merge Program Listing Three instead.

When you run the demo programs, you will be given quite an impressive list of functions to work with. The menu of functions is divided into 4 groups. The first group of functions require only one value. To use them, at the "Type in Function:" prompt, enter the function name (lower or upper case is fine), and follow that with the value inside parenthesis. For example, to get the square root of 10, you would type SQR(10) and press the <ENTER> key. After

pressing <ENTER>, the result will be displayed as 3.162277660168379. Internally, the value you selected (10) was set to variable I#, the appropriate function routine was called (GOSUB 65040), and the result was printed from variable P#.

The second set of functions require no arguments. By entering either PI or PI/2, you will get the value of PI (which is stored in P2#, by the way), or PI divided by two (stored in P3#). These are two commonly used trig values.

The third set of functions require two arguments: X and Y (which will internally be stored in IX# and IY#). The ROOT routine will display value X to the root of value Y. For example, to get the value of 9 to the root value 3, you would enter 9//3, and the result would be 2.080083823051905. To raise 9 to the power of 3, you would enter 9**3, and get a result of 729.

The final set of functions do the polar conversions. RTP does rectangular to polar conversion. X is the "northing" distance value, and Y is the "easting" distance value (internally stored in IX# and IY# respectively). To get the angle and distance from a northing value of 10 and an easting value of 5, you would enter RTP(10,5). This will give you a resulting angle of 1.107148717794091, and a distance of 11.18033988749895. The PTR, polar to rectangular, does just the opposite.

Be aware that there are small rounding errors, but to a very insignificant degree, usually out 12 or 13 decimal places, which is unimportant to most applications. This is not a result of shoddy programming, but rather is inherent in the math functions themselves.

Enjoy the programs and see you soon. Happy computing!
-David Goben

FILE CABINET UPDATE

Tim Sewell has been swamped with not only the flu, but with his full time job and the holiday season, so there is no column from him this month. There is also no File Cabinet updates as yet. If you have a File Cabinet Catalog disk that was received from CN80, that is the latest version of the catalogs. If you have a catalog that you receive from Tim, then send it in and we will replace it with the CN80 version.

You may notice that we have changed the policy on the File Catalog Disks, to a flat fee of $2.00 per catalog. This will not only help defray the cost of putting out the catalogs, but make our accounting so much simpler. In exchange for paying $2.00 for the catalog, we will give you a Bonus Disk of your choice with your first order from a catalog. In this way you will receive a $4.00 value for your $2.00 catalog fee.

If you have already paid your deposit fee for a catalog under the old system. You naturally get to deduct that catalog deposit from your first order from that catalog.

We look forward to hearing more from Tim next month. We will also be looking for more reviews of the File Cabinet Disks in the coming issues.

This may be an appropriate place to add a few comments to those of you who are using the File Cabinet disks for the first time. And are also not familiar with the use of a modem and bulletin boards.

When you call a bulletin board, many of the programs in their program file section are programs that have been uploaded by various users - experienced and not so experienced - who think that the program file they have created is of some value to the rest of the TRS-80 users. Many of course are Shareware programs uploaded by the more professional programmer and have been well documented and debugged. And are placed on the bulletin boards to receive more exposure, and certainly if you use one of these programs you should send the required shareware registration fee to the author as requested. But many of the programs you might "download" to your collection will not have any documentation. There might even be some lines of the

program missing in transmission. Lines that are critical in the running of the program.

With 798 disks in the File Cabinet Collection each containing an average of about 20 files it represents 15,960 files of programs, artwork and music for the Model I/III/4s. It would be humanly impossible for all of these program files to be checked out by Tim, or anyone else. As the readme file on the catalog says, we are not programmers, but will try to support you in any way we can. If you send us a list of the files you would like to have help with, we will try our best to help, or find someone who can provide the necessary help to get the program running. Naturally we can not offer any guarantees.

All in all the Collection is well worth it, even if you get only one program that really assists you in your computing. What better bargain could you get for $4.00. That one program could be worth hundreds at today's commercial program costs. Not to mention the cost of the phone call to download just one program of equal size.

The File Cabinet is a fabulous collection of programs and files that will keep you computing with your TRS-80 computer far into the future - and at a cost of next to nothing. -CN80

SAMPLE PRODUCT ARRIVES JUST IN TIME

In our classified ad there is a little ad which you should not miss.

It was sent in by Joseph L. Zanetti along with samples of his half height drive cover panels and are one of the best products we have seen come along in a long time.

We had just changed out the CRT tube in one of our computers that had had half height drives installed sometime ago. When we bought the half height drives they came with filler plates. These filler plates had some small feet on them that sat on the metal flange of the drives. They were also square on the top edge so that the top plate had to be cut to match the round curve of the Model 4 case. The top drive filler plate on this machine had broken feet, mostly because of a big thumb poking it when the computer was moved. So it keep falling in and leaving an unsightly upper drive to say the least. Their finish was not very esthetic either.

When we changed out the CRT we attempted to keep the broken plate in place with some contact cement and filament tape wrapped around the whole drive bezel. Shortly after that the power supply went out on that machine. The day the new power supply arrived happened to be the day that Joe Zanetti's sample package arrived.

Joe's filler plates not only snapped on to the TEAC drives with little effort - a big thumb such as mine will never again be able to break it. Not only that the pebble appearance that the plates have improved the appearance of the computer 100%.

Not only has Joe supplied a very excellent product with a logical design. But also in the package is a set of metric mounting screws for mounting TEAC drives. Now no more drilling and tapping out the drive mounting holes. The note on the bag says "short screws for metal disk towers, long screws and washers for plastic."

I don't remember what we paid for the old set of filler plates, but Joe's price of $9.95 per set won't stop us from ordering a set from him for every new half height drive we plan on installing. His price of 50 cents - can you believe that - 50 cents - for the right screws! What would you pay for the right screws while you have the computer torn down and filling the kitchen table and found that you never saved that old tap tool. (Are you listening Mr. Hill). I like the pack rat have several coffee cans of odd and end nuts and bolts, saved for house/computer repairs, but I bet there isn't a metric threaded bolt in the lot. Drilling and tapping - out of the question if the metal is still mounted inside of the computer. I know that there would be a little computer bug in there that would have a ball carrying those little lost chips back to its home in among the motherboard printed circuits. Then POW - no little bug - no motherboard.

Thanks again Joe. -CN80

HACKING ON A BUDGET
by Jerry Baker

The TRS-80 Model I/III/4 series provides fantastic computer power to people who, like myself, are operating on a tight budget but love computing. I purchased my Model 4 as a cassette system when Radio Shack was selling off that particular version of the computer. I also took home a recorder, cassette Scripsit, and a DWP-210, which was also being removed from RS shelves.
My family later went through some lean times, but my software library grew slowly as I found close-out deals on cassette software. Then one day my father-in-law gave me his old Apple compatable system--which I immediately sold and used the money to order disk drives for my M4. Later, I received some inheritance and bought a sound board, 128k memory upgrade and LeScript. CN-80 and the File Cabinet provided my wonderful introduction to Public Domain software, since I've never had the funds to add a RS-232 or a modem. Again, last winter, my father-in-law blessed me with an old hard disk system made by a now defunct company. I didn't have the knowledge to adapt it to work on the TRS-80 but I got in touch with Roy Beck whose articles appeared in CN-80 and we worked out a deal in which I received a 5-Meg drive in trade. WOW! I love working off a hard disk! Right now, I am waiting for that little brown truck to bring me my 6MHZ Speedup kit from Storage Power.

I am back in school and LeScript, with it's spell-checker and footnoting, has changed me from a "C" student to an "A" student. I remember spending all night just TYPING a 5 page paper! Now, my papers look professional and I am much more confident in my work.

I have really enjoyed watching my system grow over the years and with the help of CN-80, I'm looking forward to watching that growth continue. The TRS-80 community has provided me with the opportunity to have real computer power--on a tight budget! I would like to thank CN-80, Anitek, and everyone else who have worked hard to keep the TRS-80 alive. If my TRS-80 ever dies...I'm going to go out and find another one!!!
-Jerry Baker

OPEN FORUM

A: A reply to Hugh Abrey's questions on FORTUNE/BAS and FORTUNE/DAT on File Cabinet Disk No. 10: (Vol 3 No. 1)

COMMENTS ON HUGH ABREY'S REVIEW OF PROGRAMS ON FILE CABINET GAME DISK 10

First, FORTUNE/DAT is merely the data for use by FORTUNE/BAS, the Wheel of Fortune simulator program. It contains all of the words and phrases, plus the types (such as phrase, person, etc.) that the game uses. The entries are selected randomly, which means that repeats will come up if you play a while. After the user learns all of the things in the file, it would be easy to make up a new set of words and put them into the data file.

The Wheel game worked OK for me, but it didn't fulfill its description in the docs. The main thing lacking was the blinking reverse video that tells the players whose time it is to spin. I listed the program and found that the code to make the blinking display just wasn't there! It probably got left out in a conversion from III to 4, or something of the sort.

So, not to be defeated by a free program, I wrote and inserted code to tell the players who is spinning. I elected not to get complicated with the blinking video, so instead I just have the screen show, for example, Dick is spinning when it is my time. With that addition the program works well and my wife and I have had some fun with it when we have found some spare time.

If any reader would like to have my addition, just send me a self-addressed stamped envelope for the printout, or a disk in a reusable mailer with 65 cents return postage for the revised program on disk. The address is 159 Sortais Road; Durango, CO 81301. - Dick Houston

---

A: Editor; I'm forwarding the below comments, belatedly, but in the hope that they will be of use.

For C.P. -Fort Lauderdale, FL (Vol 1, No 6).
I too, have Accounts Payable(26-1542) and finally solved the same problem.--Not being able to get a credit, as a return, to enter properly. My solution:

Make a separate TRANSACTION entry with a "DUMMY" invoice number; using date entries needed, and entering the amounts as a negative value. Entry screen follows: (USING SAMPLE DATA)

```
T R A N S A C T I O N  E N T R Y
VENDOR.....005  HARRIS HARDWARE
SUPPLIES      VOUCHER NUMBER..00016
     INVOICE NUMBER..DUMMY001
INVOICE DATE....02/28/89  TOTAL
AMOUNT.....      205.39-          DUE
DATE.....02/28/89              DISCOUNT
DATE...02/28/89  TOTAL DISCOUNT...  .00
      REMAINING DISTRIBUTION    .00

ACCT#----DESCRIPTION-------AMOUNT----
5120-   PURCHASE RETURNS & ALLOW.
205.39-
```

I ran across this problem with ACCOUNTS RECEIVABLE (26-1541) integrated with INVOICE WRITER (26-1544) and the INVENTORY CONTROL SYSTEM (26-1545). The only solution was to cut an invoice with negative quantities and use the Ledger account number for "sales returns and allowances". This then makes the proper and offsetting double entries, in ACCTS REC and adds the returned items back to the INVENTORY.

This happens because in ACCTS PAYABLE "ALL" optional accounts are handled as expense accounts when "Purchase, Returns and allowances" is effectively an income account. In ACCTS RECEIVABLE "ALL" optional accounts are handled as income accounts when "Sales, Returns and Allowances" is effectively an expense account. You therefore have to reverse the "SIGN" of the value entered, but the programs will not 'easily' accept the "SIGN" reversal in the normal entry screens. The above procedures also maintain a better "audit trail" and therefore keep the accountants happy.

I've enclosed the pertinent Reports from ACCTS PAYABLE, please forward them to C. P.

I hope this info will be of use to C. P. and anyone else who is using these accounting packages. Sorry it took so long to get the answer to those who need the info, but I'm not very speedy.
-J. C. Cave Junction, OR

(Ed. Note) The information received from this subscriber was forwarded to C. P. of Fort Lauderdale as soon as it was received. Answers to problems are always welcome, no matter how long it takes. Many thanks to J. C. of Cave Junction for his thoughtfulness. Also for his double thoughtfulness in placing his letter on a disk for the OPEN FORUM, with a note saying that a replacement disk was not necessary. -Ed.

CALL FOR REAL HELP!

I am writing you on behalf of my friend Dick Ramm. Dick is blind and deaf, but has been able to overcome these disabilities to become an expert Tandy TRS-80 Computer operator. (See Vol 2 No. 6 pg. 4) Dick had developed many programs for the sighted and for the blind. His expertise was with the Model 3 and 4P. Last week his home burned down to the ground and all his possessions, furniture, clothing...but most of all his disks and computers. If you would be kind enough to mention Dick's problem in your next issue, some of your readers might be able to donate a 4P, a Model 3 and any other computer related materials on disks. He received Computer News on Disk, so you must be aware of Dick. (See Vol 2 No. 1, pg. 13) Your readers can mail or ship to me and I'll set it up for Dick.

Mail to Dick Ramm c/o Len Nezin
487 Guy Lombardo Ave.
Freeport NY 11520
516-378-7313

Q: I need a transfer program to transfer Model III tape to Model III disk. The two tape programs are: Basic Course-Tape 26-2015 and Assembly Language Tutor 26-2017. I have TRS-DOS 1.3 and LS-DOS 6.3, TRS-DOS 6.1 and 6.2x.

Thank you for your publication it helps a lot!
N. B. Odessa, TX

A: In the Model III Disk System Owner's Manual, page 63, are instructions to copy your tape Model III programs to memory using the TAPE transfer command, or you could use CLOAD, and then copy them to disks. We are sending you copies of these pages, in the case you do not have a Mod III manual. You will have to use the CONVert command to bring files forward onto LS-DOS 6.3 formatted disks, but they may not work under LS-DOS 6.3 if they were written for the Model III dos. We would only CONVert data files forward to 6.3 disks.

We also just received several programs from our TRS-80 friends in Holland, among which is a program to Transfer Tape to Disk, and we expect to have these programs published in our next issue.

Don't forget if you don't have the out-of-print Model III manuals, you can get the same information, plus more from Mod III by Chris manuals.

Q: I have a Model 4 and use MultiPlan. But it has an annoying default "option recalc: yes". Does anyone know how I can make the default "Option recalc: No"? If you do I really would appreciate it!
W. M. Sanford, NC

A: We are sure that someone out there in MultiPlan land will have an answer for you. In the meantime why not check out our issues (Volume.Number-Page) 1.4-2, 1.5-6, 1.7-24, 1.12-24, 2.7-27, 2.7-27, 2.7-30, 2.8-27 and 2.9-24. That listing was fast and simple - courtesy our Index disk.

LTR: The "Clan" genealogy system provided by Mr. Hurlbert has accomplished the impossible == my wife is using the computer!

I would like to compliment him publicly on the excellent way he ties together the many programs. I appreciate the way he segmented the programs so that the printer command section has the same line numbers in each program. That made it easy to get my MOD-4 and DMP-130 to print the outputs.

The easiest way to use the program is to enter each person first, then link the second parent to the first using "page number", then link the children to the one parent by using the child's "page number". The program will then make the parent show up in the children's files and the children in that of both parents.

A word of frustration-elimination. The documentation does not cover the situation where an ancestor had more than 4 children and you are not interested in the first 10. If your ancestor was the eleventh child, you must put in the names of the first ten or the system will not create " file 9". This will cause a system to "bomb" when the summary is printed for either parent.

Question: My Mod-4 has double sided disks. I don't know how to get the TRSDOS 1.3 to recognize this. Can anyone help? We sometimes switch from LS-DOS 6.3 to TRSDOS 1.3 by resetting rather than by cycling power. Is this a mistake?

A: Using reset to switch from one dos to another is the proper way, turning on and off the computer is harder on the computer circuits than using RESET. That is the major reason the RESET button was designed into the system.

TRSDOS 1.3 does not support double side drives. The only program that we are aware of to do that is the TRSDOS 1.5 Dos System, by GLR Software, Suite 209, 1051 KLO Road, Kelowna, British Columbia, Canada V1Y 4X6. (see their ad in Vol 2 No. 2, Feb. 1989) Of course LDOS 5.3 from Misosys will support double side drives in the Model III and may be a better route to go with your data files.

PROGRAM LISTING NUMBER ONE by David Goben

```
65000 'DOUBLE PRECISION FUNCTIONS AND DERIVED FUNCTIONS
65001 'BY DAVID GOBEN RELEASED INTO PUBLIC DOMAIN 1990
65002 'FOR MICROSOFT BASICS (NOTE: ALL RESULTS EXCEPT CLG & CAL IN RADIANS)
65003 '
65008 '---TAYLOR EXPANSION MODULE
65009 '
65010 P1#=I#:P#=I#*I#:FOR P3%=3 TO ABS(P2%) STEP 2:P1#=P#*P1#*SGN(P2%):I#=P1#/P3%+I#
:NEXT:RETURN
65017 '
65018 '---NATURAL LOGARITHM (LOG)
65019 '
65020 P%=0:P1%=SGN(LOG(I#)):P2%=9:IF P1%<0 THEN I#=1/I#
65021 IF I#<1.065 THEN I#=(I#-1)/(I#+1):GOSUB 65010:I#=I#+I#:IF P%=0 THEN P#=P1%*I
#:RETURN ELSE FOR P3%=1 TO P%:I#=I#+I#:NEXT:P#=P1%*I#:RETURN ELSE
 GOSUB 65040:P%=P%+1:I#=P1#:GOTO 65021
65027 '
65028 '---NATURAL ANTILOGARITHM (EXPONENT--EXP)
65029 '
65030 P%=0:P#=1
65031 IF I#*I#<.004 THEN FOR P1%=8 TO 1 STEP -1:P#=1+I#*P#/P1%:NEXT:IF P%=0
 THEN RETURN ELSE FOR P3%=1 TO P%:P#=P#*P#:NEXT:RETURN
 ELSE P%=P%+1:I#=I#/2:GOTO 65031
65037 '
65038 '---SQUARE ROOT (SQR)
65039 '
65040 P1#=SQR(I#):GOSUB 65041
65041 P1#=(I#/P1#+P1#)/2:RETURN
65047 '
65048 '---P3# = PI/2
65049 '
65050 IF P3#<>0 THEN RETURN ELSE P3#=1.570796326794897#:RETURN
65057 '
65058 '---P2# = PI
65059 '
65060 IF P2#<>0 THEN RETURN ELSE P2#=3.141592653589796#:RETURN
65067 '
65068 '---A COMMON ROUTINE FOR EXTRACTING EXP(I#) AND EXP(-I#)
65069 '
65070 GOSUB 65030:IX#=P#:IY#=1/P#:RETURN
65077 '
65078 '---COSINE (COS)
65079 '
65080 GOSUB 65050:I#=P3#-I#
65087 '
65088 '---SINE (SIN)
65089 '
65090 P%=0:P1%=SGN(I#):GOSUB 65050:GOSUB 65060:P#=P2#:I#=ABS(I#)-P#*INT(ABS(I#)/P#)
:IF I#>P# THEN P1%=-P1%:I#=I#-P#65091 IF I#>P3# THEN I#=P#-I#
65092 IF ABS(I#)<.063 THEN P#=-I#*I#:P#=I#*(1+P#/6*(1+P#/20*(1+P#/42))):IF P%=0 THEN
P#=1*P#:RETURN ELSE FOR P3%=1 TO P%:P#=P#*(3-P#*P#*4):NEXT:P#=P1%*P#:RETURN ELSE
P%=P%+1:I#=I#/3:GOTO 65092
65097 '
65098 '---COSECANT (CSC)
65099 '
```

con't on next page

```
651ØØ GOSUB 65Ø92:P#=1/P#:RETURN
651Ø7 '
651Ø8 '---INVERSE COSECANT (ARCCSC)
651Ø9 '
6511Ø I#=1/I#
65117 '
65118 '---INVERSE SINE (ARCSIN)
65119 '
6512Ø IX#=I#:I#=-I#*I#+1:GOSUB 65Ø4Ø:I#=IX#/P1#:GOTO 6527Ø
65127 '
65128 '---HYPERBOLIC SINE (SINH)
65129 '
6513Ø GOSUB 65Ø7Ø:P#=(IX#-IY#)/2:RETURN
65137 '
65138 '---HYPERBOLIC COSECANT (CSCH)
65139 '
6514Ø GOSUB 65Ø7Ø:P#=2/(IX#-IY#):RETURN
65147 '
65148 '---INVERSE HYPERBOLIC COSECANT (ARGCSCH)
65149 '
6515Ø I#=1/I#
65157 '
65158 '---INVERSE HYPERBOLIC SINE (ARGSINH)
65159 '
6516Ø IX#=I#:I#=I#*I#+1
65161 GOSUB 65Ø4Ø:I#=IX#+P1#:GOTO 65Ø2Ø
65167 '
65168 '---SECANT (SEC)
65169 '
6517Ø GOSUB 65Ø8Ø:P#=1/P#:RETURN
65177 '
65178 '---INVERSE SECANT (ARCSEC)
65179 '
6518Ø I#=1/I#
65187 '
65188 '---INVERSE COSINE (ARCCOS)
65189 '
6519Ø GOSUB 65Ø5Ø:GOSUB 6512Ø:P#=P3#-P#:RETURN
65197 '
65198 '---HYPERBOLIC COSINE (COSH)
65199 '
652ØØ GOSUB 65Ø7Ø:P#=(IX#+IY#)/2:RETURN
652Ø7 '
652Ø8 '---HYPERBOLIC SECANT (SECH)
652Ø9 '
6521Ø GOSUB 65Ø7Ø:P#=2/(IX#+IY#):RETURN
65217 '
65218 '---INVERSE HYPERBOLIC SECANT (ARGSECH)
65219 '
6522Ø I#=1/I#
65227 '
65228 '---INVERSE HYPERBOLIC COSINE (ARGCOSH)
65229 '
6523Ø IX#=I#:I#=I#*I#-1:GOTO 65161
65237 '
65238 '---TANGENT (TAN)
```

con't on next page

```
65239 '
65240 IX#=I#:GOSUB 65090:I#=IX#:IX#=P#:GOSUB 65080:P#=IX#/P#:RETURN
65247 '
65248 '---COTANGENT (COT)
65249 '
65250 GOSUB 65240:P#=1/P#:RETURN
65257 '
65258 '---INVERSE COTANGENT (ARCCOT)
65259 '
65260 I#=1/I#
65267 '
65268 '---INVERSE TANGENT (ARCTAN, ATN)
65269 '
65270 P%=0:P1%=SGN(I#):I#=ABS(I#):GOSUB 65050:IF I#>1 THEN I#=1/I#:P4%=1 ELSE P4%=0
65271 IF I#>.077 THEN P%=P%+1:P#=I#:I#=1+I#*I#:GOSUB 65040:I#=P#/(1+P1#):
GOTO 65271 ELSE P2%=-11:GOSUB 65010:IF P%<>0 THEN FOR P3%=1 TO P%:
I#=I#+I#:NEXT
65272 P#=I#:IF P4%=1 THEN P#=(P3#-P#)*P1%:RETURN ELSE P#=P1%*P#:RETURN
65277 '
65278 '---HYPERBOLIC TANGENT (TANH)
65279 '
65280 GOSUB 65070:P#=-IY#/(IX#+IY#)*2+1:RETURN
65287 '
65288 '---HYPERBOLIC COTANGENT (COTH)
65289 '
65290 GOSUB 65280:P#=1/P#:RETURN
65297 '
65298 '---INVERSE HYPERBOLIC COTANGENT (ARGCOTH)
65299 '
65300 I#=1/I#
65307 '
65308 '---INVERSE HYPERBOLIC TANGENT (ARGTANH)
65309 '
65310 I#=(1+I#)/(1-I#):GOSUB 65020:P#=P#/2:RETURN
65317 '
65318 '---COMMON LOGARITHM (CLG)
65319 '
65320 GOSUB 65020:P#=P#/2.302585092994047#:RETURN
65327 '
65328 '---COMMON ANTILOGARITHM (CAL)
65329 '
65330 IY#=I#:IX#=10:GOTO 65350
65337 '
65338 '---ROOT; ROOT Y of X (Y%X)
65339 '
65340 IY#=1/IY#
65347 '
65348 '---POWER; X to power of Y (X[Y)
65349 '
65350 I#=IX#:GOSUB 65020:I#=IY#*P#:GOTO 65030
65357 '
65358 '---POLAR TO RECTANGULAR CONVERSION (PTR)
65359 '
65360 I#=IA#:GOSUB 65090:PY#=P#*ID#:I#=IA#:GOSUB 65080:PX#=P#*ID#:RETURN
65367 '
65368 '---RECTANGUALR TO POLAR CONVERSION (RTP)
```

con't on next page.

```
65369 '
65370 I#=IX#*IX#+IY#*IY#:GOSUB 65040:PD#=P1#:I#=IX#/PD#:GOSUB 65120:PA#=P#:RETURN
65377 '
65378 '---DEGREES TO RADIANS
65379 '
65380 I#=I#*.0174532925199433#:RETURN
65387 '
65388 '---RADIANS TO DEGREES
65389 '
65390 I#=I#*57.29577951308237#:RETURN
```

PROGRAM LISTING NUMBER TWO by David Goben

```
10 'DEMO PROGRAM FOR 'DOUBLE/BAS' -- REQUIRES 80 x 24 SCREEN FOR DISPLAY
20 'DEMO DESIGNED FOR MODELS 4/4P/4D
30 'DOUBLE/BAS WILL OPERATE ON I/III/4/4P/4D
40 'DEMO/BAS COPYRIGHT 1985,1989 BY DAVID GOBEN
50 'DOUBLE/BAS COPYRIGHT 1985,1989 BY DAVID GOBEN
60 '
70 CLEAR:CLS:DEFINT A-Z
80 PRINT"DOUBLE PRECISION SUBROUTINE DEMO"
81 PRINT:PRINT"Single Data value for the following functions:   usage: fn(value)"
82 PRINT:PRINT"LOG    EXP   CLG   CAL   SQR   SIN   COS   TAN   COT"
90 PRINT"ARCSIN  ARCCOS ARCTAN ARCCOT SINH  COSH  TANH  COTH"
91 PRINT"ARGSINH ARGCOSH ARGTANH ARGCOTH SEC    ARCSEC SECH  ARGSECH"
92 PRINT"CSC    CSCH  ARCCSC ARGCSCH"
100 PRINT:PRINT"No data input for the following functions:":PRINT:PRINT"PI    PI/2"
110 PRINT:PRINT"TWO data elements for the following:"
111 PRINT:PRINT"ROOT  usage for X to root Y:       X//Y"
112 PRINT"POWER usage for X to power Y:       X**Y"
120 PRINT:PRINT"PTR   Usage for angle X and distance Y:  PTR(X,Y) :results X north, Y
east"
121 PRINT"RTP   Usage for northing X and Easting Y: RTP(X,Y) :results X angle, Y dist."
122 PRINT STRING$(79,"=")
130 PRINT@(21,0),CHR$(31)"Type in Function: ";
140 LINE INPUT A$:IF A$=""THEN 130
150 FOR X=1 TO LEN(A$):Y=ASC(MID$(A$,X,1)):IF Y>96 AND Y<123 THEN MID$(A$,X,1)=
CHR$(Y-32)
160 NEXT
170 IF RIGHT$(A$,1)=" "THEN A$=LEFT$(A$,LEN(A$)-1):GOTO 170
180 Y=INSTR(A$," "):IF Y THEN FOR X=Y TO
LEN(A$)-1:MID$(A$,X,1)=MID$(A$,X+1,1):NEXT:A$=LEFT$(A$,LEN(A$)-1):GOTO 180
190 IF LEN(A$)=0 THEN 130 ELSE IF INSTR(A$,"**") OR INSTR(A$,"//") THEN 250
200 IF LEFT$(A$,2)="PI"THEN 310 ELSE IF RIGHT$(A$,1)<>")" THEN 130
210 A$=LEFT$(A$,LEN(A$)-1):B$=RIGHT$(A$,1):IF B$<"0" OR B$>"9" THEN 130
220 Y=INSTR(A$,"("):IF Y<4 THEN 130
230 B$="/"+LEFT$(A$,3):Y=INSTR("////PTR/RTP",B$)/4:IF Y GOTO 320
240 Y=INSTR("////LOG/EXP/CLG/CAL/SQR/SIN/COS/TAN/SEC/CSC/COT/ARC/ARG",B$)/4:
IF Y=0 THEN 130 ELSE IF Y<12 THEN 380 ELSE ON Y-11 GOTO 430,450
250 IF INSTR(A$,"**") THEN 260 ELSE Y=INSTR(A$,"/"):GOSUB 270:IF Y=0 THEN 130 ELSE
 GOSUB 65340:GOTO 470260 Y=INSTR(A$,"*"):GOSUB 270:IF Y=0 THEN 130
 ELSE GOSUB 65350:GOTO 470
270 IF Y=1 THEN 300 ELSE FOR X=1 TO Y-1:Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=0
280 NEXT:IF Y=0 THEN RETURN ELSE IX#=VAL(MID$(A$,1,Y-1)):Y=Y+2:FOR X=Y TO
```

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```
LEN(A$):Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
29Ø NEXT:IF Y THEN IY#=VAL(MID$(A$,Y)):RETURN
3ØØ Y=Ø:RETURN
31Ø IF A$="PI"THEN GOSUB 65Ø6Ø:P#=P2#:GOTO 47Ø ELSE IF A$="PI/2"THEN
 GOSUB 65Ø5Ø:P#=P3#:GOTO 47Ø ELSE 13Ø
32Ø GOSUB 39Ø:ON Y GOTO 33Ø,34Ø
33Ø GOSUB 35Ø:IF Y=Ø THEN 13Ø ELSE IA#=IX#:ID#=IY#:GOSUB 6536Ø:Y=1:GOTO 48Ø
34Ø GOSUB 35Ø:IF Y=Ø THEN 13Ø ELSE GOSUB 6537Ø:Y=2:GOTO 48Ø
35Ø IF LEFT$(A$,1)<>"("THEN 3ØØ ELSE Y=INSTR(A$,","):IF Y<3 THEN 3ØØ ELSE FOR X=2 TO
Y-1:Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
36Ø NEXT:IF Y=Ø THEN RETURN ELSE IX#=VAL(MID$(A$,2,Y-1)):FOR X=Y+1 TO
LEN(A$):Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
37Ø NEXT:IF Y=Ø THEN RETURN ELSE IY#=VAL(MID$(A$,Y+1)):RETURN
38Ø Y1=Y:GOSUB 4ØØ:IF Y=Ø THEN 13Ø ELSE ON Y1 GOSUB 65Ø2Ø,65Ø3Ø,
6532Ø,6533Ø,6504Ø,6509Ø,6508Ø,6524Ø,6517Ø,651ØØ,6525Ø:
IF Y1=5 THEN P#=P1#:GOTO 47Ø ELSE 47Ø
39Ø A$=MID$(A$,4):RETURN
4ØØ GOSUB 39Ø
41Ø IF LEFT$(A$,1)<>"("THEN 3ØØ ELSE Y=1:FOR X=2 TO LEN(A$):Z=ASC
(MID$(A$,X,1)):IF (Z<48 OR Z>57) AND Z<>46 THEN Y=Ø
42Ø NEXT:IF Y=Ø THEN RETURN ELSE I#=VAL(MID$(A$,2)):RETURN
43Ø GOSUB 39Ø:B$="/"+LEFT$(A$,3):Y=INSTR("////SIN/COS/TAN/COT/SEC/CSC",B$)/4
:IF Y=Ø THEN 13Ø
44Ø Y1=Y:GOSUB 4ØØ:IF Y=Ø THEN 13Ø ELSE ON Y1 GOSUB 6512Ø,6519Ø,6527Ø,6526Ø,6518Ø,
6511Ø:GOTO 47Ø
45Ø GOSUB 39Ø:B$="/"+LEFT$(A$,3):Y=INSTR("////SIN/COS/TAN/COT/SEC/CSC",B$)/4:
IF Y=Ø THEN 13Ø ELSE GOSUB 39Ø:IF LEFT$(A$,1)<>"H"THEN 13Ø ELSE A$=MID$(A$,2)
46Ø Y1=Y:GOSUB 41Ø:IF Y=Ø THEN 13Ø ELSE ON Y1 GOSUB 6516Ø,6523Ø,6531Ø,653ØØ,6522Ø,6515Ø
47Ø Y=Ø
48Ø IF Y=Ø THEN PRINT"The result is "P# ELSE IF Y=1 THEN PRINT"The result is
 Easting:"PX#" Northing:"PY# ELSE PRINT"The result is Angle:"PA#" Distance:"PD#
49Ø PRINT".....Any key to continue ";:A$=INKEY$
5ØØ A$=INKEY$:IF A$=""THEN 5ØØ ELSE 13Ø
51Ø '
52Ø '*************************************************************************
53Ø '           DOUBLE/BAS ROUTINES START HERE
54Ø '*************************************************************************
55Ø '
```

PROGRAM LISTING NUMBER THREE by David Goben

```
1Ø 'DEMO PROGRAM FOR 'DOUBLE/BAS' -- REQUIRES 64 x 16 SCREEN
2Ø 'DEMO DESIGNED FOR MODELS I/III
3Ø 'DOUBLE/BAS WILL OPERATE ON I/II/III/4/4P/4D
4Ø 'DEMO/BAS COPYRIGHT 1985,1989 BY DAVID GOBEN
5Ø 'DOUBLE/BAS COPYRIGHT 1985,1989 BY DAVID GOBEN
6Ø '
7Ø CLEAR 3ØØ:CLS:DEFINT A-Z
81 PRINT"Single value input for these functions:     usage: fn(value)"
82 PRINT"LOG    EXP   CLG   CAL   SQR   SIN  COS   TAN"
9Ø PRINT"COT    ARCSIN ARCCOS ARCTAN ARCCOT SINH COSH  TANH"
91 PRINT"COTH   ARGSINH ARGCOSH ARGTANH ARGCOTH SEC  ARCSEC SECH"
92 PRINT"ARGSECH CSC    CSCH  ARCCSC ARGCSCH"
1ØØ PRINT:PRINT"No data input for the following functions:   PI   PI/2"
```

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```
11Ø PRINT"TWO data elements for the following:"
111 PRINT"   ROOT usage for X to root Y :   X//Y"
112 PRINT"   POWER usage for X to power Y:   X**Y"
12Ø PRINT"PTR   Usage for angle X and dist Y: PTR(X,Y) :results X=N, Y=E"
121 PRINT"RTP   Usage for N=X and E=Y: RTP(X,Y) :results X angle, Y dist"
122 PRINT"============= DOUBLE PRECISION SUBROUTINE DEMO ==============="
13Ø PRINT@832,CHR$(31)"Type in Function: ";
14Ø LINE INPUT A$:IF A$=""THEN 13Ø
15Ø FOR X=1 TO LEN(A$):Y=ASC(MID$(A$,X,1)):IF Y>96 AND Y<123 THEN MID$(A$,X,1)=CHR$(Y-32)
16Ø NEXT
17Ø IF RIGHT$(A$,1)=" "THEN A$=LEFT$(A$,LEN(A$)-1):GOTO 17Ø
18Ø Y=INSTR(A$," "):IF Y THEN FOR X=Y TO
LEN(A$)-1:MID$(A$,X,1)=MID$(A$,X+1,1):NEXT:A$=LEFT$(A$,LEN(A$)-1):GOTO 18Ø
19Ø IF LEN(A$)=Ø THEN 13Ø ELSE IF INSTR(A$,"**") OR INSTR(A$,"//") THEN 25Ø
2ØØ IF LEFT$(A$,2)="PI"THEN 31Ø ELSE IF RIGHT$(A$,1)<>")" THEN 13Ø
21Ø A$=LEFT$(A$,LEN(A$)-1):B$=RIGHT$(A$,1):IF B$<"Ø" OR B$>"9" THEN 13Ø
22Ø Y=INSTR(A$,"("):IF Y<4 THEN 13Ø
23Ø B$="/"+LEFT$(A$,3):Y=INSTR("////PTR/RTP",B$)/4:IF Y GOTO 32Ø
24Ø Y=INSTR("////LOG/EXP/CLG/CAL/SQR/SIN/COS/TAN/SEC/CSC/COT/ARC/ARG",B$)/4:
IF Y=Ø THEN 13Ø ELSE IF Y<12 THEN 38Ø ELSE ON Y-11 GOTO 43Ø,45Ø
25Ø IF INSTR(A$,"**") THEN 26Ø ELSE Y=INSTR(A$,"/"):GOSUB 27Ø:IF Y=Ø THEN 13Ø
 ELSE GOSUB 6534Ø:GOTO 47Ø
26Ø Y=INSTR(A$,"*"):GOSUB 27Ø:IF Y=Ø THEN 13Ø ELSE GOSUB 6535Ø:GOTO 47Ø
27Ø IF Y=1 THEN 3ØØ ELSE FOR X=1 TO Y-1:Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
28Ø NEXT:IF Y=Ø THEN RETURN ELSE IX#=VAL(MID$(A$,1,Y-1)):Y=Y+2:FOR X=Y TO
LEN(A$):Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
29Ø NEXT:IF Y THEN IY#=VAL(MID$(A$,Y)):RETURN
3ØØ Y=Ø:RETURN
31Ø IF A$="PI"THEN GOSUB 65Ø6Ø:P#=P2#:GOTO 47Ø ELSE IF A$="PI/2"THEN GOSUB 65Ø5Ø
:P#=P3#:GOTO 47Ø ELSE 13Ø
32Ø GOSUB 39Ø:ON Y GOTO 33Ø,34Ø
33Ø GOSUB 35Ø:IF Y=Ø THEN 13Ø ELSE IA#=IX#:ID#=IY#:GOSUB 6536Ø:Y=1:GOTO 48Ø
34Ø GOSUB 35Ø:IF Y=Ø THEN 13Ø ELSE GOSUB 6537Ø:Y=2:GOTO 48Ø
35Ø IF LEFT$(A$,1)<>"("THEN 3ØØ ELSE Y=INSTR(A$,","):IF Y<3 THEN 3ØØ ELSE FOR X=2 TO
Y-1:Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
36Ø NEXT:IF Y=Ø THEN RETURN ELSE IX#=VAL(MID$(A$,2,Y-1)):FOR X=Y+1 TO
LEN(A$):Z=ASC(MID$(A$,X,1)):IF Z<48 OR Z>57 THEN Y=Ø
37Ø NEXT:IF Y=Ø THEN RETURN ELSE IY#=VAL(MID$(A$,Y+1)):RETURN
38Ø Y1=Y:GOSUB 4ØØ:IF Y=Ø THEN 13Ø ELSE ON Y1 GOSUB
65Ø2Ø,65Ø3Ø,6532Ø,6533Ø,65Ø4Ø,65Ø9Ø,65Ø8Ø,6524Ø,6517Ø,651ØØ,6525Ø:IF
 Y1=5 THEN P#=P1#:GOTO 47Ø ELSE 47Ø
39Ø A$=MID$(A$,4):RETURN
4ØØ GOSUB 39Ø
41Ø IF LEFT$(A$,1)<>"("THEN 3ØØ ELSE Y=1:FOR X=2 TO LEN(A$):Z=ASC(MID$(A$,X,1)):IF
 (Z<48 OR Z>57) AND Z<>46 THEN Y=Ø
42Ø NEXT:IF Y=Ø THEN RETURN ELSE I#=VAL(MID$(A$,2)):RETURN
43Ø GOSUB 39Ø:B$="/"+LEFT$(A$,3):Y=INSTR("////SIN/COS/TAN/COT/SEC/CSC",B$)/4:
IF Y=Ø THEN 13Ø
44Ø Y1=Y:GOSUB 4ØØ:IF Y=Ø THEN 13Ø ELSE ON Y1 GOSUB 6512Ø,6519Ø,6527Ø,6526Ø,6518Ø,6511Ø
:GOTO 47Ø
45Ø GOSUB 39Ø:B$="/"+LEFT$(A$,3):Y=INSTR("////SIN/COS/TAN/COT/SEC/CSC",B$)/4:
IF Y=Ø THEN 13Ø ELSE GOSUB 39Ø:IF LEFT$(A$,1)<>"H"THEN 13Ø ELSE A$=MID$(A$,2)
46Ø Y1=Y:GOSUB 41Ø:IF Y=Ø THEN 13Ø ELSE ON Y1 GOSUB 6516Ø,6523Ø,6531Ø,653ØØ,6522Ø,6515Ø
47Ø Y=Ø
48Ø IF Y=Ø THEN PRINT"The result is "P# ELSE IF Y=1 THEN PRINT"The result is
 Easting:"PX#" Northing:"PY# ELSE PRINT"The result is Angle:"PA#" Distance:"PD#
```

con't on next page

```
490 PRINT".....Any key to continue ";:A$=INKEY$
500 A$=INKEY$:IF A$=""THEN 500 ELSE 130
510 '
520 '*************************************************************************
530 '           DOUBLE/BAS ROUTINES START HERE
540 '*************************************************************************
550 '
```

Note: Many of the above lines were too long for the width of our printed page. Where rap around occurs; if there is a space beginning a line then there is a space between the last character of the preceding line and and the first character on that line. If there is no space then there is no space between the last character of the proceeding line and the first character of the following line.

Example: Line 480 There is a space between "is" and "Easting".
Line 240 There is no space between "/4:" and "If".

de BUG REPORT

In Vol 2 No. 12 page 19 were three patches for TRDDOS 1.3, the second patch on that page had misprints and should be:

PATCH*0(ADD=4ED4,FIND=3A814F,CHG=C3FE4E)

Patch One and Three should have worked without a hitch.

CN 80 INDEX TRS/LSDOS Version 6.3

The first six or seven issues that were sent out had a couple bugs in the Model 4 program, and were replaced with updated disks as soon as we were aware of the bugs.

But those replacement disks (only the first seven) had one more bug. If your issue shows a line error in line 550 when you are in the list to screen and are at the very last data entry. Then correct line 550 by adding a comma as shown after (19,0) and before the first semicolon.

550 Print@(19,0),;CHR$(31);PR------the rest of the line is the same.

You need not be concerned unless your copy reports this error to you when you hit enter on the very last data entry in the file. Our Model III TRS-DOS program had the same error in it but they were corrected before the first copies were sent out.

If you do experience any difficulty with the Index disks, send them back with a detailed explanation of what is happening and we will send you a fresh copy.

For those of you who have double sided drives we would like to suggest that you combine the two years of the Index using APPEND. As the CN1988 file and the CN1989 file are in ASCII, you can APPEND the two files together. You can then search all the issues without having to search one year at a time. Just copy the CN80/BAS and CN1988 files on side one of our Index disk to a formatted double sided disk. Then copy the CN1989 file from the second side of the Index disk to your new working disk, and APPEND CN1989 data file to the CN1988 file. When done REMOVE or PURGE the CN1989 file from your working disk. You may then want to RENAME the CN1988 file to some easier name like Index.

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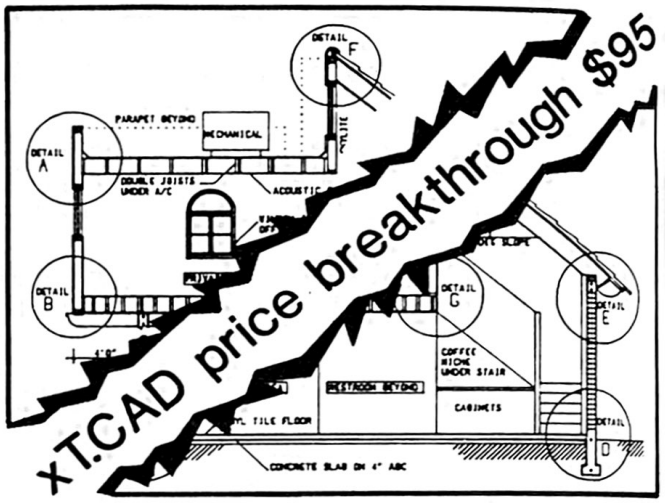

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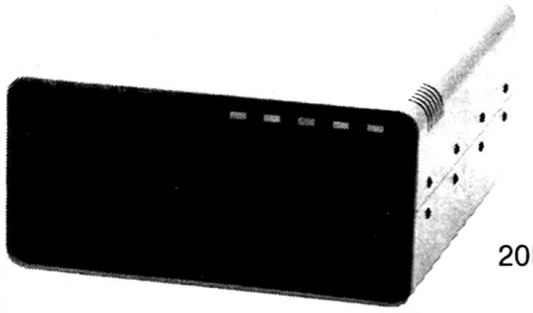

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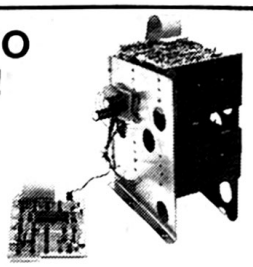

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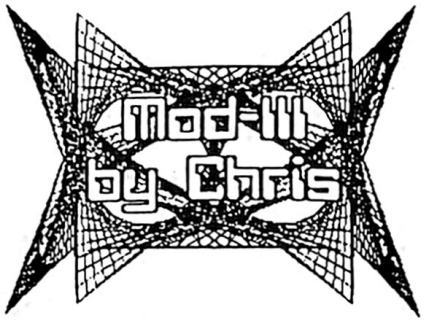

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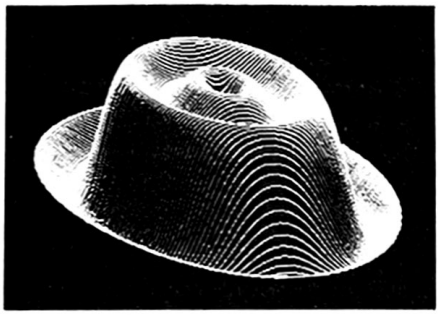

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February 1990 Vol 3 No 2	Jan 15	Jan 29
March 1990 Vol 3 No 3	Feb 12	Feb 26
April 1990 Vol 3 No 4	Mar 12	Mar 26
May 1990 Vol 3 No 5	Apr 16	Apr 30
June 1990 Vol 3 No 6	May 14	May 28
July 1990 Vol 3 No 7	Jun 11	Jun 25
August 1990 Vol 3 No 8	Jul 16	Jul 30
September 1990 Vol 3 No 9	Aug 13	Aug 27
October 1990 Vol 3 No 10	Sep 10	Sep 24
November 1990 Vol 3 No 11	Oct 15	Oct 29
December 1990 Vol 3 No 12	Nov 12	Nov 26

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