Computer News 80

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EDITORIAL COMMENT

Here we go! Entering our third year of publication and still growing, with many new and exciting things planned for 1990. Many new things are already in the works and many more are in the development stage.

There really is no need that much of the so called "new" technology in the computer world can not be made available to the TRS-80 user. There is certainly no need for the TRS-80 user to sacrifice his equipment and the hours and hours he has spent learning the ins and outs of the software because he thinks that a lot of the new equipment will not run on the TRS-80.

Some of the new software for the MS world is so big, takes up so much memory space that it is slow and offsets the higher clock speed of the MS computers. This is what we see in the ads - how fast the MS computers run. But you do not see how fast will they do a job using such and such software. Some word processing programs are so big, that we could have our letter in the envelope and out the door, using our trusty TRS-80, while the MS program is still looking for page one.

And how about if I want to adjust some of the program to fit my particular need? Modification of a program written in

machine language that takes 500K just to boot up! No way!

Sure there are some business needs that are large enough and standard enough for the application of MS machines and software. But do I need one? I want my computer to be friendly, not just some other machine that I plug in and run, or does it run us?

But I still want to be able to take advantage of the new technology coming out. So why not!

Well first, because Tandy decided that their best route to the market place was to build a computer that was just another clone of the IBM, and then sell someone else's software. That way they could cut out all the software support costs and just have a few people who would give customer support to the hardware they sold. Simple isn't it. High sales - low support cost.

Secondly, the software produced for the IBM MS-DOS computers and their clones has pretty well been taken over by the big producers of software, thus squeezing out the small software author and publisher.

Such a market squeeze has been placed on the small software developer, that most of them - some of the best - have been pushed into the MS-DOS companies and no longer have time or can afford to develop software on their own, much less for the TRS-80. We said some, not all - thankfully there are those who are still willing to develop software and hardware for the TRS-80s.

In coming months you can look for these developments in CN80.

For example many people felt that they could not use a laser printer on the TRS-80, and would have to give up their equipment to take advantage of the new wave in printers. That ain't so either. And in the coming issues of CN80 we will be running a series of articles on "HOW TO USE THE TRS-80 COMPUTERS WITH LASER PRINTERS." Soon you will begin to see the results of our learning efforts in the production of CN80, but not right away.

We do not want to change from our traditional methods of publication until we are sure that we have mastered the technique and have settled on a standard format for the magazine. By the way our philosophy is that we produce CN80 with TRS-80 equipment, with the exceptions of our printers. As long as we are producing a support magazine for TRS-80 users, we feel that the magazine should be created with TRS-80 computers and software. We could produce the magazine with an IBM clone, and a desk top publishing package that only works with MS-DOS, but is that fair to the reader. Besides, as we develop and learn more about our TRS-80 equipment we can pass that learning on to our readers.

How about it folks! Anybody out there want to share their experience along these lines with other users. Get your letters, articles, and how to do it in the mail. On disks in ASCII with a hard copy - Please.

NEWS ITEMS

It took three long distant phone calls to come up with this bit of news.

First we called one of the traditional Tandy support phone numbers. A recorded voice said, "The support service phone numbers for Tandy products has been changed. Contact your local radio shack store for the new numbers."

Boy, I wanted to use last months fun program for changing phone numbers to letters to see what new words I could come up with for the Tandy old numbers, I am sure they wouldn't be nice, so I forgot it.

Call your local Radio Shack store for the new numbers - forget it. Around here that's like calling the moon for the time of day.

So what did we do. We dug up the Tandy information main switch board number, which by the way they don't call it that anymore either. It's just their main switch board. (817)390-3011 and I asked what the new support numbers were. The operator switched me to customer service. Again, "What are the new support phone numbers?", I asked. The lady said, "What model of computer do you have?" I said several kinds, and what difference did it make. I was really afraid to tell her that I had seven model 4s. I would probably have to spend

another long distance phone call to see if she had recovered from the shock. Maybe the silence on the line would come from either her fainting dead away or shear fright at the mention of TRS-80.

Anyway, I got the numbers:

Hardware Support (817)878-6875

She assumed I had a MS computer, and I believe she said the number for MS computers is.

Software Support (817)878-6880

Thankfully, she did not ask me what software I was using, or I am sure she would have had a stroke.

So to continue my quest, I called the software support number. I was looking to ask someone a question about a software product when I placed the first call.

The phone rang, and a recorded voice said "Press one if you are using so and so. Press two if you need help with so and so. And on and on, on my nickle! Luckily I didn't have to wait till the voice said "If you are not calling from a touch tone phone (which everyone should own from the tone of the message) please stay on the line for operator assistance." Ain't modern gadgets fun.

While getting this story out to our readers we might as well tell you why we were calling. As most of you already know we have picked up some software from the Radio Shack stores at close out prices and have made it available to our readers, as well as building our archives. Well we picked up a brand new Cat. #26-5300 Lotus 1-2-3 for the Tandy 2000, which we sold to a subscriber that had a 2000. When he got the package the Lotus System disks were missing, the other three where there.

It was our understanding that if the package was complete with the registration card, and never owned by anyone before that all you had to do was send in the registration card, to establish new ownership and to receive the upgrades.

This our reader did, with a letter telling Tandy about the missing disks. The software registration department told him that was good for updates, if any, but could not send him the missing disks.

I was calling software support to see if we could resolve the problem some way, when I found out about the phone changes.

I finally succeeded in reaching "Tom" in software support. I told him what I was looking for, and his first reply was - "They didn't make Lotus 1-2-3 for the Tandy 2000 computers only MS computers". I pointed out to him that the last catalog they had it listed in was the 1987 software catalog on page 62. That got his attention and from there on he was very cooperative.

His solution was, "Take the package to your nearest Radio Shack store, and tell them they have to order the disk for you from the Software Assembly Division, and if the store does not have that number tell them to call 'TOM' at this number ext. 2, and I will tell them what needs to be done."

This information was relayed to our customer and we hoped that this would solve the problem. Lotus 1-2-3 is too good a program just to scrap, especially when one owns a Model 2000 and would like to get the maximum use out of it.

The latest we heard from our reader is that he went to the RS store and told them what we had informed him to do. The answer was (we assume from Software Assembly Division), "We can't do that, we could replace the disks if you had the original and it didn't work any more, but we can't replace missing disks."

Now for our appeal. Does anyone have a Lotus 1-2-3 for the Model 2000, that you are using or not using and can help this reader complete his system. If so please let us know.

In the meantime our reader is in the hope that he may find a copy of the disks in some Radio Shack store - sometime. And we will just keep on punching our touch tone buttons.

On another note. Rob Stewart of Storage Power tells us that he has an external clock unit available that plugs into the 50 pin I/O bus and then you plug your 50 pin I/O cable into that if you want to use the I/O bus connector for other equipment. At this time he did not furnish us with prices and we understand that using his software you can call up the time of day at any time. If we receive one we will give you more information with a review of the product.

David Dalager has sent us a software package called GRAFDSK, written by William Bowman, which is available from several bulletin boards and is supposed to access a HiRes board if you have one and use it as an additional memory bank adding more memory to your system. We will try to have a review of this package for the next issue.

We still have several copies of the TRSDOS manual complete with TRSDOS 6.2 disks. These are brand new manuals and systems disks from Radio Shack and are available for $20.00 plus $ 4.00 S & H.

This system coupled with David Goben's T62DOSXT date extension and utility program will give you not only dating beyond the Dec 31, 1987, but will also give you utilities such as a one pass backup that works just like DISKCOPY in the LS-DOS 6.3 system package, in that you do not have to pre-format your disks to do a backup. (See the display ad for this package - now published and distributed by CN-80, but still directly supported by the author.)

John Gregg of TRY-O-BYTE Software, 1008 Alton Circle, Florence, SC 29501 has released his public domain TAX ESTIMATOR Program (basic version) for 1989. He has incorporated the last minute tax changes, and makes the disk available to anyone who would like to have it for the cost of shipping and handling. Which according to his ad in the Product Source section would be $ 3.00.

CN80 INDEX ON A DISK

Thru much work on the part of Louis Carson of Boulder Colorado, who did all the data input and David Goben, who modified and enhanced the basic program used to index and search the data files, we finally have CN80 1988 and 1989 listed and cataloged on disks.

Actually a flippy disk, because the files for 1988 and the basic program takes up one side of a single sided 180K disk. 1989 is on the second side and leaves room to add the 1990 index.

We could not print this data because it would take up too many pages in CN80. Lou has listed everything in the issues. There are 555 listings for 1988, and 374 listings for 1989. We wondered at first why so many more for 1988 than for 1989 when the second year was consistently more pages per issue. But the reason is that the articles in 1989 were longer, and Lou listed every topic of information as a separate item, such as each Open Forum question and answer, etc. This really makes for a thorough search facility for the magazine.

You can use the basic program as provided to print out all the data files. Or print them singly. Or just view them on the screen. You can also use the program to build your own personal index of anything that you want to keep track of and then use the search command in the menu to look for it.

You have 24 Classifications of search in our Index, plus a search by model number; a search by "Word" only; a search by book (Vol# and No.); a search by system and you can search out all the articles that have program listings. All in all quite a package and a lot of work on the part of those who built it. We owe them our thanks.

If you would like a copy the CN80 INDEX ON A DISK send $2.00 to cover the postage and disk costs. Tell us if you want the TRSDOS 6.x version for Model 4 or the TRSDOS 1.3 version for Model III.

The CN80 INDEX ON A DISK will also be available on Chicago Syslinks, TRSLINK, and Genie bulletin boards, and may be found on several of your local BBs.

LeSCRIPT ver 2.0 REVIEW

by Danny C. Mullen

I've been using this latest version of LeScript for about four months now and I have to say it's a welcome update over the older versions. It really is a pleasure to have this 55k program load as quickly as it does. In fact, prior to this update, I had often used my old version 1.65 copy to do minor jobs that required no spell checking just to elude the long wait. My version 2.0 loaded in just 45 seconds - including the dictionary files in my extended memory board. This is the Alpha Products SuperMem Board also sold by Anitek.

One feature added is the dynamic line and word count feature, and a page indicator. No more guessing as to what page/line number you're on or approximate word count. I say this because the word count, according to the author of LeScript, says that header/footer, footnote, and printer commands may affect the count slightly, but only within a few percentage points. The word count will change as you move the cursor through the document. That is, if you're on line one, it counts the words in line one. When you move to line two, it will add that count to line one's and show the total. So if you want the total for the document, move the cursor to the end of the document and it's displayed instantly.

Another appreciated feature is the exit warning given if you haven't saved any recently added text to a document. This is very helpful if you've made slight changes, worked on a new document in another window, or had to interrupt your work for some reason and then decided to quit for the evening. A message will flash stating that text in window 'x' has not been saved. The 'x' means one of four windows allowed on the new version - previously only 2 screens were allowed .

The four windows feature is one I normally don't use, but if I were to use LeScript for writing source code for assembly language and desired to compare an old version of code with newer, I'd certainly like to have this. You may work on up to four documents, and transfer blocks across them as in the older versions. Also, each has its own line, word, page count, and memory count displayed independently as before.

Pop-up help screens are one of the best improvements made. Now you get a small window on screen and can go to a particular area of help (i.e. print, disk, block, and others) with one keypress, or you can scroll through them if desired. It's almost instantaneous even though the data is read from disk. In addition, full instructions are given in the manual showing how to customize the help to suit your own desires.

There are a few key-press changes to become familiar with. The old <CTRL ><W> combination to delete a word controls which window you're in. A <CTRL><8> gets the justification feature locked on or off with a message. This is important when editing Visacalc files or doing any type where you don't want LeScript to delete extra spaces. Turn justification off prior to loading these type files. The <CTRL><U> associated with the old Visacalc load function now is used in displaying characters 176 through 207 or used in a new line draw feature.

There are several more changes: customization patch area, <CTRL><Z> doesn't abort in the middle of loads/saves, wild card search uses '?' instead of blank character, blank and end of sentence character are combined, LeScript text files format is changed - it can read old text file versions, but old versions can only read the new if saved in ASCII, KSM files must be updated to ver 2.0 format, default left margin is 0 now, maximum line length is 254 versus 252 in older versions, directory displays are pageable using <CTRL> and up/down arrows, cursor forward/back by tab stops, pop-up macro display, print-to-disk command.

Finally, I've saved the best for last; the line draw mode. Though not used much by me, when desired, I love it. You first must have a printer that can duplicate the IBM-PC character set to get the output. Then, you have two options on how to get this on your screen: have the Graphyx Solution Hi-Res board by Micro Labs or a 'PC-set' ROM installed (sold by Anitek - Note that without these, you could still do line drawing with your printer, you just wouldn't be able to see what it looked like on screen). The <CTRL><Y> combination puts you in line- draw mode and the <F3> toggles you in/out of displaying the actual

lines if using the Graphyx Solution board (which I do). The drawing and cropping of lines takes a little practice, and I suggest you draw any boxes first then fill with data since you can't move the data inside the box. Using the Graphyx Solution method with it's display activated slows down typing speed, and sometimes you get cursor over-run due to the delay. You can get normal speed by deactivating the board once you're used to it, and reactivating it when needed.

Since I received my original version 2.0, I reported a few minor bugs to Anitek, and Mr. Ray fixed them quickly and correctly. Due to it being so enhanced compared to the old versions, I expected to have a few. The responsiveness in fixing them outweighs the negative here. In the manual, I noted that the external spell activation sequence was different than in the quick reference card/online help.

As stated in some advertisements, most of LeScript works much faster than in previous versions, especially in spite of its code size. About the only feature I still want (and keep bothering Mr Ray about) is an online thesaurus. He says there are no plans at present for one. One item that makes LeScript a pleasure to work with is the extended memory board also sold by Anitek. I highly recommend its purchase if you are using the spell checking feature of LeScript or working on larger documents. Fine products, fine support - especially in the dwindling TRS-80 market.
-Danny C. Mullen

About the author: Mr. Mullen has been an infantry soldier for 14 plus years in the US ARMY. He is presently serving in Panama as an Equal Opportunity Advisor.

His main hobbies are computer programming and fishing, and expects to be back in the USA around Feb '90.

He started computing with a Sinclair ZX81 kit until it burned up in '84 and have been banging this Model 4 around since - from Virginia to California to Georgia and Panama. He says, "I love to program in assembly now that I've figured it out."

ASSEMBLY LANGUAGE TUTOR Part 12

by Christopher Fara (Microdex Corporation)

Happy New Year. We continue our essays on assembly programming under a simplified title. These essays are still for "beginners", but we assume that the reader is familiar with the ideas discussed in the "TRS-80 Assembly Language for Beginners" series of 11 articles in CN-80 January through December 1989.

B A S I C i n t e r f a c e

There are many ways to store and load machine routines for interfacing with BASIC. For a graduate assembly programmer the following procedure is often the simplest.

1. PROTECT MEMORY: From DOS enter BASIC and specify the highest address BASIC will be allowed to use. Our examples load at 64000, so we can let BASIC use memory up to 63999. In Mod-3 under TRSDOS 1.3 enter

```
BASIC -M:63999
```

In Mod-3 under LDOS 5.3 and in Mod-4 enter

```
BASIC (M=63999)
```

2. LOAD ROUTINE: Once in BASIC, we can any time load any /CMD-type program into protected memory. For example:

```
Mod-3: CMD "L","DEXHEX/CMD"
Mod-4: SYSTEM "LOAD DEXHEX/CMD"
```

The /CMD extension is not assumed and must be typed.

3. CALL ROUTINE: The traditional method which works in Mod-3 and Mod-4 is the USR call. Before calling the routine, its entry address must be defined. That's why putting executable instructions up front (as we did last month in DEXHEX) helps when dealing with BASIC: the entry address is the same as the load address. The following command would define our usual address:

```
DEF USR = 64000 - 65536
```

Why not just 64000? Since BASIC integers can't be greater than 32767, higher addresses must be expressed as their "signed" equivalents. The theory of signed integers is a bit involved, so let's just say for now that the highest "absolute" integer 65535 is internally encoded by the same bit pattern as "signed" -1 and the count goes backwards: 65534 is -2, and so on. Thus the

signed equivalent of an absolute integer 32768 to 65535 can be always obtained by subtracting 65536. Actually in Mod-4

```
DEF USR = 64000
```

is okey because Mod-4 BASIC converts it internally to signed integer, but Mod-III doesn't. If we know the hex form of the address, then we can also write on both computers

```
DEF USR = &HFA00
```

This is one of the reasons we have picked 64000 for our examples: its hex equivalent FA00 is also an easy to remember "round" number. Either way the address is now defined and the actual call can be made like this:

```
X = USR (0)
```

The value in brackets in this case is a "dummy" required for syntax only. In other cases it may be a variable to be "passed" to the routine for some processing.

Model 4 BASIC has also a new command for calling machine routines. Instead of DEF USR, we assign the entry address value to some variable, then "call that variable" so to speak. In our case we could write

```
X = &HFA00
CALL X
```

In any case, after return from the routine control returns to BASIC. All the above commands can be executed directly from BASIC "immediate mode" or within a running program. We'll try it later today.

Case conversions

In BASIC and in assembly programs we often want to have all alfa characters in upper case, even if typed in lower case. For example, our conversion routines in the last few essays in CN-80 were looking for "hex digits" A-F. If these characters were typed in lower case then the routine would not accept them. Conveniently in the ASCII code the only difference between upper and lower case is bit #5 (sixth from the right) which is 0 in upper case and 1 in lower case. For example

```
0100 0110 = 70 = ASCII 'F'
0110 0110 = 102 = ASCII 'f'
```

Recall how the AND instruction was used for "masking" (CN-80 Nov'89 page 10). Suppose we have 'f' in register A and want to make it upper case. The instruction

```
AND 0DFH
```

leaves all bits in register A intact except bit #5 which is ANDed with 0, and will therefere become 0 regardless of its original status, like this

```
0110 0110 = 'f' original
1101 1111 = hex DF = mask
0100 0110 = 'F' result
```

Thus, for example, in our HEXBIN subroutine (CN-80 Nov'89 page 11) before CP 'A' we could insert

```
AND 0DFH
CP 'A' ;else is it < A?
```

to make sure that lower case "hex digits" 'a-f' will be recognized. Similarly in DEXHEX last month

```
AND 0DFH
CP 'H' ;is it 'H'?
```

would accept lower case 'h'.

Conversion of upper to lower case means setting bit #5, of course. This can be done with another "logical instruction", similar to AND.

```
OR byte
```

Bit-wise comparison of register A with a single 'byte'. If matching bits are both 0 then the corresponding bit in register A is "reset" 0, otherwise it is "set" 1. Carry flag is always "reset" NC (No Carry). The 'byte' can be a number, a single register, or a value in memory addressed by (HL).

```
OR 32
OR B
OR (HL)
```

For example suppose we have the value 70 in register A (ASCII code for upper case F). The instruction

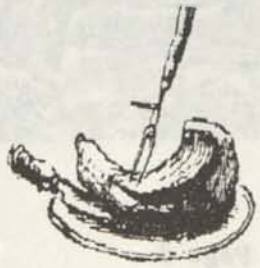
```
OR 20H
```

does this

```
0100 0110 = 'F' original
0010 0000 = hex 20 = mask
0110 0110 = 'f' result
```

CAP, DECAP routines

The CAP routine takes a string of up to 255 alfanumeric characters and "capitalizes" it (converts letters to upper case). Suppose the length of string is in register B and the register pair DE points to the first character in string text.



```
;-----------------------------------------------
        XOR   A         ;make A=0
        CP    B         ;is B also 0?
        RET   Z         ;yes, quit, else
CAP:    LD    A,(DE)    ;get character
        CP    'A'       ;is it alfa?
        JR    C,NEXT    ;no, else
        AND   0DFH      ;make caps
        LD    (DE),A    ;put it back
NEXT:   INC   DE        ;next character
        DJNZ  CAP       ;if any left
        RET             ;else done
;-----------------------------------------------
```

Before doing the actual CAP routine, we test the length of string and quit at once if it's zero. Otherwise on the first go-around DJNZ would decrement register B to 255 (binary byte 0 minus 1 makes binary 255, we'll talk about it some other time). As a result the DJNZ loop would execute 256 times and would most likely crash our poor TRS-80 (which of course rhymes with "crash" anyway).

The CP 'A' prevents unwanted conversion of numeric and punctuation characters in the string (ASCII codes lower than 'A'). As an exercise, the reader may want to add a trap to prevent conversion of characters with codes higher than 'z'.

From the CAP routine we can easily make DECAP to "de-capitalize" letters in a string (ie. convert to lower case). Simply replace

AND 0DFH ... by ... OR 20H

The routines could be combined. Suppose we have a list of names in an array, some in lower case, some upper, and want to make the first letter in each name upper case, the rest lower.

```
-----------------------------------------------
        XOR   A         ;make A=0
        CP    B         ;is B also 0?
        RET   Z         ;yes, quit, else
CAP:    LD    A,(DE)    ;first char
        CP    'A'       ;is it alfa?
        JR    C,NEXT    ;no, else
        AND   0DFH      ;make caps
        LD    (DE),A    ;put it back
        JR    NEXT      ;next character
DECAP:  LD    A,(DE)
        CP    'A'
        JR    C,NEXT
        OR    20H       ;do lower case
        LD    (DE),A
NEXT:   INC   DE
        DJNZ  DECAP
        RET
;-----------------------------------------------
```

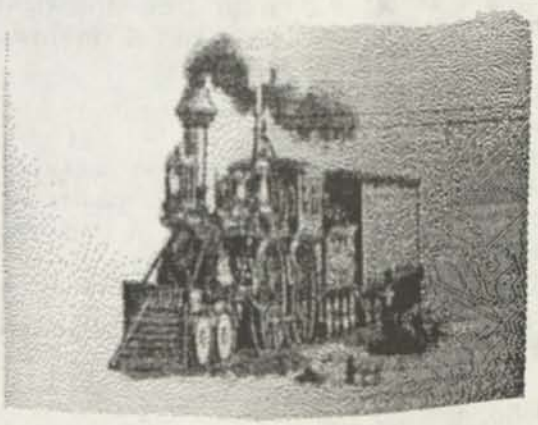
Similar schemes could be used for all kinds of character conversions.

Calling CAP, etc.

In a USR call we can pass a string to the CAP routine and have it instantly converted to upper case. Suppose we have some string in variable A$. The call sequence could be

```
DEF USR = 64000 - 65536
X$ = USR ( A$ )
```

Notice that the type of the "calling" variable X$ must be the same as the type of the value in the brackets (integer to integer, string to string, etc). When the variable in USR brackets is a string then on entry to the routine the register pair DE points to the memory location where the "string descriptor" is stored: 1-byte length of string followed by 2-byte address of the actual string text. In other words DE contains the "variable pointer", the same value as would be returned by the BASIC command VARPTR(A$). We want to put the length of string into register B and address of text in DE for the CAP loop. So we need to arrange the registers.



```
;-----------------------------------------
;ALFA   case conversion subroutine
;-----------------------------------------
       ORG   64000
       EX    DE,HL       ;now HL=varptr
ALFA:  LD    B,(HL)      ;string length
       INC   HL          ;next get...
       LD    E,(HL)      ;address of...
       INC   HL          ;string text
       LD    D,(HL)      ;DE=> text
;.... here type the CAP routine
       END
;-----------------------------------------
```

There is an interesting thing to notice here: the END instruction does not have our usual "transfer address" (like END RUN in all our previous examples). It's because ALFA will be never used as a stand alone program executable from DOS. It will be only loaded into memory and accessed from BASIC.

To get the length of string into register B we can't simply LD B,(DE). It's not a legal instruction. LD A,(DE) in CAP above was fine because any register pair can be used as address for LD A, but only (HL) can be used with other registers (see CN-80 Aug'89 page 8). The registers A and HL are just special, and we must learn to live with those exceptions. To copy DE to HL we could

```
PUSH DE
POP HL
```

but there is a fast 1-byte instruction to swap registers DE and HL.

```
EX DE,HL
```

EXchange contents of register pairs. Works only with DE,HL and is always written this way (EX HL,DE is illegal).

Now we can use HL as a pointer to string information. At the label ALFA the lengthand then the address of the actual string text are loaded into B and DE.

Let's try it out. Assemble the whole thing as usual, enter BASIC (protect high memory) and load ALFA/CMD as described in steps 1 and 2 at the beginning of today's essay. Now in BASIC enter, for example

```
A$ = "Computer News 80"
DEF USR = &HFA00
X$ = USR ( A$ )
PRINT A$
```

The above BASIC command sequence could be also lines in a running program. If all went well the display shows

```
COMPUTER NEWS 80
```

instantly converted to upper case. Or the other way around with the CAP+DECAP combination, etc.

M o d - 4 C A L L

The USR scheme works in Mod-3 or Mod-4, but Model 4 BASIC command CALL is more flexible and is the preferred method for accessing machine routines. In our assembly routine we don't need EX DE,HL because CALL puts the "variable pointer" directly in HL. Edit our ALFA routine (delete EX DE,HL), assemble, load, and in BASIC enter

```
A$ = "Computer News 80"
ALFA = 64000
CALL ALFA ( A$ )
```

and PRINT A$ should show again

```
COMPUTER NEWS 80
```

or whatever string we had in A$. Once the entry address is defined (ALFA=64000) we could repeatedly

```
CALL ALFA ( B$ )
CALL ALFA ( C$(1) )
```

etc, to convert any simple or array variable to upper case. Or to lower case, and so on.

W h y n o t j u s t B A S I C ?

The case conversion can be done in BASIC without machine subroutines. Suppose we have an array A$() with 1000 strings. A procedure equivalent to CAP conversion could be:

```
120 FOR Y=1 TO 1000
130 FOR X=1 TO LEN(A$(Y))
140 K$=MID$(A$(Y),X,1)
150 IF K$<"A" THEN 180
160 K$=CHR$(ASC(K$) AND &HDF)
170 MID$(A$(Y),X) = K$
180 NEXT X
190 NEXT Y
```

Then why bother with assembly? The thing is mainly speed in this case (and some 80 bytes memory saving). The BASIC scheme would take several minutes to convert the array, depending on the length of individual strings. On the other hand we could write:

```
110 DEF USR = 64000-65536
120 FOR Y=1 TO 1000
130 X$ = USR ( A$(Y) )
190 NEXT Y
```

In Mod-4 we could also use the CALL scheme. Simplify ALFA subroutine (delete EX DE,HL) and change lines 110 and 130:

```
110 ALFA = 64000
130 CALL ALFA ( A$(Y) )
```

With either of the machine subroutines the job would be done in a couple of seconds.

Self-serving plug...

If you like these essays on assembly, you'll also like "Mod-III by Chris" and "Mod-4 by Chris" recently pulished by CN-80. These books are complete Owner's manuals, much better than the originals and updated for the latest versions of TRSDOS, LDOS, LS-DOS and BASIC. The chapters on Z-80 have all the info needed for general purpose assembly programming and interfacing with ROM, DOS and BASIC.

MORE ABOUT COMPUTERS

by David Dalager

How About a HiRes?

No, I don't mean the root beer, I mean a high resolution graphics board. The kind that draws very pretty pictures on the screen of my model 4/4P. Even lets me draw pretty high resolution pictures, even though I'm not a very good artist!

Back in early 1986, I bought a Micro-Labs Grafyx Solution Hi Res board for $199.95. Loved it! Still do! Later on I bought a Radio Shack Hi Res board very inexpensively at a tent sale, I say that because they were still selling for around $299.95 at that time. Installed one of each in my two 4Ps. I love them both! Wouldn't do without them! They expanded my computers' capabilities tremendously! The only program that won't run on both of them so far is TRSDRAW/BAS, which runs only on the RS board no matter what I do.

EASY INSTALLATION?
YES! This is true in both cases! No soldering at all!

On the gate array 4 you remove only one jumper, press into place, for the RS board. Installing the GRAFYX Solution board involves the same action plus clipping on a micro-clip onto only one pin of a chip.

With the non-gate array 4 and both types of 4P, there is only a jumper to remove (and the clip for the GS board) Nothing at all complicated and is true of both board installations. I repeat, no soldering at all! You now have a beautiful computer screen when using the HiRes capability.

EASY TO USE?
There are MANY Public Domain programs, utilities, and picture available from The File Cabinet. While RS is not supporting the models 4/4P, Micro-Labs has a number of programs and utilities for supporting both the Grafyx Solution and the RS hi-res boards. Microdex Corp. has XTCAD and other programs available at very reasonable prices. As a matter of fact, both of them have items at a VERY reasonable price! See their ads this issue.

THE MODEL 4/4P IS DEAD!
Don't you believe it! The number of model 4/4P programs are growing in numbers all the time! I'm continually amazed at the growth! Let me give you just one example: GRAFDISK, updated and completely rewritten by William R. Bowman, a MCTRUG member, is capable of providing you with an increased but VERY fast loading memdisk, 32K for the RS board; 20K for the GS board which will load in about 15 seconds! Not the 1 to 3 minute like MEMDISK! It has all the systems and BASIC needed to operate as a system drive. So if you only have 2 floppies, you can now have effectively 3! This is because you are now operating a very fast system drive which is in the upper 64K plus either 20 or 32K additional memory depending on which hi-res board you choose. What amazed me was typing in BASIC and hitting ENTER that basic was operational almost before I could get my eyes open again! Certainly saves the wear and tear on a floppy drive! Remember: Each time you run a program, the floppy drive must return to the directory, find the appropriate LIBRARY

command and/or any "overlays" needed, read it into memory (temporarily) and do whatever else that may require its attention. That is a lot of work! GRAFDISK (available from The File Cabinet) increases the computer's efficiency tremendously! The docs contain patches to run in the slightly smaller memory of the GS board.

WHICH ONE IS BEST?
Well, that is a very difficult question to answer! So, let's do a comparison. Both boards offer hardware resolutions of 640 x 240 or 512 x 192. That is to say 640 pixels horizontally by 240 pixels vertically. A pixel is: Picture (PIX) ELement (or dot), whether turned on or off. This is the same resolution as EGA (expanded graphics) in the MiSery DOS world, which is the middle between the poorest and the very best (CGA, EGA, and VGA)

From the GS installation manual: "When in the 640 x 240 mode the GS board works exactly like the RS board. Therefore any software which writes directly to the graphics boards should run on either board. The hi-res screen dump files made by Radio Shack and Micro-Labs are identical and interchangable. However, the graphics BASIC does differ in capabilities and syntax. Therefore, programs written in the respective graphics BASIC must be modified." Even then, there are no problems because if you want to run the Micro-Labs programs on the RS board, all you have to do is get the GBASIC 3.0 for the RS board from Micro-Labs. The major reason that a RS board owner might want this is because it works on more DOSs and adds many advantages.

The only program that I've found that can't run on the GS board is TRSDRAW/BAS and is due to the slightly smaller memory on the GS board. Both boards allow you to do text overlay while in the hi-res mode although the info regarding the RS is undocumented according to Ted Carter (Mr. Micro-Labs), although with the GS board this is standard. Programs and info for these features are in The File Cabinet! The model 4/4P technical reference manual contains information on the undocumented port assignments to do even more as well (on either board).

WHAT PROGRAMS AVAILABLE?
Well, as a start you get several with the graphics boards you buy. There are many out there as I said above. I like PRO-DRAW, XTCAD, TRSDRAW for the commercial programs, though Micro-Labs has others as well. For the PD programs, I like Rembrant (the hi-res version) which has an icon menu along the left side with a "fill" icon along the bottom, GrafPack by Mel Patrick that has many excellent utilities, TRSDRAW/BAS which I gave to a fellow whose 9-year old promptly learned how to draw an F-16 in less than 30 minutes!

There are many, many more to enjoy! See The File Cabinet's Hi-Res catalog! Also read "GIF Graphics" in the November '89 issue of CN80, Frank did a wonderful job!

PRINT PICTURES?
Certainly! Provided your printer is capable of a "graphics" mode. Such pictures and picture/calenders you wouldn't believe!

MORE INFO
More comparisons are given in TRSLINK-20 from The File Cabinet. Incidentally, TRSLINK has a reader, which if you have a hi-res board, will now "read" the hi-res file and put it up on you screen! You'll Love it! This started with TRSLINK-25.

Installing HiRes Graphics Board
Installing a graphics board in a model 4 or a model 4P whether a gate array or non-gate array, can be a very simple operation, depending only on how complex the operation is made.

Removal of the case, cover shields has been thoroughly covered elsewhere and will not be attempted here.

The model 4P is presented first as the location of the hi-res board is the same. The jumper designations are the same as well.

Looking at the mother (CPU) board from the rear (card-edge connector side), locate the HEADER CONNECTOR (34 pin) on the right side; make certain that all the pins are straight, as this is a "male" type of connector.

Although the following is for the Tandy HiRes board, the installation for the MicoLabs board are equally simple and

comes with good instructions.

Remove the wrappings from the graphics board being very careful of the possibility of static electricity which can damage the board. Taking the board in hand,look at the IC (component) side of the board, rotate until the large IC is at the upper-left corner which places the female header connector on the right, on the opposite side of the board. Carefully match the male and female header connectors, making certain that all pins are inserted into female connector. Before pushing the board all of the way onto the male connector. Notice the 3/16 inch holes along the left side of the Hi-Res board, these holes must match up with identical holes on the motherboard, if they do, push the HiRes board on all the way. Installation of the board is now complete.

Now to activate the board:

Remove the jumper between E4 and E5 on both the gate array and non-gate array boards. On the non-gate array board the jumper is located adjacent to U125, on the gate array board it is adjacent to U102 (a 40 pin IC). You might like to save the jumper by pulling it off the pins and rotating the jumper, replacing the jumper on only one of the pins.

Model 4 gate array and non gate array installation of the HiRes board.

After the case and shields are removed:

The gate array version is addressed next.

The hi-res board is looked at and held in the same manner as for the 4P, look for the header connector as done in the above, noting that there is a jumper located between pins 16 and 18, remove, install hi-res board as above saving jumper for any future possibilities. Note that this both installs and activates the hi-res board. In the cases where a Smartwatch is installed several solutions are possible, the simplest is by filing a small portion of the hi-res board, being careful not to remove any part of the traces (conductor) from the board.

Non-gate array model 4:

Remove jumper between E14 and E15, saving the jumper as for the 4P, this activates the hi-res board.

Above J1 (the printer card edge connector) about 3 inches, locate the 34 pin header connector, note pin designations ie pins 1 and 2 to the left, match up the connectors (male and female), insert (press).

The installation is complete. Please re-assemble your computer!

WHERE CAN I GET ONE?
One what? Oh! Thought you'd never ask! HiRes Boards are available from:

MicroLabs, Inc.
See their ad this issue.
And myself, see my ad this issue.

MicroLabs also has some very good graphics

-David Dalager

DESKMATE FILER AND ME!
by Helen Hillmann

After nearly four years with my Model IV and only SuperScripsit I finally coaxed my husband into buying me Deskmate Cat #26-1608 as a birthday gift. And I have been able to put it to some good use for volunteer work for a local elementary school's PTA.

I was not impressed with the Text portion for word processing for it did not give me the options that SuperScripsit does. The Worksheet portion was intriguing for it was fun changing numbers and watching the calculations automatically change down the rows although its potential does not equal Visicalc by quite a bit. I had no interest in Telecom, Calendar nor the Mail sections. But FILER made it worth the price of the program!.....The one I have is version 1.0.0 and has to be run under TrsDos without use of the current dating of LsDos. I was overconfident with my hoped for expertise at doing computer work and as a result I had to have both disks of Deskmate reformatted by Tandy/Radio Shack in Texas. This cost extra and had I been more

knowledgeable I might not have needed the Program disk redone. But additional expense teaches many things so now I use a public domain to back up my Data disks that I save for a later day!

It takes time to learn the various aspects of this application program, but I do not make my living by computer work so I have plenty of time to spare.

To run Deskmate you need two drives. The Program disk goes in Drive Zero and the Data disk is placed in Drive One. At the ready prompt you type "DM" and ENTER and from there on you must answer queries as displayed either by highlights or on the status line. There are functions listed on the main menu as well as access to subfunctions gained by using the F-2 key.

The Filer portion allows you plenty of space for labels/fields of information and automatically places things in alphabetical or numerical order depending upon how you set up your personalized system. By using some subfunctions it is possible to change the order of the information displayed.. What I consider as the control to this program is the CLEAR key. The arrow keys play a prominent part in gaining the information needed. When it is time to Print your material you must set/reset the printer defaults but you can have only certain fields of information displayed on the hardcopy; yet the information storage is still available for retrieval as desired.

Prices for this program seem to be reduced now so if you have the time, buy Deskmate for the filer unless you are a good programmer. I can keep a telephone directory with addresses and comments as individualized as I desire. With little effort I can call up all sorts of things using the Find function of Deskmate.
-Helen Hillmann

Ed. Note: you can use DISKCOPY :1 :0 in LSDOS 6.3 at DOS ready for quick backup of data disks.

A VISIT WITH DAVID GOBEN
by David Goben

BUG REPORTS FOR DEA

I have yet to see ANY complex program without a bug in it that is less than 1 year old. I doubt that my DEA Disk Editor/Assembler will be any different. My testers and I have tested it to death, but it always comes out that the simplest bugs are the ones that testers overlook, but most certainly will be the ones that YOU will find first. Therefore, if you find a bug in the DEA program (and be sure it IS a bug and not simply a feature that does not operate as you want it, but DOES operate as documented in the DEA manual), you can speed fixing it up by sending a DETAILED bug report directly to either me or to CN80. The ABSOLUTE FASTEST way to get it fixed is to do the following: Send TO ME your ORIGINAL DEA disk in a disk mailer (or home-made, but LIGHT), and detail ON PAPER what is wrong, what operating system you are using it under, any patches you might have applied, provide a sample program that it will not work correctly on (if needed) and lastly, include return postage (65 cents in most cases, but I prefer stamps, since I can just slap those onto the mailer and get them back into the mail right away). Although the normal procedure is to send your reports to the distributor (CN80 in this case), by instead sending it directly to me I can usually find the bug the same day I receive your report, fix it, and put it back in the next morning's mail. This way you should only have to wait a week instead of longer for return receipt. Although you can still send your report to CN80, you will find that by following the above procedure will result in faster results.

NEWS FOR BASIC PROGRAMMERS

Some of you are aware of my original PACK4/CMD program that was released on the 80 MICRO December '87 LOAD 80 disk as a bonus. It was a program that would pack, unpack or compress a Model 4 BASIC program. What packing means is that it will take a program, remove extra spaces, comments, unneeded tokens (such as LET, GOTOs after THEN and ELSE, etc), and combine as many statements onto a line while maintaining complete program logic. Unpacking essentially re-inserts spaces as needed, expands tokens and places each

statement on its own line, yet still maintain proper program logic.

Well, PACK is now back and full of new and more powerful punch! I have attacked it with full steam, totally re-writing it and at the same time fixing a few minor bugs from the old version, and added some new features. I also completely rewrote my MS-DOS version. Finally, to round things out, I have also written a Model I/III version. Please note that this is NOT an "upgrade" of that Dec 87 LOAD 80 program (like the one I offered in '88), but is rather a totally NEW program.

One of PACK's neat new features is SUPER PACK, which can make all lines have UNLIMITED length. Thus a line could be several kilobytes in length, rather than having the 255-byte limit. This adds security to your program because no-one can edit one of these long lines unless they first unpack it using the PACK program. But best of all, it will make your program run their absolute FASTEST. The only way to make them run faster would be to compile them with a BASIC compiler. So stay tuned to CN80 to check for its availability!

SCROLL PROTECT FOR I/III

Now we get to the meat and potatoes. In a previous article (CN80 Vol 2, No 5, pages 15 and 16), I showed Model 4 users how to safely scroll protect up to 23 lines using simple pokes. But what about the Model III, which is still stuck with just 7 lines protectable, or the Model I, with NONE? Never fear, David's here! While riding the crest of a fresh batch of brain storms, I wondered how hard it would be to provide extended scroll protect to not only the Model III, but to the Model I as well. It was so difficult that it took me all of 3 hours to write. But then ol' Dave's brain starts whirring, and he said "Gosh, on the Model 4 I can send code zero to the video, and then any zero-31 or 192-255 code after it, and it will display a special character code. Hm, currently on the III we have to poke them on the screen to get them. What if I added this feature?" But that wasn't enough. I next thought, "Gee, in using a Model 4 in the III mode, by sending certain control codes to the display I can invoke and turn off reverse video." So I added that as well. So what started out as just a simple scroll-protect program ended up being a major work (of art). I sure hope you folks think enough of it to USE it and take full advantage of it (and since I'm releasing it into the PUBLIC DOMAIN, you can include copies of it with a program you are yourself distributing or selling, as long as you do not ALTER it or CHARGE for it), and give proper credit.

Program Listing One is a BASIC program that, when run on a Model I or III from BASIC (PLEASE note that in the listing's DATA statements that there are NO ohs, ONLY zeros -- in case some of them don't get slashed), will create on disk a program called VIDX/CMD, which is the video extension program that will add all these neat features mentioned above. To use VIDX/CMD, return to DOS (After running the program), and enter VIDX. VIDX/CMD will load, relocate itself to high memory, protect itself and report that all went well. You are now set for great screen control!

One the Model I, the only advanced feature is scroll protect, since it does not feature special and alternate characters, or reverse video like on the Model 4 in the III mode. But even with just that, you can do a lot with it.

USING VIDX

You can enter VIDX from one of two ways. You can enter it using the command VIDX as demonstrated above, or you can enter VIDX X. The extra "X" indicates EXTEND, in that the scroll-protect will emulate the Model 4 type rather than the Model III type. What I mean by this is that on the Model 4, when you enter a CLS command the ENTIRE screen is cleared. On the Model III, entering CLS (or simply homing the cursor) with screen lines protected will only clear the UNPROTECTED screen lines. This latter format is the default. This unique feature of the Model III is UNDOCUMENTED. Some of you may have already figured this out when you first started playing with scroll protect on the III.

How do you scroll protect? Well, on the Model III you do as you always did: you poked a value into address 16916 (4214H). However, this will not work on the Model I. Therefore, on the Model I the scroll protect address has been changed to 16428 (402CH).

Go into BASIC and try poking a value into 16916 on the Model III, or 16428 on the Model I. Notice that it will accept ANY value, but will truncate it so that zero to 15 are accepted OK, but 16 would be truncated to zero, 17 to 1, 18 to 2, and so on. Notice that if you did not enter VIDX with the "X" parameter, that doing a CLS will clear ONLY the lower screen. Neat. However, you can still PRINT@ in the upper, protected area. Think of all the nifty things you can do with this: split screen displays, non-eraseable messages that will not scroll off the screen, banners for programs, scoreboards for scrolling games, etc.

If for some reason you want to set the Model III so that it will ALSO use address 16428 instead of 16916, you can patch VIDX/CMD to do so by changing a single byte in the program. This might be handy in a program you write that you want to run on the Model I and III without modification. Using your PATCH program, change the 01 (zero-one) value at hex address 5200 to 00 (zero-zero). Refer to your DOS manual or "MOD III BY CHRIS" for details on patching addresses. After the patch, poking to 16916 will do nothing after you load VIDX again. You will have to use 16428 (409FH).

I must point out at this time of another unique feature of the Model III that is ALSO undocumented. That is that when you enter RUN (without a line number) or NEW, that the scroll-protect value stored at 16916 (if there was something there) will be made ZERO (I'm starting to wonder how many OTHER features are undocumented on the III). If you choose to patch VIDX to use 16428 as outlined above, this unique feature will NOT occur.

Program listing 2 is a BASIC program that, when RUN, will create a program called PROTECT/CMD. It, like VIDX, is used from the DOS level. With this program you can scroll protect lines right from the DOS READY prompt. All you have to do is enter PROTECT number, where number is a value from zero to 15. If you enter zero or no number at all, then scroll protect is turned off. Also, you can use this program on the Model III even without VIDX loaded. It will set both 16428 and 16916 to your selected value. We're having fun now.

MODEL III VIDX ENHANCEMENTS

On the Model III, either from BASIC or from another program, you can send a zero (null) byte to the display driver (XOR A and then CALL 33H in machine language), and then send a byte with a value of zero through 255 (LD A,value and then CALL 33H from machine language), and the code will be placed right at the cursor position. For example, on the Model III with VIDX loaded, enter and run the following program from BASIC:

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

You will notice that it will print codes 32 through 191 normally (these are the usual displayable characters), but special characters listed in the appendix of your DOS manual for codes zero to 31 and 192 to 255 will be displayed right there on your screen, all without having to poke them at all (even if the alternate character set is not switched on and you have tabs enabled). Now you can print these special characters using simple print statements and not have to calculate poke addresses to properly position them. For example, PRINT "COPYRIGHT " CHR$(0); CHR$(239) " 1989 BY JOE SMOE" will place the circled copyright symbol after the word COPYRIGHT and before 1989. Best of all, if you decide to move such a line to a different position, you never have to worry about recalculating a new poke position for your symbol. A breath of fresh air.

REVERSE VIDEO WITH VIDX

If you are running on a Model 4 in the III mode, you can ALSO take advantage of REVERSE VIDEO. To use it, you will find that 2 more control codes have been added to your list of video controls. Code 16 will turn reverse video on. Code 17 will turn it off. For example, PRINT"TEST-" CHR$(16)"REVERSE" CHR$(17)"-VIDEO", will print the word REVERSE in reverse video. Code 16 actually does two things; it enables reverse video and turns the high-bit routine on. This is actually simple and only sounds complex. You see, reverse video is actually a HARDWARE command telling the video controller chips to change codes 128 through 255 to represent REVERSE images of codes zero through 127. The high bit

routine, on the other hand, is a SOFTWARE command, controlled by the video output routines (VIDX in our case). When the high-bit routine is turned on, you can poke codes zero through 127 on the screen and display them in normal video, but any characters send through the display routine (either through VIDX or the LS-DOS 6 display driver) will have their high bits set (bit 7, a value of 128, which is unused for codes zero to 127). This effectively sets their values 128 higher. Thus zero becomes 128, 1 becomes 129, etc. Of course this is only internal to the VIDX display routine. If you sent a code in register "A" to the display driver from machine code, on return from the display driver register "A" will still contain the original value.

As expected, code 17 turns the high-bit routine off. Thus codes will NOT have 128 added to them internally. However, the reverse video is STILL in effect. Just try printing codes 128 and up and see what happens. To turn the whole "smeal" off and reset codes 128 through 255 to normal, you print CHR$(28), the HOME CURSOR code to the display. Be aware that printing codes 192 through 255, if tabs are enabled, will still do tabbing, because this is a software-controlled feature.

Well, I've run out of room. So fire up the imaginations and submit programs that use these new features to CN80. Meanwhile, I'm going to get busy preparing more exciting capabilities for you to flex on your I/III/4's! HAPPY COMPUTING!!!!

David Goben
417 Prospect St, 1st Floor
Willimantic, CT 06226
(if you write, send a SASE for a reply)

A REVIEW OF PROGRAMS ON GAME DISK 12 AND 10 from The File Cabinet Library.

By Hugh Abrey

The following programs are found on game disk number 12:

ELECTRO/BAS
This program is a game of run and chase. The playing field is enclosed by an electric fence and also has electronic barrier. You run and try to avoid being hit by lightning. It is possible to teleport to a safety zone. This program might amuse young children.

LOTTERY/BAS 1989-88 By C. W. Smith
Prints out a series of random lottery numbers, after you input the highest number allowed in your state.

MIKE/BAS
Makes a pin-up calendar for any year you choose. The figure is that of a well-built young man.

MSQUARE/BAS
Prints Magic Squares of the size you specify, from 3x3 to 19x19 numbers. Each row, column and diagonal all total the same.

PASART1/BAS
Creates designs based on PASCAL'S Triangle. It gives a list of options for you to choose from and prints the pattern plus a Calendar for the year you choose between 1600 & 2300.

POKER7/BAS
Is a Jackpot Poker program. You may watch seven players or be one of them. You can even choose which position you will play.

There are no Wild Cards and a three card draw limit. You must have Jacks or better to open. Chips are $5.00, $10.00 & $25.00. It shows the individual hands as dealt, each player's action and the cards again after the draw, plus what each player elects to do.

It keeps a total of the amount in the pot and gives the standings after each hand is played out.

This program has over 500 lines of source code.

ROCKET/BAS
Offers two choices. #1 is for designing a Rocket. You specify the weight, body diameter, drag and type of motor; there are eleven motors to choose from.

It shows the time, in tenths of seconds, and the altitude, velocity, acceleration and weight for each time interval and then adds the max. altitude and time to get to the peak.

#2 Gives the stability calculations. It will draw the rocket and ask you to furnish the dimensions and information necessary for the program to calculate the rockets stability and displays it on the screen.

START/BAS
Is called STAR TREK 2500 AD. It is very complicated and different from most of this type game. You can save a game for replay, or to continue, or play a new game.

It has twenty eight screens of instructions and hints, listing the goals of the game. They printed out on fourteen pages. It has ten levels of difficulty and twelve different commands with most of these having several options.

The program uses over six-hundred lines of source code and takes a great deal of strategy and knowledge about the game to become proficient.

The following are on The File Cabinet Game disk number 10:

ESCAPE/BAS
Escape from a jail cell. FIRST ADVENTURE by DAVID MENY. May 15th, 1985. The program has over 350 lines of source code but there are no instructions on how to play the game. Anyone familiar with this?

FORTUNE/BAS
This is a wheel of fortune game for one to five people. It has instructions that say when your name is blinking, reverse video, it's your turn. It shows the categories and players names. At the bottom of the screen it shows the options, F1 Spin the wheel, F2 Buy a vowel, F3 Guess the puzzle. At this time pressing the keys, any of the keys, has no effect. It does nothing.

There is a program on the disk called FORTUNE/DAT. But I don't know how to use this. Perhaps it must be used in conjunction with FORTUNE/BAS. Can Someone help?

GUNNER/BAS .. WELCOME TO BUNKER 7.
This is a gunnery angle of trajectory at which the artillery is to be fired, to hit the target,, at specified distances. You are limited to ten shells per target. With some practice it is not too difficult to come close on the first or second try.

LANDER4/BAS
As the commander you are to land a space ship. The distance you are above the landing spot is given along with the rate of descent and the amount of fuel left.

It takes quite a lot of calculation and skill to make it all come out right for a safe landing.

LIFE/BAS
LIFE ON A 4P by L Vancil.
This one also has no directions and I didn't figure out what to do with it. Can someone help please?

PARTYGM/BAS
This is a game for adults, A kind of strip poker and added features. OK for a married couple, if your wife is willing.

PICKS/BAS
This one is a Football program to pick the point spread of any given football game between the twenty-eight teams of the N.F.L.

POKER/BAS
This a good poker game. There are no instructions on how to play the game. You can state which cards you want to hold, cancel or enter for a new hand. It keeps track of the coins won or lost.

POLYNADV/BAS
You are at a Polynesian Treasure house. There are no instructions to go with this; you are on your own unless someone offers help. HELP!!

SEABATL4/BAS
You are in a Submarine set out to destroy the enemy ships in your area, without letting them destroy you. The ships have depth charges and there are monsters.

Torpedoes don't affect them but a missile will kill them.

You may issue any one of ten orders to help you out of your dilemma.

SIXTYMIN/BAS
A satire of the Sixty Minutes TV program with Dan Rather and Morley Safer, having to do with a teenager and his computer. It also involves Senator Proxmire.

SQUARE/BAS
A game for one or two players. Play an opponent or the computer. It lays out a grid of dots. The object is to place a marker at four corners to form a square before your challenger can complete his, or keep him from making a square. Each player has twelve markers and a choice of who starts.

It sounds and looks easy but the computer is a real challenger. GOOD LUCK!!

AWARI/BAS
There are no instructions with this game and a list of the program didn't help me know what it was to do or how to get started. Help!

BLACKJAC/BAS
This is a good game of Blackjack played by Casino rules. You have the option of having a running card count and may automatically stand on seventeen or nineteen card count. The minimum bet is $2.00 and the maximum is $500.00 but not to exceed your bankroll which starts with $200.00. You can choose to play with one, two or four decks.

CRESTORY/BAS
This program creates a story, part of which is already programmed in the computer. You enter your name, eleven adjectives, five adverbs, ten nouns, two first names for a man, a women's first and last name, plus a geographical location, a kind of liquid, and on or two exclamatory words. The Computer then uses these to write stories or a newspaper ad. It can be quite amusing, depending on the words entered.

CRAM/BAS
A rapid moving line starts across the screen. you change the direction, or make turns, with the arrow keys. The object is to make as many turns as possible without hitting any of the lines already drawn, which ends the game.

This is a fast moving game requiring practice and skill.

DOGDO4/BAS
This is an upgrade of an older game. It was written by Colin Dunn. It is an exercise in trying to cross the street without stepping in dog poop. There are cripples to help, for extra points, and manhole covers for those that know what to do with them. It becomes more difficult as you go along. There are least eight levels of play. Interesting and challenging.
-Hugh Abrey

Editors Note: We thank Hugh for taking the time to review these game disks and write a short description of what the games are all about. We will print more outline descriptions of the programs in The File Cabinet Library as time goes on.

For those who like the mental challenge that most computer games provide, you will certainly find one that suits your taste among the 25 disks in this collection. Just think with 15 to 20 games per disk for $4.00, when one game selling in the stores goes for $9.95 and up.

We would welcome your input on The File Cabinet disk that you have purchased, and not just the game files, but the utilities, the business and other files as well.

TRANSFERRING FILES VIA THE RS-232 PORT

by John Gregg

One of the problems we encounter when moving from the usage of one computer to another is the transfer of that favorite basic program which cost so many hours of our time. Or perhaps you have a large data base you would prefer not to retype. The movement of these can be accomplished without too much pain.

The easiest way is probably by means of a conversion program if available. Otherwise the use of the RS-232 port is fairly simple

and inexpensive. It is, however, much slower.

The pin assignment of the RS-232 standard are as follows:

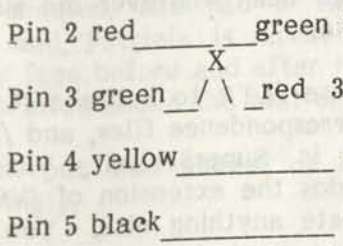
1 Ground
2 Transmit data
3 Receive data
4 Request to send
5 Clear to send
6 Data set ready
7 Signal Ground
8 Carrier detect
20 Data terminal ready
22 Ring indicator

Since the usual connector used as the serial port is a 25 pin "D" it is apparent that all are not used. Some are reserved for future use and some are not required for all applications. For example, Tandy's Color Computer only uses four. Some AT class machines uses a nine pin connector.

While data can be transferred with a direct modem to modem connection, it seems to work better with a direct port to port connection. For this you need a null modem. These can be purchased for less than $10.00 from various sources. If you already have the cable this is probably the best solution. Rather than purchase both the cable and null modem you might prefer to construct a "null cable". If the connectors are non-standard, you may have no choice but to construct it.

Purchase the proper connector for each serial port and the proper length of four strand wire. Telephone cable works well.

Begin by soldering one wire to pins 2,3,4, and 5 on one connector. For example, the red wire to pin 2, the green to pin 3, etc. Only these pins will be used. On the other connector, reverse the wires from pins 2 and 3, that is the red will be soldered to pin 3 and the green to pin 2.



Connect the cable to the serial ports, load your favorite communication program on each machine, and you are ready to transfer. The task goes rather slowly with large files at 300 baud. Try 1200 or even 9600. Some machines will, some won't. Parity and bits is not likely to be critical but should be the same in each communications program. Try the defaults. No parity, 8 data and one stop bit should work fine.

Your BASIC programs will have to have been saved in ASCII format (SAVE"NAME/EXT",A). Also your data files or you are likely to get garbage. This does not assure that your BASIC program will run on the other machine. Some will, others will require some modification due to differences in key words and syntax.
-John Gregg

FILE MANIPULATION FOR BEGINNERS
Part V

We have many readers who have just started to expand their horizons in the use of their computer. Several have had their computers for years, working from within commercial canned programs, who are now just getting acquainted with their DOS systems.

To get the full benefit from your computer, it is a must that you study and use the capabilities that your systems disk operating system provides. You really don't need to know all the commands, but it is mandatory to know how to use such things as BACKUP, DIRectory, COPY, REMOVE, and LIST commands from the DOS command level.

Let's not leave out BASIC. You don't have to learn any more BASIC than a few of the standard BASIC commands to be able to use some of the great public domain BASIC programs that are available. Such as those you can find in the File Cabinet Collection.

To be able to enter BASIC, to load programs, run the programs, and to exit the BASIC mode back to DOS ready, are about all you need, along with List and LList

which are used to call up the program's text or data disk text to the screen (LIST) or to send it to the printer (LLIST).

Most DOSs use very similar commands to do the same thing, and the following is not meant to be a tutor for every DOS now in use, it is intended to make you aware of how few commands you need to know to break out of depending on canned programs.

For example to remove a file from a disk using TRS-1.3 the command is KILL and in TRSDOS 6.x and LSDOS 6.3 it is REMOVE. But the concept, the spaces needed in the command line, the colon for disk drive number and several other syntax layouts are the same, or very similar.

If you have just received a disk full of programs and you don't know what is on that disk, then reading the directory is the second thing to do. The first thing you should have done was to have made a WORKING COPY of the original disk. Then, if the working disk copy becomes damaged in the future you will have your original disk to restore it with.

The first step in any file manipulation always starts with the use of the BACKUP command.

The next question that comes up is - "I can't get the xxxxxx/DOC program to run."

That is because the file is not a program, it is most likely a data text file.

Another question commonly asked is "I can't get the xxxxx/CMD program to come up on the screen."

That is because the file may be a machine language program that does not have a banner and a menu. It is a computer command program that tells the computer to do something and does not need to talk to you via the screen or give you a menu of selections to use. Many times the /CMD files will do such things as put the computer into the BASIC mode, so it can run a basic program without you having to enter all the key strokes to do the same thing.

The next common question is, "How do I get the printer to print a program?"

To print any file with the extension of /DOC or /TXT which are not programs that run on their own. Usually they are text files that provide the documentation for the program that they were written for.

For example:

KONAN/BAS - normally would be a basic program that you would have to load into basic to run.

KONAN/CMD - normally would be a machine language program that would run all by itself by typing

KONAN <ENTER> at dos ready prompt

it also might be a command that would enter basic, load the program and run it, as is the case with our README/CMD on the disk, which installs basic, runs the program and reads the README/TXT file.

KONAN/TXT - /DOC, etc. are text files that can be brought up to the screen by typing

LIST KONAN/TXT <ENTER>

or type

LIST README/TXT <ENTER> and you will see the difference between reading the text under dos and using our README/CMD program command.

/DAT - files with this extension are normally given the /DAT extension to reflect that they are data files. One common use is to identify the file that a program sets up to store certain information for access by the program as it runs. Normally this type of /DAT file can not be used for much else, other than by the program it stores data for and then feeds back to.

However any three letters can be used as file extensions to mean whatever the author wants to indicate.

For example I use /LTR to indicate it is a letter in my correspondence files, and /SCR for documents in SuperScripsit, VisiCalc automatically adds the extension of /VC, if you don't indicate anything else. You can use anything you want, but some form of

standardization really helps the other person who might be using your data disks.

So, the commands to view a file are the same regardless of what the extension is. Generally if you view a /CMD file the computer screen will show you all kinds of weird things, and you may have to hit reset to restore the screen. But it is a good way to see what the file is.

An ascii text file will look just like that - a text.

A machine language program will look just like that - something only the computer could love.

A complied basic program would be a bunch of jumbled lines on the screen. But a basic program stored in the ascii mode would look just like the basic program, just the same as if you had loaded the program into BASIC and then asked to see what it looked like by typing LIST <ENTER> while in basic with the program loaded into basic.
-CN80

SPEAKING LOUDLY
by Dale Hill

"Thanks, Dale! Wow, this is neat!"

We had taken a girl for the Thanksgiving Holiday who couldn't be with her parents. Her name was Patricia, and we have had her before and expect to have her again. I had asked her if she had any computers at her school or if she got to work with any. Her reply was negative, so I quickly sat down at my Model 4P with my trusty 120 DMP printer and pulled out "Long and Loud".

Did she like the results? You bet. Within a few minutes, she had a two-page banner that said,"Patricia is number one!" with a happy face before and after her name which was printed above the rest of the quotation.

"I can put this above my bed," she said admiringly.

Is a banner with Long and Loud that easy? Well, ... with all honesty yes, if you have the documentation. I had looked at a copy of the CPM version of Long and Loud in the past with the idea of purchasing it. Without documentation, it was difficult, but not only that, I do believe getting a good installation with my setup would have been difficult. With TRSDOS version and the manual, it is a piece of cake.

Much has been said about Long, but little has been said about Loud. Funny, the name "Long and Loud" is a bit confusing. Even though banners are long, one has to use "Loud" to print them. "Long" is for printing spreadsheets out sideways. Maybe a better name for it would have been "Sideways and Long"!

At any rate both come on the supplied data disk from Spectre Technologies, Inc., which can be purchased from good ol' CN-80. Moving them onto their own system diskette takes up about 120k and can be done easily and efficiently.

The installation process is as easy as rolling over in bed. Simply type "Install" and the rest is elementary - after a short wait. When choosing a printer, the installation process gives you 4 screens of 16 printer choices and one more screen of only 4 choices: 69 printer choices in all. Okidata printers have 4 files with 12 printers listed so the actually number of printers supported is probably closer to 200 - not bad for a $34.95 jewel from CN-80. Incidentally, Radio Shack printers are well supported, though the Line Printers are not listed nor is the DMP 105.

After installing LOUD, either type "Loud" as a command file or press enter over the LOUD/CMD on your DOS shell, and your first screen is up in little more than a flash. Documentation is needed here and should be read carefully. Once, though, you get the hang of it, bannering is easy.

Three "Output formats" are supported: Graphic Mode, Quick Mode and Quick Mode Auto. Lets face it, the Graphic Mode leaves a lot to be desired and, with 4 available print lines, text must be put on the first and fourth line or the banner will be jumbled. The print out using the Graphic Mode is simply not that "aesthetically

pleasing". But wait 'til you try the other two.

Using the Quick modes, the program will not allow you to jumble up text as easily and produces well defined fonts: Times Roman, Sans Serif, Olde English and Script. Each of these "Typefaces" take up about 12k of space on your diskette. The banners produced are "Dot Matrixy", using either the asterisk or the letter of your choice to print out the words. The fifth choice is a neat addition to the banner program.

Typeface 5 is actually 13 choices of pictures that can be printed out on the banner with the alphabet A-M assigned to each one. Our visitor sure loved the happy face, but the heart is neat as is the musical note and the floppy disk. A typographical error in the book leaves space for a little laugh.

I printed one banner out for my daughter and the letter F is assigned to the symbol "space". Now, I had never seen a space printed out and so I tried it. My daughter saw the banner with hearts on it and a couple of out-of-place symbols.

"What are those, Dad?" she asked.

"Those were supposed to be spaces but they ended up being 'SPADES', dear!" I laughed.

I eat a lot of crow around our house and living near Fort Cobb Reservoir, the crow capitol of the world, there is a lot of crow to eat. I must admit, "Loud" is an excellent banner program, easy to use and quite flexible. With a price as advertised in Computer News 80 of $34.95 for both Long and Loud, why not jump in head first and try it - your kids will love it. You never know who may have a budding PRESIDENT in their household.
-Dale Hill

ZAPPING THE MODEL 4 PRINTER DRIVER
by Bob Martin

It all started about a year ago after I had purchased all the back issues of CN80, read them all about two times, and decided to use some of the Utility programs I have been collecting. My pet peeve at the time was the way the printer would kick completely out of its operation if for any reason it went off line during a printing session - and I print a lot of /doc/txt files, as well as basic programs, to see what they are all about. I tried David Goben's patch in CN80's Vol. 1 No. 1, which was supposed to force the computer to wait until the printer goes back on-line, but it didn't work (I found out later that it was never installed like the computer said it was).

So I called on "Big Will" at nearby Ferris State University and asked him if he had the fix. Now, "Big Will" is who I look up to in the TRS-80 world. He tore apart and rebuilt a Model 4, dis-assembled the code and re-assembled it the way he liked it, forgot more than I'll ever know, and he's always got at least three answers to all my questions. Well, he told me all about the printer driver, sent me down a printout of the code and told me to change 0E2C from 20 to 18, and why, but when I hung up the phone, all I could think of was "what the bleep did he mean by that...". I did however catch the challenge he put to me, so I opened up my copy of "Model 4 by Jack" and dug in. Now that CN80 has been giving us articles on Assembly Language, the code Will sent me makes a little sense, but back then I was lost. He told me he'd be right proud if I could do it in two weeks, but that he would call me in a month if he didn't hear from me first, so I dug right in.

The first thing I did was invoke the DEVICE (B=YES) command, which listed *PR => X'0E01', the start of the driver code in memory. I used Mel Patrick's OVERVIEW//CMD and dis-assembled 0E01 to 0E3D, and duplicated the program that Will had sent to me, both listing 0E2C as having a value of 20, my target. I then used both Brian McKay/Bruce Travers' TSK/CMD, and David Goben's UTILITY4/CMD to find, display, and then zap the value of 0E2C from 20 to 18 and then try out the printer - and after turning it off-line in the middle of a session, everything waited patiently

(while I ate supper) until I put it back on-line and it resumed where it left off. Now all I had to do was change it on the disk, wherever the bleep that is.

Since David Goben's original patch was in BOOT/SYS, that's where I started. So, using my trusty SHELL20/CMD (a bonus shareware program in CN80's Disk #1 and also found in the FILE CABINET), I effortlessly <L>isted out all the sectors of Cylinder/Track 0 to the printer, using the password LSIDOS, and went looking for a match of the ".....z...>." ascii line that contained the 0E2C byte 20 in the line of hex/ascii in the memory sector (I didn't then, and don't now, know how to do it any other way - but I'm learning). And I found that sucker in sector 000C hex, the 13th sector, with the byte "20" in the third row (row 20 hex), under column 0C hex, therefore, it was the 45th byte (2C hex) in this 256-byte sector. I promptly inserted a BACKUP COPIES of my system disk and zapped them to "18" (one with TSK and one with UTILITY4, learning the mechanics of both). I re-booted each one and smiled inwardly as both passed the "printer off-line" smoke test.

Then, upon closer inspection of the same line, I found David Goben's patch, that is, the lack thereof - my computer had lied to me and had never made the patch of the seven "F"ind bytes in record 0C hex, starting with byte 21 hex....which made me think PATCH THE SUCKER! So I re-read Henry Herrdergen's dissertation on Patches for Model III, dug into Model 4 by Jack, insert another BACKUP System Disk and typed in PATCH BOOT/SYS.LISDOS (D0C,2C=18:F0C,2C=20) and BWALLAH! It worked! Now this is no great feat for you heavyweights, but its a landmark for me.....I can fight my way through this stuff if I think it out, read a lot, and exercise a little caution.

Well, I called up Will and gave him the good news and he said he had confidence in me - then he gave me some "bad" news.....that he had acquired a loaded 286/12, 1Meg of RAM, 60 Meg, Dual Floppies, math co-processor, modem, EGA, yaadi-yaadi etc, and that he had boxed up his Model 4 and he "won't be back" - but he'll be around. Well, that's not all that bad, because I also have a MS-DOS machine and we both measure our software in feet (TRS-80 and MS-DOS). But before he hung up, he told me to get off my duff and put the two 360K double sided drives I got for a right price, either into or external to my 4P, in a challenging sort of way, "and have some fun" (on a lesser scale than what he did to his Model 4), and I knew just what he meant. All I lack is the guts, but its winter, and its time, so here's to the next time.
-Bob Martin

RETURN ADDRESS BASIC PROGRAM
by Henry A. Blumenthal

I decided to send this program to CN80, for whatever it's worth. It is a BASIC listing, for the Model 4, (see program listing number three) of my program for a DMP130A printer that gives a return address complete with a graphics representation of the printer. The graphics part comes from the printer manual. Line 170 is an optional form feed if you want only one return address on a printer page.
-Henry A. Blumenthal

OPEN FORUM

LTR: This open letter is to express my appreciation to an "OUTSTANDING" person in the Tandy computer community. This person is none other than David Dalager of Arlington, Texas. I heard of David via the TRSLINK newsletter and called him when I started having trouble with my Tandy 5 Meg hard drive. I was having trouble getting the computer to recognize the hard drive and the hard drive was acting erractic and giving me numerous Error 11H's. In talking to David he instructed me to try several things before suggesting to send the HD to him.

I sent him my 5 Meg with instructions to completely check the HD and call me with the results. I also inquired about replacing bubble with a larger one. He called a few days later with good news, bubble was ok, but power supply and several other small

items were bad and needed adjusted. He also came up with a 20 meg bubble (Mini Scribe) for quite a reasonable price. Needless to say I didn't expect to get a hard drive with double + speed over the 5meg and the hard drive formatted into 5 drives. He also installed a new power supply and line filter. What I now have is a spectacular Tandy with all the storage I need and a great working machine. All I have to say is; if you're having problems with your Tandy, wanting some information, or looking for some equipment, the one call to make is to David Dalager in Texas at P/N 817-640-6204.

David also suggested that I check out "Computer News 80" for some excellent information and reading on Tandy TRSDOS/LS-DOS equipment. I now have a subscription and look forward to each issue. It's great to finally find some help on these great machines!
-R. J. G. Youngstown, OH

LTR: I do not claim to be an expert on keyboard repairs, yet I frequently have to repair various keyboards from many different manufacturers. The TRS-80 users are lucky in the fact that the keyboards use common keyboard switches. Other computer users are not so lucky (Commodore users to be specific).

My recommended procedures for keyboard maintenance start simply: keep your keyboard covered when not in use, and wash your hands before using. When you do start to find a key acting "sticky" or not functioning correctly, then you need to take appropriate action.

Some keys stick because the switch shafts have to much dirt on them. Remove the key caps, wipe the exposed part of the shaft with a dry cloth or paper towel to remove as much dirt as possible. Then I recommend using a light oil that will not harm the plastic. I have found that WD-40 has worked on most of the TRS-80 keyboards I have tried. Spray a little of the oil into a container. Insert a cotton swab (Q-tip) into the oil. Apply it sparingly to the shaft of the switch. This usually solves the problem. You may need to repeat the "wiping, oiling" processes a few times on very sticky key switches. If that does not work, you should replace the switch.

When the contacts get bad, I find that they usually just need a good cleaning of the dirt. Most contacts inside switches either have dirt breaking the contact or the contacts have actually been worn away (the action of the switches have a tendency to keep the contacts clean - they are a bit abrasive). I find that giving the switch a good soaking with isopropyl alcohol will usually help remove the dirt. The comment about putting the keyboard in a baking tray is a good idea. I do not use non-residue cleaners on key switches, unless I know exactly what is inside the switch (which on many occasions I do). The switches should be operated to make sure the alcohol does get inside. The keyboard should then be set on a cloth or paper towel, with key side down. The switches should again be pressed to allow the alcohol to drain out. Let the keyboard dry in this position for some time.

If you have one or two bad keys, you can usually fill the switches with cotton swabs soaked in alcohol. To remove the alcohol, take the cloth or paper towel and operate the switch a number of times. This is a pumping like action which helps remove the alcohol. The cloth or paper towel will help soak out the alcohol. Again let the keyboard sit for a good while to dry. The alcohol may "dry out" the shafts of the keys and cause the sticking key problem. Again, putting a little light oil on the shaft should decrease the friction.

My best recommendation is to replace the switches. Frequently, the computer has had a lot of use (otherwise, you know the key is dirty from non-use). This usually means that key action has worn the contacts, and thus cleaning is only a delay of the inevitable - key replacement. The switches for most TRS-80 keyboards are available, but may require you to look. I found a local supplier for my switches that could supply them for $2.00 each. There are two types of switches (typically) for the TRS-80 keyboards - two pin and four pin switches. Check your keyboard before purchasing.

If you have a number of switches that are bad, I recommend a keyboard replacement. This is relatively easily done, but you may

ask for help from someone experienced with such devices. The cost of continually replacing switches as they go, will be more than the keyboard replacement. Additionally, the replacement will typically last longer than a repaired keyboard. There are other ways of maintaining and repairing your keyboards, but these have given me the greatest success and the longest lasting repairs. Be sure to determine how the keyboard is used, and you will be able to determine the best type of repair or cleaning to do.
-Bret Bensley

A WORD ABOUT PRINTER RIBBONS

As you will see when you check out the TRS-80 Product Source section, we have stocked an almost complete line of printer ribbons for the Radio Shack printers.

We have tried to answer the needs of those who have told us they could not find the correct ribbon for their Radio Shack printer. Or if they did find them, the price was very high. Or they had to buy a minimum of six ribbons to place a mail order for them. For many users six ribbons at a time is too many. We believe that our service which allows you to buy just one ribbon or as many as you want, at a reasonable price, provides just another service our readers can use.

If you have a DMP 105 printer - don't throw the cartridge away. These cartridges are no longer available except from Tandy, but they can be easily refilled using the ribbon refill pack that we stock.
-CN80

A: J. M. of Madison Heights, MI, Open Forum (Vol 2 No. 11, p. 26) is having a problem with the Alpha Technology memory board. I don't have any experience with a Model 4P, so this may not help.

My instructions for a gate array Model 4 require that the break key be held down on power up and answer the memory prompt with 32000.

Within the past two weeks I installed a board I've had since July 1987, (RAM prices finally came down). The 74LS32N chip had been inserted backward. When I attached the final 3 wires in the instructions and powered-up the result was a blown chip and garbage on the screen. No other damage apparently, but it was a nuisance to trouble shoot. Luckily I had a spare chip on hand for another project.

If J. M. or anyone else is installing this design board I would certainly suggest a close visual inspection to make certain all the components match the socket orientation notches. It's an easy mistake to make, especially if non-technical labor is used to stuff the boards.

The board works great now (evidence this letter) SuperScripsit is so much faster from RAM disk 1024, and quite too, except for the cooling fan.

Please keep up the good work.
-P. D. Coos Bay, OR

A: P. E. H. Long Beach MS (Open Forum Vol 2 No. 9 pg. 24) wrote that in using Multiplan for calculations for successive months, he did not want it to re-calculate past months. Suggest he try making a DIF file of the area on the spreedsheet where he wants to remove the formulas and then re-boot the DIF file back into the same area to keep the caculated data intact.

Don't forget to copy the formulas to column for the next month before locking the past month.
R. L. M. Fairmont, MN

Example of DMP printer artwork using The FILE CABINET HiRes Utility and MacPaint Picture Files. No HiRes Board Required.

VIDX/CMD - PROGRAM LISTING NUMBER ONE by David Goben

```
10 CLS:PRINT"BUILDING 'VIDX/CMD'":RESTORE
20 H$="0123456789ABCDEF"
30 OPEN"O",1,"VIDX/CMD":L=90
40 CS=0:L=L+10
50 READ A$:IF A$="END"THEN CLOSE:END
60 IF LEFT$(A$,1)="-"THEN 80
70 A=INSTR(H$,LEFT$(A$,1))*16+INSTR(H$,RIGHT$(A$,1))-17:CS=CS+A:GOTO 50
80 IF VAL(MID$(A$,2))=CS THEN 40 ELSE PRINT"CHECKSUM ERROR IN LINE"L:END
90 ''' DATA AREA '''
100 DATA 05,06,56,49,44,58,20,20,01,FE,00,52,01,CD,94,53,56,49,44,58,-1479
110 DATA 20,31,2E,33,20,2D,20,56,69,64,65,6F,20,53,63,72,65,65,6E,20,-1462
120 DATA 45,6E,68,61,6E,63,65,72,20,66,6F,72,20,54,52,53,2D,38,30,20,-1625
130 DATA 4D,6F,64,65,6C,20,49,20,61,6E,64,20,49,49,49,0D,43,6F,70,79,-1616
140 DATA 72,69,67,68,74,20,28,63,29,20,31,39,38,39,20,62,79,20,44,61,-1453
150 DATA 76,69,64,20,47,6F,62,65,6E,2E,20,41,6C,6C,20,72,69,67,68,74,-1779
160 DATA 73,20,72,65,73,65,72,76,65,64,2E,0D,0D,00,7E,E6,5F,FE,58,20,-1908
170 DATA 05,3E,18,32,5F,54,2A,1E,40,22,B2,53,23,23,23,23,11,A5,53,06,-1162
180 DATA 06,1A,BE,20,27,13,23,10,F8,CD,94,53,50,72,6F,67,72,61,6D,20,-1807
190 DATA 61,6C,72,65,61,64,79,20,69,6E,73,74,61,6C,6C,65,64,2E,0D,00,-1789
200 DATA 21,FF,FF,C9,2A,49,40,3A,0F,00,FE,06,F5,28,2C,3A,00,52,B7,28,-1948
210 DATA 0C,21,14,42,22,3A,53,22,5B,54,22,96,54,AF,32,3B,54,32,C6,53,-1482
220 DATA 3E,8E,32,2D,54,3E,04,32,8B,54,21,10,42,22,88,54,2A,11,44,22,-1252
230 DATA A3,53,E5,11,01,FE,FC,52,C7,54,A7,ED,52,44,4D,21,C8,54,5E,23,-2441
240 DATA 56,7A,B3,28,10,23,22,04,53,EB,5E,23,56,EB,09,EB,72,2B,73,18,-1824
250 DATA E6,D1,01,27,01,21,C7,54,F3,ED,B8,13,EB,22,1E,40,2B,F1,20,05,-2163
260 DATA 22,49,40,18,03,22,11,44,AF,32,9F,40,FB,CD,94,53,70,72,6F,67,-1892
270 DATA 72,61,6D,20,73,75,63,63,65,73,73,66,75,6C,6C,79,20,69,6E,73,-2031
280 DATA 74,61,6C,6C,65,64,2E,0D,00,3A,5F,54,FE,18,20,28,CD,94,53,43,-1779
290 DATA 4C,53,20,74,6F,20,63,6C,65,61,72,20,70,72,6F,74,65,63,74,65,-1871
300 DATA 64,20,61,72,65,61,20,65,6E,61,62,6C,65,64,0D,00,21,00,00,C9,-1535
310 DATA E3,7E,23,B7,28,05,CD,33,00,18,F6,E3,C9,18,11,00,00,05,24,56,-1738
320 DATA 49,44,58,00,00,DD,CB,FF,BE,C3,00,00,DD,CB,FF,FE,2A,20,40,DD,-2585
330 DATA 7E,05,38,74,B7,28,01,77,79,18,41,06,00,05,28,57,B7,20,07,3C,-1276
340 DATA 32,C8,53,3D,18,59,FE,11,28,07,FE,10,20,2A,3E,80,06,AF,32,22,-1624
350 DATA 54,B7,28,1D,3E,08,D3,84,18,17,21,71,78,44,3E,01,D3,90,D3,FF,-2014
360 DATA 01,E2,F8,53,10,FE,44,3D,D3,90,D3,FF,10,FE,2D,20,EC,79,18,27,-2545
370 DATA FE,C0,30,2E,FE,07,28,DE,FE,0D,28,54,FE,0A,28,50,FE,1C,28,35,-2213
380 DATA FE,20,3F,30,8C,06,00,AF,32,C8,53,79,B0,CD,85,54,CD,80,04,DD,-2328
390 DATA CB,FF,BE,C9,B7,20,F8,7E,18,F5,18,06,DD,7E,07,B7,20,DF,79,D6,-2864
400 DATA C0,28,E5,47,3E,20,CD,85,54,10,F9,18,DB,CD,B1,53,AF,D3,84,21,-2572
410 DATA 00,3C,3A,9F,40,E6,0F,28,CB,11,40,00,19,3D,18,F7,7D,E6,C0,6F,-1925
420 DATA 11,40,00,19,CB,74,28,05,CD,92,54,18,B3,E5,36,20,23,7D,E6,3F,-1876
430 DATA 20,F8,E1,18,A7,77,23,3A,3D,40,E6,08,28,01,23,CB,74,C8,21,C0,-2091
440 DATA 3F,3A,9F,40,E6,0F,FE,0F,28,20,3C,21,00,3C,11,00,04,C5,01,40,-1366
450 DATA 00,09,EB,A7,ED,42,EB,3D,20,F7,D5,E5,A7,ED,42,EB,E1,C1,ED,B0,-3267
460 DATA C1,EB,E5,36,20,23,CB,74,28,F9,E1,C9,2A,54,4B,54,75,54,52,54,-2464
470 DATA D1,53,25,54,E3,53,00,00,02,02,01,52,-810,END
```

BUILDING PROTECT/CMD - PROGRAM LISTING NUMBER TWO by David Goben

```
10 CLS:PRINT"BUILDING 'PROTECT/CMD'":RESTORE
20 H$="0123456789ABCDEF"
30 OPEN"O",1,"PROTECT/CMD":L=90
40 CS=0:L=L+10
50 READ A$:IF A$="END"THEN CLOSE:END
60 IF LEFT$(A$,1)="-"THEN 80
70 A=INSTR(H$,LEFT$(A$,1))*16+INSTR(H$,RIGHT$(A$,1))-17:CS=CS+A:GOTO 50
80 IF VAL(MID$(A$,2))=CS THEN 40 ELSE PRINT"CHECKSUM ERROR IN LINE"L:END
90 ''' DATA AREA '''
100 DATA 05,06,50,52,4F,54,45,43,01,35,00,52,11,00,00,7E,23,FE,0D,28,-1093
110 DATA 14,FE,30,38,10,FE,3A,30,0C,EB,29,44,4D,29,29,09,85,6F,EB,18,-1781
120 DATA E5,7B,E6,0F,32,9F,40,67,3A,0F,00,FE,06,7C,28,03,32,14,42,21,-1642
130 DATA 00,00,C9,02,02,00,52,-287,END
```

RETURN ADDRESS BASIC PROGRAM FOR DMP 130A PRINTER - PROGRAM LISTING NUMBER THREE
by Henry A. Blumenthal

```
10 LPRINT CHR$(18)
20 FOR R=1 TO 5
30 READ N:IF N=999 THEN 80
40 IF N>=0 THEN LPRINT CHR$(128+N);:GOTO 30
50 READ M
60 LPRINT CHR$(28);CHR$(-N);CHR$(128+M);
70 GOTO 30
80 LPRINT:NEXT R
90 LPRINT CHR$(30)
100 LPRINT CHR$(27) CHR$(66) CHR$(1) CHR$(27) CHR$(29);
110 LPRINT "From the printer of ..."
120 LPRINT CHR$(27) CHR$(66) CHR$(0);
130 LPRINT CHR$(27) CHR$(29) CHR$(27) CHR$(14) " A. COMPUTER USER"
140 LPRINT CHR$(27) CHR$(15) "  123 Main Street"
150 LPRINT "  Anywhere, America 12345-6789"
160 LPRINT CHR$(27) CHR$(19)
170 REM SYSTEM"tof"
180 DATA -8,0,64,32,12,4,66,97,-4,113,97,110,-4,104
190 DATA -5,80,-7,32,-6,64,-5,32,96,999
200 DATA -3,0,96,16,72,116,59,8,96,112,-24,127,-6,126
210 DATA 64,56,70,49,8,0,127,999
220 DATA 120,6,65,68,71,75,8,10,-3,11,-2,19,-4,23
230 DATA -2,39,-4,47,-2,79,-4,95,-2,31,-5,63
240 DATA 31,7,115,13,66,125,62,29,96,24,6,1,999
250 DATA 3,12,-4,16,-7,33,-7,66,-8,4,-6,9,-3,18
260 DATA 17,16,3,64,48,12,3,999
270 DATA -20,0,-8,1,-7,2,-4,4
280 DATA 2,1,999
```

From the printer of ...
A. COMPUTER USER
123 Main Street
Anywhere, America 12345-6789

ASCII FILE WORD SEARCH - PROGRAM LISTING NUMBER FOUR For the Model 4
Author unknown.

This short program can easily be typed in basic and it is a very interesting and useful little program.

Once you have typed the program into BASIC and typed RUN, it will ask you for the file you wish to search. Type the name of the file, it must be an ASCII file.

Then it will ask you for the word you want to search for. Enter the word and press enter.

The program will then send the File Name to the printer that you are searching, and the word that you are looking for as a header line in the print out.

It then proceeds to print out the text of the file beginning with the first line that has the word that you are searching for in it, and ends with the last line with the searched for word in it.

Remember to have your printer on and ready to receive the print message, as this program does not send the text to your screen. It runs very fast so there would be little need to send it to the screen anyway.

This program is a great little addition for those of you who have purchased our Bible series, as those files are all in ASCII. This program will be in our disk series number eight, but if you can't wait just drop us a line with enough money to cover the postage and the disk cost and we will mail you a copy of it. In the meantime it is a great little file for searching any ASCII text, or even a Basic program that has been converted to an ASCII file. For example if you were searching for the beginning and end of a particular string entry.

Many a little GEM like this in the File Cabinet Collection Library. - CN8Ø

```
1Ø1Ø PROG$="WORDSCAN/BAS":VERS$="89/12/14"
1Ø2Ø '
1Ø3Ø ' Scans lines of an ASCII file for a given character string
1Ø4Ø '
1Ø5Ø DEFINT A-Z:CLS:PRINT"       W O R D S C A N / B A S":PRINT:PRINT
1Ø6Ø PRINT "ENTER FILE NAME (MUST BE AN ASCII FILE) ";:INPUT "",N$
1Ø7Ø OPEN "I", #1, N$
1Ø8Ø PRINT:PRINT "ENTER WORD TO SEARCH FOR";
1Ø9Ø LINE INPUT"",A$:IF A$="" THEN 1Ø8Ø
11ØØ LA=LEN(A$)
111Ø PRINT:PRINT:PRINT:PRINT "     L O O K I N G  . . . ."
112Ø LPRINT CHR$(27);"E";CHR$(27);"G STATEMENT SCAN OF "N$" FOR '"A$;
113Ø LPRINT "'";CHR$(27);"F";CHR$(27);"H":LPRINT
114Ø IF EOF(1) THEN 118Ø ' End the program
115Ø LINE INPUT #1,F$:IF INSTR(F$,A$)>Ø THEN 116Ø ELSE 114Ø
116Ø LPRINT F$ ' Found the string, so print it
117Ø GOTO 114Ø ' Loop back to try next line, if any
118Ø LPRINT:LPRINT "  E N D  O F  F I L E"
119Ø PRINT:PRINT:PRINT " J O B  F I N I S H E D":END
```

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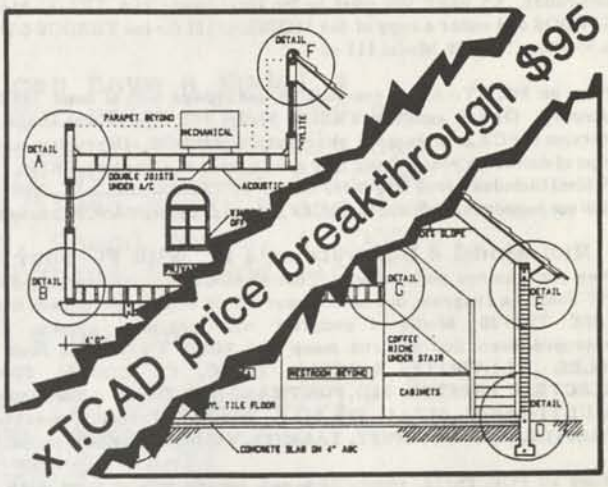

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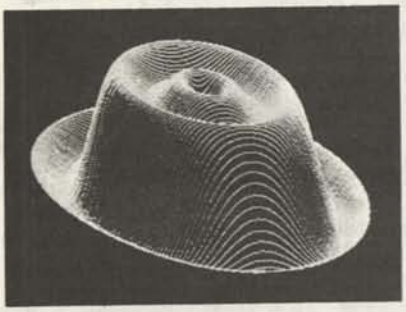

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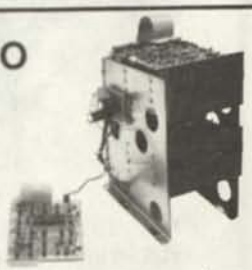

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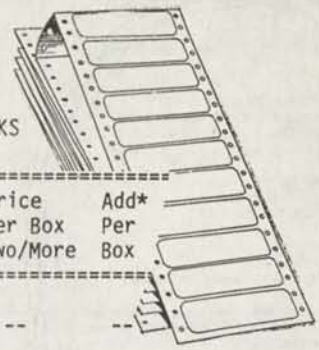

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TIME TO RENEW - CHECK YOUR LAST ISSUE DATE ON YOUR LABEL

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:

```
1Ø FOR X=Ø TO 255
2Ø PRINT CHR$(Ø);CHR$(X);
3Ø 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 SYSØ/SYS.LSIDOS space
(D=Ø9,BØ=13:FØ9, BØ=Ø9)
```

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

```
65100 GOSUB 65092:P#=1/P#:RETURN
65107 '
65108 '---INVERSE COSECANT (ARCCSC)
65109 '
65110 I#=1/I#
65117 '
65118 '---INVERSE SINE (ARCSIN)
65119 '
65120 IX#=I#:I#=-I#*I#+1:GOSUB 65040:I#=IX#/P1#:GOTO 65270
65127 '
65128 '---HYPERBOLIC SINE (SINH)
65129 '
65130 GOSUB 65070:P#=(IX#-IY#)/2:RETURN
65137 '
65138 '---HYPERBOLIC COSECANT (CSCH)
65139 '
65140 GOSUB 65070:P#=2/(IX#-IY#):RETURN
65147 '
65148 '---INVERSE HYPERBOLIC COSECANT (ARGCSCH)
65149 '
65150 I#=1/I#
65157 '
65158 '---INVERSE HYPERBOLIC SINE (ARGSINH)
65159 '
65160 IX#=I#:I#=I#*I#+1
65161 GOSUB 65040:I#=IX#+P1#:GOTO 65020
65167 '
65168 '---SECANT (SEC)
65169 '
65170 GOSUB 65080:P#=1/P#:RETURN
65177 '
65178 '---INVERSE SECANT (ARCSEC)
65179 '
65180 I#=1/I#
65187 '
65188 '---INVERSE COSINE (ARCCOS)
65189 '
65190 GOSUB 65050:GOSUB 65120:P#=P3#-P#:RETURN
65197 '
65198 '---HYPERBOLIC COSINE (COSH)
65199 '
65200 GOSUB 65070:P#=(IX#+IY#)/2:RETURN
65207 '
65208 '---HYPERBOLIC SECANT (SECH)
65209 '
65210 GOSUB 65070:P#=2/(IX#+IY#):RETURN
65217 '
65218 '---INVERSE HYPERBOLIC SECANT (ARGSECH)
65219 '
65220 I#=1/I#
65227 '
65228 '---INVERSE HYPERBOLIC COSINE (ARGCOSH)
65229 '
65230 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 '
6537Ø I#=IX#*IX#+IY#*IY#:GOSUB 65Ø4Ø:PD#=P1#:I#=IX#/PD#:GOSUB 6512Ø:PA#=P#:RETURN
65377 '
65378 '---DEGREES TO RADIANS
65379 '
6538Ø I#=I#*.Ø1745329251994329#:RETURN
65387 '
65388 '---RADIANS TO DEGREES
65389 '
6539Ø I#=I#*57.2957795131Ø8237#:RETURN
```

PROGRAM LISTING NUMBER TWO by David Goben

```
1Ø 'DEMO PROGRAM FOR 'DOUBLE/BAS' -- REQUIRES 8Ø x 24 SCREEN FOR DISPLAY
2Ø 'DEMO DESIGNED FOR MODELS 4/4P/4D
3Ø 'DOUBLE/BAS WILL OPERATE ON I/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:CLS:DEFINT A-Z
8Ø 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"
9Ø 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"
1ØØ PRINT:PRINT"No data input for the following functions:":PRINT:PRINT"PI    PI/2"
11Ø 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"
12Ø 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$(79,"=")
13Ø PRINT@(21,Ø),CHR$(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 47Ø26Ø 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
```

con't on next page

```
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#
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"
```

con't on next page

```
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 6506Ø: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#
```

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```
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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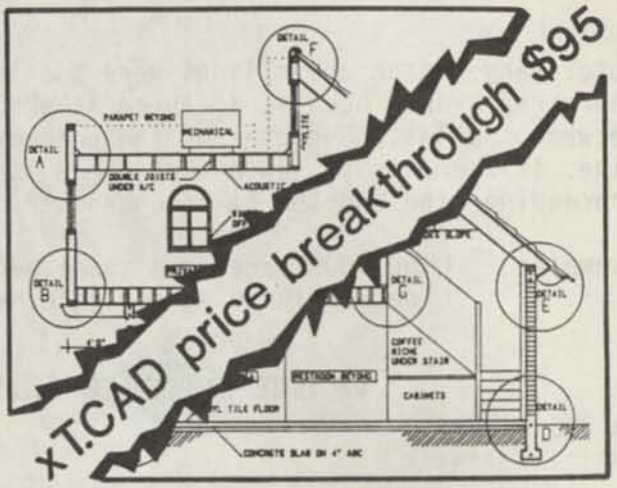

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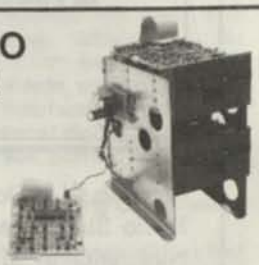

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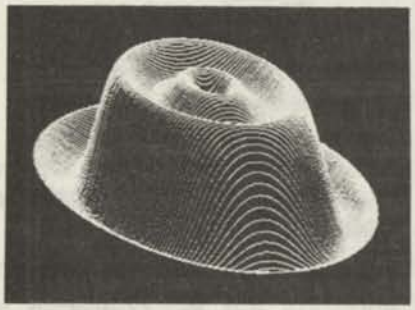

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March 1990 Vol 3 No 3	Feb 12	Feb 26
April 1990 Vol 3 No 4	Mar 12	Mar 26
May 1990 Vol 3 No 5	Apr 16	Apr 30
June 1990 Vol 3 No 6	May 14	May 28
July 1990 Vol 3 No 7	Jun 11	Jun 25
August 1990 Vol 3 No 8	Jul 16	Jul 30
September 1990: Vol 3 No 9	Aug 13	Aug 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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J.F.R. "Frank" Slinkman
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WALLSTRT/TRK: RS Model 4D, MS-BASIC copyrighted prgm for tracking your Stock Market Portfolios. Includes RATIOing & Multi-Point, X-Y GRAPHing to aid decision-making. 15K editable program, 20K documentation & 10K of actual/demo data files supplied SD on 5" floppy in pure ASCII. Price $40. For optional-extra $20 I'll edit prgm to reflect your actual Portfolio. Demo Printout & Prospectus/Application for $1 bill & your 4X9 SASE. For complete info write: Roy Martin, PE; 460 - 74th St., Downers Grove, IL 60516-5208
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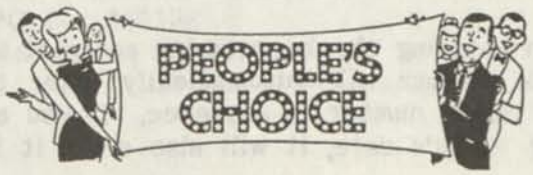
Don't miss your chance to get a copy of SuperUtility from Misosys for $24.95

EDITORIAL COMMENT

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

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

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



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

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

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

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

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

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

It has good documentation and built-in help screens.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

407-259-9397
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PO Box 361136
Melbourne, FL 32936

DOING IT ON A MODEL 4P

by David Goben

BOOTING UP IN THE MODEL III MODE

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

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

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

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

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

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

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

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

CREATING SELF-BOOTING III DISKS

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

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

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

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

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

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

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

Finally we need to patch the boot sector so that it will contain the CD xx 00 sequence to tell the boot ROM that it will be a Model III disk. We do this by entering
PATCH BOOT/SYS.LSIDOS:1 space
(Dø1,Fø=CD:Fø1,Fø=øø) <ENTER>

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

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

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

THE "A" IN MODELA/III

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

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

THE MODEL 4P AND OLDER TRSDOS 6

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

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

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

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

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

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

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

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

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

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

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

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

SPECIAL MODEL 4P FEATURES

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

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

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

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

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

FOR EXPERIENCED USERS

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

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

CONCLUSION

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

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

GRAFDISK REVIEW
by Frank Gottschalk

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

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

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

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

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

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

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

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

You'll love it, I do!.

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

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

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

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

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

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

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

ASSEMBLY LANGUAGE TUTOR Part 14
by Christopher Fara (Microdex Corporation)

Relocatable routines

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

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

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

Memory modules

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

1. Loader
2. Header
3. Actual routine

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

The header

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

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

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

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

The loader

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

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

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

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

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

Famous last words.

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

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

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

C a l l i n g t h e m o d u l e

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

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

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

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

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

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

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

and to store the screen

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

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

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

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

Many modules

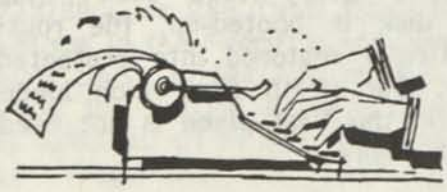
Suppose our BASIC program needs several machine subroutines. So from DOS we execute VIDEX, ALFA, etc, one after another, and enter BASIC. Only that routine which was loaded last has its entry address just above HIGH$. We know how to find that, but where are the entry addresses of the other pre-loaded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

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

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

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

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



A VISIT WITH DAVID GOBEN

by David Goben

VIDX AND PROTECT PROBLEMS

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

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

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

REVERSE VIDEO IN MOD-4 DEBUG

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

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

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

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

WHAT CAN READ WHAT?

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

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

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

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

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

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

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

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

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

THE FIX FOR MOST XLR8ER PROBLEMS

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

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

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

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

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

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

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

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

ENHANCED VERSION OF DEA AVAILABLE

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

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

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

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

NEW MODEL 4 SPREADSHEET

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

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

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

them.

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

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

ULTIMA REVIEW
by Henry A. Blumenthal

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

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

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

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

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

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

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

I came across some inadequacies with the

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

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

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

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

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

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

PACK: A REVIEW
by Mark Allen Reed

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

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

THE PROGRAM

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

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

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

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

extra spaces and remark statements without combining lines.

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

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

DOCUMENTATION

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

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

CONCLUSIONS

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

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

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

PATCH UTILITY PROGRAM for TRSDOS 1.3 REVIEW

by Christen M. Jespersen

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

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

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

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

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

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

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

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

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

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

Programmers Ego Syndrome? Never heard of it.

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

USING VISICALC TO PREPARE DATA FOR PLOTTING ON xT.CAD

By Robert L. Mensch, PE

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

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

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

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

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

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

SINGLE COMMAND SYSTEM RESET PROGRAM

by Rex A. Basham

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

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

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

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

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

THE SOLUTION

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

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

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

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

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

BASIC VERSION

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

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

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

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

BAR GRAPHS WITHOUT A HI-RES BOARD
by Elton Wood

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

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

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

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

MENU CREATOR FOR MODEL III
by R. Joseph McCarthy

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

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

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

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

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

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

OPEN FORUM

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

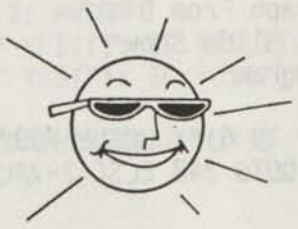
The important formulas to build the spreadsheet are: F13:(+H12); G13:(+I12); H12:(+F12+(E12*@SIN(D12*0.0174532)); I12:(+G12-(E12*@COS(D12*0.0174532); K11: (@COUNT(K12...K100 or as long as necessary for your table of data); K12-K17 use the xT.CAD code for type of line desired; L12:/FI (((F12/G2)+G3)*G5);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

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

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

con't on next page

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



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

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

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

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```
890 IF G$="B" THEN GOSUB 1690 ELSE IF G$="L" THEN GOSUB 1900
900 PRINT @1860,"Do you want to do more EDITING (Y/N) ?";
910 Z$=INKEY$: IF Z$="" THEN GOTO 910
920 IF Z$="Y" OR Z$="y" THEN GOTO 730 ELSE IF Z$="N" OR Z$="n" THEN GOTO 940
    ELSE GOTO 900
930 GOTO 900
940 PRINT @1860,"Do you want to SAVE this GRAPH (Y/N) ?";
950 Z$=INKEY$: IF Z$="" THEN GOTO 950
960 IF Z$="Y" OR Z$="y" THEN GOSUB 2210 ELSE IF Z$="N" OR Z$="n" THEN GOTO 230
    ELSE GOTO 940
970 GOTO 230
980 REM *** PRINT GRAPH ***
990 CLS: H$="PRINT GRAPH": GOSUB 2390: PRINT: PRINT
1000 IF G$="" THEN H$="There is no GRAPH currently in memory": GOSUB 2390: FOR
     T=1 TO 1500: NEXT: GOTO 230
1010 H$="Prepare PRINTER then press <ENTER>": GOSUB 2390
1020 Z$=INKEY$: IF Z$="" THEN GOTO 1020
1030 IF G$="B" THEN GOSUB 1690 ELSE IF G$="L" THEN GOSUB 1900
1040 FOR X=0 TO 179: DUMMY=FNSET(X,71): NEXT X: Y=0
1050 REM *** DMP 200 PRINTER SUBROUTINE ***
1060 CH$(0)=" "
1070 CH$(1)=CHR$(18)+CHR$(28)+CHR$(3)+CHR$(255)+CHR$(28)+CHR$(3)+CHR$(128)+CHR$(30)
1080 CH$(2)=CHR$(18)+CHR$(28)+CHR$(3)+CHR$(128)+CHR$(28)+CHR$(3)+CHR$(255)+CHR$(30)
1090 CH$(3)=CHR$(18)+CHR$(28)+CHR$(6)+CHR$(255)+CHR$(30)
1100 FOR ZY=0 TO 23
1110 FOR ZX=0 TO 79
1120 ZP=&HF800+ZX+ZY*80
1130 IF PEEK(ZP)<128 THEN ZZ$(1)=ZZ$(1)+" ": ZZ$(2)=ZZ$(2)+CHR$(PEEK(ZP)):
ZZ$(3)=ZZ$(3)+" ": GOTO 1150
1140 ZZ$(1)=ZZ$(1)+CHR$(PEEK(ZP) AND 3): ZZ$(2)=ZZ$(2)+CHR$((PEEK(ZP) AND 12)/4):
ZZ$(3)=ZZ$(3)+CHR$((PEEK(ZP) AND 48)/16)
1150 NEXT ZX
1160 FOR ZX=1 TO 3
1170 FOR ZZ=1 TO LEN(ZZ$(ZX)): IF ASC(MID$(ZZ$(ZX),ZZ,1))>3 THEN LPRINT
     MID$(ZZ$(ZX),ZZ,1); ELSE LPRINT CH$(ASC(MID$(ZZ$(ZX),ZZ,1)));
1180 NEXT ZZ: LPRINT CHR$(18): LPRINT CHR$(30);: ZZ$(ZX)=""
1190 NEXT ZX,ZY
1200 PRINT @1861,"Do you want another COPY (Y/N) ?";
1210 Z$=INKEY$: IF Z$="" THEN GOTO 1210
1220 IF Z$="Y" OR Z$="y" THEN FOR X=0 TO 179: DUMMY=FNSET(X,71): NEXT: GOTO 1040
     ELSE IF Z$="N" OR Z$="n" GOTO 230 ELSE GOTO 1200
1230 REM *** LOAD GRAPH ***
1240 CLS: H$="LOAD GRAPH": GOSUB 2390: PRINT: PRINT
1250 H$="Insert DATA DISK in DRIVE 1 then press <ENTER>": GOSUB 2390: PRINT:
     PRINT @345,;: INPUT "Enter FILE NAME";F$
1260 POKE &HB97,0: CLS
1270 ON ERROR GOTO 2410
1280 OPEN "I",1,LEFT$(F$,12)+":1"
1290 INPUT #1,G$
1300 IF G$<>"P" THEN GOTO 1320
1310 REM *** BAR or LINE GRAPH ***
1320 INPUT #1,N,M1,H1$,H2$,HX$,HY$
1330 FOR T=1 TO N: INPUT #1,Y0(T),X$(T): NEXT
1340 FOR P=&HF800 TO &HFF7F
1350 INPUT #1,CH
1360 POKE P,CH
```

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

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

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

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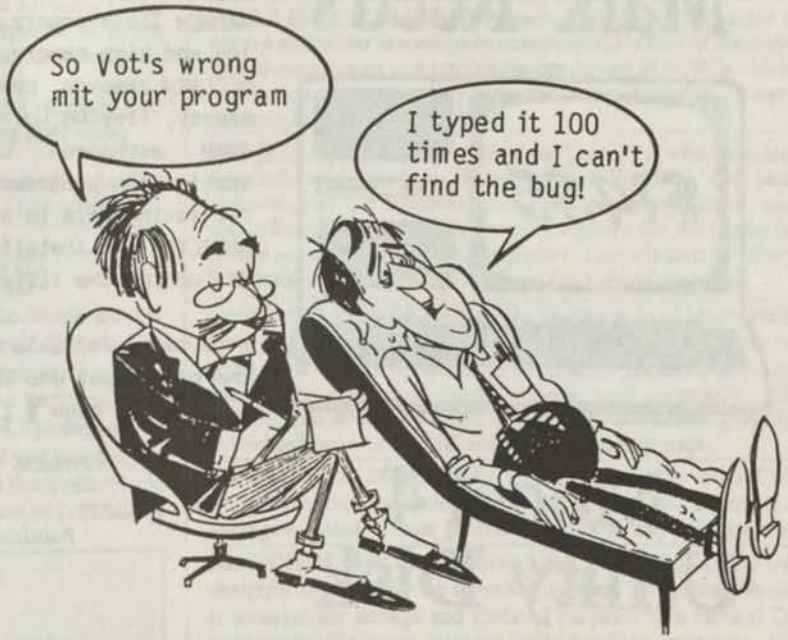
```
370 IF OP>8 THEN A$="Please limit the number of options to eight or less.": PRINT: PRINT
TAB(32-LEN(A$)/2); A$: PRINT: GOTO 350
380 PRINT
390 BL=10
400 INPUT"What is the beginning line number";BL
410 PRINT
420 IC=10
430 INPUT"What is the line number increment";IC
440 LN=(BL+IC*3)-IC
450 CLS
460 GOSUB 1270
470 HC=32-LEN(NA$)/2
480 IF HC<>INT(HC)THEN HC=INT(HC+1)
490 LN$(CU)=LN$(CU)+"PRINTTAB(" +STR$(INT(HC))+");" +CHR$(34)+NA$+CHR$(34)
500 GOSUB 1270
510 LN$(CU)=LN$(CU)+"PRINT STRING$(64,61)"
520 FOR N=1 TO OP
530 PRINT"What is the name of option";N;"";
540 INPUT A$(N)
550 IF LEN(A$(N))>CL THEN CL=LEN(A$(N))
560 NEXT N
570 H2=(32-CL/2)-1
580 IF H2<>INT(H2)THEN H2=INT(H2+1)
590 FOR N=1 TO OP
600 GOSUB 1270
610 LN$(CU)=LN$(CU)+"PRINTTAB(" +STR$(H2)+");" +CHR$(34)+STR$(N)+". " +A$(N)+CHR$(34)
620 C1=C1+1
630 NEXT N
640 GOSUB 1270
650 LN$(CU)=LN$(CU)+"PRINT"
660 GOSUB 1270
670 LN$(CU)=LN$(CU)+"PRINT STRING$(64,61);"
680 GOSUB 1270
690 LN$(CU)=LN$(CU)+"PRINT" +CHR$(34)+"Please select an option by using the
<ARROW-KEYS>," +CHR$(34)
700 GOSUB 1270
710 LN$(CU)=LN$(CU)+"PRINT" +CHR$(34)+"and then press <ENTER>." +CHR$(34)+";"
720 C1=C1+7
730 VL=(15-C1)/2
740 IF VL<>INT(VL)THEN VL=INT(VL+1)
750 PN=(VL+3)*64+H2-1+15360
760 IF OP=8 THEN PN=PN+64
770 IF INT(PN)<>PN THEN PN=INT(PN+1)
780 GOSUB 1270
790 LN$(CU)=LN$(CU)+"A=" +STR$(PN)+":" +"B=1"
800 GOSUB 1270
810 LN$(CU)=LN$(CU)+"POKEA-3,143:POKEA-2,244:POKEA-1,245:POKEA,246"
820 GOSUB 1270
830 LN$(CU)=LN$(CU)+"POKE A-64,128:POKE A+64,128"
840 GOSUB 1270
850 LN$(CU)=LN$(CU)+"POKEA-65,128:POKEA+63,128"
860 GOSUB 1270
870 LN$(CU)=LN$(CU)+"POKEA-66,128:POKEA+62,128"
880 GOSUB 1270
890 LN$(CU)=LN$(CU)+"POKEA-67,128:POKEA+61,128"
900 GOSUB 1270
```

con't on next page

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



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

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

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DoubleDuty, published previously by Radio Shack (cat 26-2231), is now available from MISOSYS. DoubleDuty divides your 128K TRES-80 Model 4 computer's memory into three complete and independent partitions. Two partitions each operate as if they were ther own 64K Model 4. The third can be used to execute DOS library commands. If you thought you needed another computer, think again. With DoubleDuty, you can now have two for the price of one! Just $49.95 (+$2S&H)!

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TRS-80 Model I/III/4 Language Software

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

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

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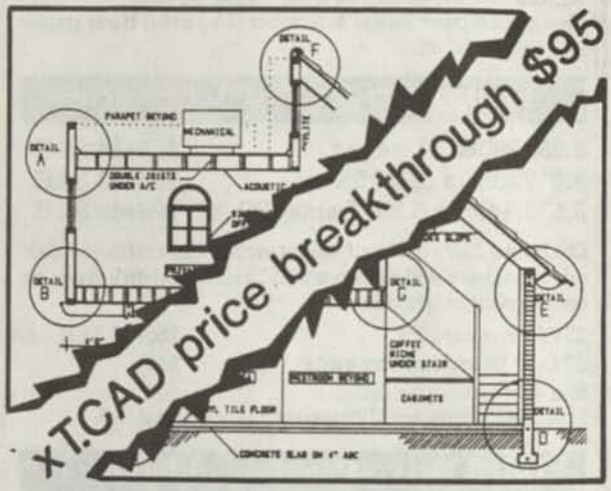

xT.CAD PROFESSIONAL by Microdex. Computer Aided Drafting software for technical production and education. Create, edit, modify precise drawings, details. Features include overlays, grids, cursor snap, zoom, pan, block copy, enlarge, reduce, rotate, mirror, clip, merge, text labels, more. Requires hi-res screen and RS-232 interface. Output to pen plotters. Input from keyboard, or optional digitizer.
Friendly, competent support since 1984. Software is backup-free. Was $345 in 1986 catalog.
Model 4 4p 4d or **MSDOS** **$95** ~~$145.00~~

xT.CAD BILL of Materials by Microdex. Software utilizes text labels from xT.CAD drawings to automatically generate invoices, parts requests, shipping lists, etc. Includes a mini-editor for customizing line printer output.
Model 4 4p 4d or **MSDOS** $ 45.00

CASH PROFESSIONAL by Microdex. Bookkeeping software with automatic double-entry ledger distribution in user-definable accounts. Reports by period, account, project, etc. Ideal for small business, professional or personal accounts.
Model 4 4p 4d or **MSDOS** $45.00

S/XT software by Microdex. Enables disk directory review and special character printing from within standard Scripsit.
Model III or **4 4p 4d** $15.00

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Computer News 80

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HERE'S SOME *Exciting* NEWS!

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

xT.CAD

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

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

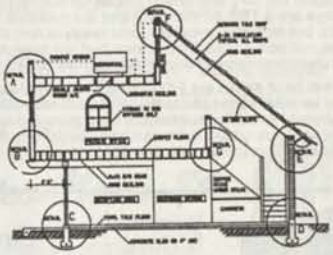
INPUT: xT.CAD is designed for easy cursor control from the keyboard, but you may also use a **mouse.** MSDOS packages support selected mice such as Microsoft, Logitech or Tandy. However, depending on hardware and operating system the mice may not always work with MSDOS versions of xT.CAD. TRS/LSDOS packages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

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

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

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

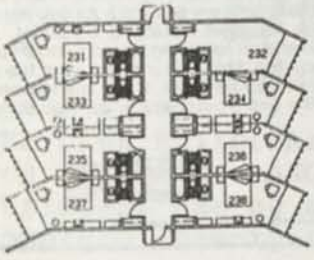
Also, any serial plotter 100% compatible with current **Hewlett-Packard HP/GL** language, or current **Houston Instrument DM/PL** language, should also work with all current versions of xT.CAD.
Screen-print utility for selected dot-matrix printers is included in all TRS/LSDOS packages. On MSDOS computers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

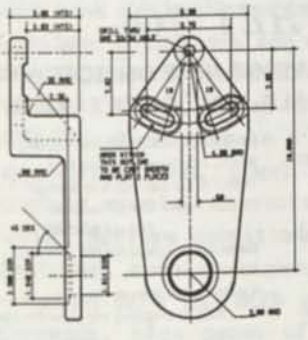


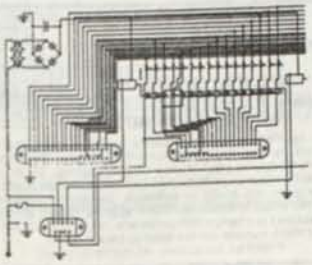
TRS/LSDOS package: **Models 4/4p/4D** require 64K memory, 2 disk drives, floppy or hard, RS-232 interface and a high-resolution graphics board, Tandy or Grafyx Solution from Micro-Labs. Runs in fast machine language under TRSDOS 6.2 or LSDOS 6.3.

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

New reduced price $ 95.00







ALSO AVAILABLE

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

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

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

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

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

xT.CAD w/manual	was $345.00	$ 95.00
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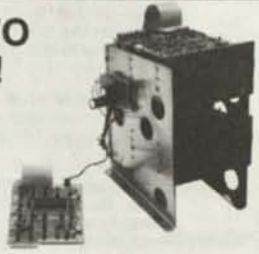

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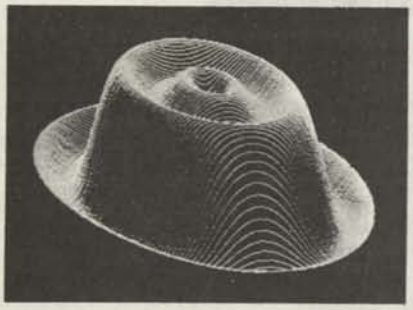

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June 1990 Vol 3 No 6	May 14	May 28
July 1990 Vol 3 No 7	Jun 11	Jun 25
August 1990 Vol 3 No 8	Jul 16	Jul 30
September 1990 Vol 3 No 9	Aug 13	Aug 27
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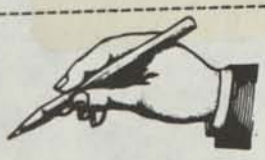

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J.F.R. "Frank" Slinkman
4108-C Fairlake Lane
Glen Allen, VA 23060

FOR SALE MODEL 4P 64k, green screen, no software, $295 + $15 shipping. Contact Computer News 80.

FOR SALE MODEL 1 MONITOR .... $50 or B.O. + $15 shipping. Contact Computer News 80.

FOR SALE: R/S Mod 1, 48k, RS-232 $250. Mod IV, 128k, HiRes, 2 drives $400. Robert Lucas, 4213 Berwick Dr, Wichita Falls, TX 76309.

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INDEX

Look for the SUPER SAVER RIBBON for money saving offers in this issue for CN80 Subscribers

EDITORIAL COMMENT

Well it looks like Uncle Sam's postal people did it to us again, because we got several calls as late as March 15th that the March issue had not been received yet. It was mailed on February 26th right on schedule. Even some of the first class mail was delivered after 14 days. But we might as well tell you now that this issue for reasons beyond our control is being mailed two days after our regular scheduled date. Even at that you should be receiving this issue before the 15th of the month.

If you don't receive your issue, please give it an extra week from normal to allow for Uncle Sam's boys to get it to you. If by then you don't receive your issue it is time to call us. Some of the snow storms that crossed the nation just after we mailed the March issue may have been some of the cause for delay. But this is the first time in three years that we have missed our mailing schedule by even a day.

Well the votes are not all counted yet as to our survey of the most important things that readers want to see in CN80, but as the votes come in we will run the results in the May issue as promised. So get yours in

the mail. Your vote is important to us.

As the primaries votes are now being tallied it looks like the long, long listings are losing out to more informative articles. Many votes were received that said "don't change a thing" and "now that you call attention it, I am amazed at the scope of coverage you have been giving us". "Don't take up precious space with long listings, the disk series is fine." And one writer suggested we put out a disk with each issue, by increasing the subscription price to cover it. A very interesting idea, but one that would require special mail handling and cartons to protect both the issue and the disk if they were mailed together. The increase in cost may be beyond what one would expect. And yet it is an interesting idea that we could pursue if there was enough interest - let us know.

NEWS ITEMS

Ted Carter of MicroLabs has made a special offer to CN80 readers, where you can get a free copy of his Draw program with the purchase of the MicroLabs high resolution board. Look for his special coupon in the Product Source section.

M.A.D Software of Ft. Worth Texas is still producing software and special items for the TRS-80 computers. Such as HBUILD6 which is a utility to boot your hard drive directly into LS-DOS 6.3. They also have ROM updates for the older Model III and IVs. Write to them for their latest list of products.

M. A. D. Software
PO Box 331323
Ft. Worth, TX 76163

Still using SuperScripsit, (we are) and we just found a source for print drivers that we were unaware of. They have Super-Scripsit print drivers for all most every printer ever made, including a driver for the HP laser printer. One problem we found so far is that their print drivers do no support right hand justification when using proportional type spacing, but they do support proportional printing with out the right hand justification.

So far we have purchased two of their drivers, one for the FX80 and one for the HP laser printer. We will let you know more about these drivers in future issues, but for now the source is:

ALPS
1502 County Road 25
Woodland Park, CO 80863
(719) 687-1442

We counted over 130 different print drivers that they have available. They are not connected with the ALPS printer line. We talked with a very pleasant person by the name of George-Jean when placing our order who was more than helpful in our selection. Each print driver is $49 with quantity discounts if you buy more than one.

HINTS AND TIPS

When changing printers on SuperScripsit, you must adjust the document for the new print driver. SuperScripsit does not automatically adjust a document if you switch from one print driver to another after the document has been created.

To readjust a document to a new print driver do the following:

Go to the beginning of your document.
Type Control X to use block action
Then type E for end of document.
Then type B for Block action.
Then type A for Adjust.

This will restructure the document to the new print driver.

If you change from one print driver to another frequently, like using as dot matrix for draft work and a daisy wheel printer for finished work, then you might want to set up the block adjust commands on a user key, to save typing the full procedure each time.

FILE CABINET UPDATE
a CN80 Staff Report

NOTICE OF PRICE CHANGE
We have had to increase the copy cost of File Cabinet disks for those of you who wish to supply your own disks. The new price is $2.75 per disk plus postage at the same rate as regular orders. If you send flippy disks the price is still $2.75 per side, i.e. $5.50 per disk plus postage.

If you wish to supply your own disks with labels affixed, please write the name of the disk volume on the label before affixing the label. You DO NOT need to supply a return address label or shipping carton. You DO NOT have to pre-format the disks. Our copy procedure will format the disks to the format that the volumes are stored on, i.e. the Mod 4 disks are stored on TRS/LS-DOS 6.3 formats. If you do supply pre-formatted disks, our program will just wipe it out and format the disk over.

The price for our making copies of the File Cabinet Library of disks using our own disk stock is still $4.00 per disk with the same - more than 10 volume order - discounts as shown in the Readme File of your catalog.

PROGRAM AND SUBMISSIONS
If you would like to submit programs or collections of public domain programs for inclusion in The File Cabinet Library they are now to be sent directly to us at our regular CN80 address. If the programs you submit are not already in the catalog, we will trade you program for program. Include return postage for the return of your original program disks if we find we can not use them, or to cover the cost of sending new program disks back to you.

Regular article submission and program listings to be published in CN80, of course is unchanged.

SHAREWARE
We invite all shareware program developers to send us their shareware and bannerware programs.

While working on updating the File Cabinet Catalogs, we have decided to separate all shareware programs and bannerware programs from being mixed in with plain Public Domain programs and place them in a separate SHAREWARE SECTION of the Catalogs, which you will be able to call up from the menu just as you now call up the Utility, Business, Education, Games and Communication programs.

We feel that this will make it easier for you to look over the shareware offerings of the programmers that are coming out with new programs, plus give the programmer a better place to promote their products. Remember "shareware" is the - look before you buy - concept.

We do ask that if you do use the programs that you send the authors requested registration fee. Not only do you, in most cases need to do this to get the full documentation of the program and be registered for any updates, but it also helps the author defray his cost of writing programs that keep our beloved TRS-80's going with great new programs.

Sometime in the future we may even break the shareware away from the present catalogs and issue a separate shareware catalog, with the programs placed in sub categories of their own.

CATALOG UPDATES
There are no new catalog listings yet. If you have disks that came from Tim Sewell directly these should be replaced with catalog disks that have the CN80 label on them. These catalogs are the latest version existing.

Look for new catalog announcements or additions to the catalogs in this section of CN80, as new groups of programs are added we will report them here first. This will save you having to send your existing catalogs in for updating before we have a major group of new programs collected and cataloged, and at the same time let you know that there is a new volume of programs that you can order rather than wait for a major catalog revision.

PROBLEM SOLVING
We are working hard to find and correct individual programs in the library, and to find the documentation for the programs that are listed without any instructions, or write new instructions to go with them, otherwise the programs need to be scrapped from the listings. Watch this column, which

will be a monthly feature of CN-80 from here on, for hints and tips to individual or disk volumes.

YOUR HELP IS NEEDED

All of this is a monumental task and we seek your active participation in this project, if you find a program that does not work let us know. If you find a program that does not have instructions with it and you know how it works, we invite you to write the instructions and send them in. They will be included in the library with your name listed as the author for writing the docs, keeping the proper acknowledgement for the programmers original author of course.

SOME SOLUTIONS

Q: On library disk MD3GAM04 there is a program called SOUNDA/BAS, a collection of sound demonstrations. When I run it the screen says the memory size must be set lower than the maximum. I don't know what the maximum is and set it at 000. The screen then says its working, but I get a syntax error in line 605, changing the line with ' to make it a remark line did not work as more lines show syntax errors.
H. A, Coldwater, MI

A: Set memory size to 65,000

Q: I am having problems with some of the programs I have received from the File Cabinet. I'd like you to check them out and see if I am doing something wrong. I'm using TRSDOS 6.01.2 and get an "error 3" when I try to run utility programs: SCRSV/CMD (on volume MD4UTIL 01 disk); GETMOD/CMD (on volume MD4UTL0 disk); PRINT/CMD (on volume MD4UTL44 disk); PURGEUP/CMD (on volume MD4UTL3 disk).
J. H. Rapid City, SD

A: All of these programs require a TRSDOS 6.2 or higher. We still have about 10 sets of original Tandy 6.2 manuals and systems disks. ($20 plus $4 S&H) or get the new LS-Dos 6.3.1 from Mysosis.

Q: Some other programs I am having problems with are MEMSYS/CMD the screen display says "PDS Membership Required" (disk 01).

A: The documentation file explains this. Read (LIST) the MEMSYS/DOC file.

Q: PURIFY/CMD displays "Illegal file name" (disk 40).

A: Read (LIST) the PURIFY/SRC file.

We are here to help if we can, and as time and space permits we will try to answer all the questions, but remember the few fundamental DOS commands like LIST DIRectory can help find and read the files that may support the /CMD files. The extensions are usually /DOC or /TXT with the file name the same as the name of the program with the /CMD extension.

If the file has the extension of /BAS, be sure that you have BASIC files on your system disk. Not all BASIC programs are the same and not all programs written in Basic will match the BASIC you have, unless the program was written for that basic. If you try to load a program into BASIC and get "direct statement in file" try going back to dos ready and type the program name. It might just be a program written in machine language as a command file and the author did not identify it with the common /CMD extension. If you try loading a program from DOS ready, and it does not work, try loading it in BASIC, it might just be a basic program with out saying so with the common /BAS extension.

Again some programs need to be loaded into BASIC and then when it has finished nothing happens except the word "ready" appears on the screen. This is when you need to type RUN <ENTER>. Other basic programs might have this instruction line written in so that they go to a nice flashing menu and take you from there, not all are flashing and not all programmers are that flashy.

If you get a "syntax error on line so and so" it usually means that the basic program and the BASIC you are using are not compatible and the line would either have to be rewritten, or you would have to find what BASIC the program was written with. Unfortunately the authors of the programs, who probably wrote the program under "his" basic that he was using at the time and not thinking that there would ever be an

upgraded BASIC coming down the road. So it depends on how long the program has been around, as to what BASIC it was written under. Unfortunately we are not all sharp BASIC programmers to know just what to do to change a line to have the program work on "our" BASIC" instead of "his" BASIC.

If you have a program that you can't make work under your current BASIC, try booting up with an older DOS version, or a newer version, you might just find the right combination without having to change the syntax error.

In the mean time we will be working on getting the file descriptions expanded to tell what DOS is require, and what BASIC version is required. If you have a File Cabinet disk that you have unraveled and identified all the programs send your findings in (hard copy is all we would need) it sure would help this project.

Another tip; if you're searching the catalog disk for a particular type of program use the WORDSCAN (on CN80 disk series #8; Vol 3 No. 1) to search the listings.

And still another tip; if you want to read a DOC file without having to use the scroll stop and go of the LIST command, rename the file README/TXT and use the README/CMD that is on the catalog disk to read the file. It will only read files that are saved in ASCII. The same as the TED command in LS-DOS 6.3, so you might have to save the file in ASCII. Be sure to write the original name down so you can then rename it back to the original title.

HIDDEN GEMS

How often have you worked for hours on a document and then saved it to disk, only to get "end of file encountered" and you can't call the file back up because the file did not close properly. Well here is a life saver. I know because it just happened me as I was writing this segment of CN80. On the Model 4 Utility Disk Volume number 1 the very first program listed is called CLOSE/CMD which is a short 1.5k machine language program for closing open files. Being machine language we can't print it here with out having the source code. And we don't know the origin of this program, but it works, it let me get back into the first (and only) file of these two and a half pages. -CN80

CN80 Disk series number 8 is now ready for shipment and has all the programs and program listings from the first three issues of 1990 on it plus the following bonus programs.

There are two games both for the model 4; ANALYSIS/BAS which is a fun game that is not really what it sounds like. You start out by having the computer ask you what your problem is and then you carry on a running conversation with the person behind the computer screen. Entering some serious and some not so serious replies gets you some really off the wall responses that are guaranteed to have you laughing.

CIVILWAR/BAS is the second game on the disk and has you refighting the civil war again.

Two more bonus programs for the Model III folks are on this disk also, one is DSKSEC/BAS which is a Nice desk phone and appointment secretary. The second is SCREEN/BAS a utility for drawing screen graphics for your programs.

Watching the Discovery Channel "Beyond 2000" program the other night, we heard of a computer of the future that could recognize if you were smiling or just had a blank stare on your face. They said if you had a blank stare on your face the computer would automatically switch its presentation to make you happy.

Now if we could have a computer that would recognize my blank stare - and then tell me what I don't understand, or just go ahead and do it right and tell me about it later. That would make me - very - happy! -Ed.

ASSEMBLY LANGUAGE TUTOR Part 15

by Christopher Fara (Microdex Corporation)

Last month we have learned how to construct and load "memory modules", and how to call them from BASIC. From assembly programs we can use a different calling method based on the module name stored in the "header". As a reminder, the standard header looks like this:

```
;-----------------------------------------
HEAD:   JR      EXEC          ;to routine
LAST:   DEFW    0             ;end address
NICK:   DEFB    HOOK-NAME     ;name length
NAME:   DEFM    'UNIQUE'      ;module name
HOOK:   DEFW    0             ;reserved
DOSS:   DEFW    0             ;reserved
;-----------------------------------------
EXEC:  ... actual routine starts here
;-----------------------------------------
```

The address labeled HEAD is the entry to the module after it has been relocated by the "loader", and JR simply jumps over the data in the header to the first executable instruction at a label EXEC in the actual routine. In the "word" LAST the "loader" has stored the address of the last byte of the relocated module. That address provides a link to any next module which might have been loaded right above it. The labels NICK, NAME mark the length and text of the module's name. The length is calculated automatically by the assembler as the difference between the addresses of HOOK and NAME (instead of DEFB 6 and changing the number every time we invent a name with a different length). In driver and filter routines the "word" at the label HOOK is used for the address of "device control block", so it's a kind of a "hook" to DOS device table. Finally DOSS is a "word" reserved for DOS. We will use those funny labels for reference purposes.

M O G E T s u b r o u t i n e

This subroutine gets the "entry address" of a high-memory module, ie. the address at which the start of the header (label HEAD) has been relocated by the "loader". Before we call MOGET we store in a buffer the name of the module we want to find, terminated by carriage return byte 13. Let's say this buffer is labeled SPEC. Its address is passed to the subroutine in register pair HL (eg. LD HL,SPEC). On return Zero flag is set if the module has been found, and its entry address is in HL. If the SPECified module has not been found then Z-flag is reset NZ. Register pairs BC and DE are altered, so if they contain some needed values, PUSH them before calling MOGET and POP after return. To fit the comments into our page format we use the symbol => meaning "points to" or "contains the address of".

```
;-----------------------------------------
;MOGET  get module address
;-----------------------------------------
MOGET:  EX      DE,HL         ;DE=> SPEC
        LD      HL,(17425)    ;get high$
TRY:    INC     HL            ;HL=> HEAD?
        LD      A,(HL)        ;what's there?
        CP      24            ;JR instruct'n?
        RET     NZ            ;no, quit, else
        PUSH    HL            ;save HEAD
        PUSH    DE            ;save SPEC
        INC     HL
        INC     HL            ;HL=> LAST
        PUSH    HL            ;save it
        INC     HL
        INC     HL            ;HL=> NICK
        LD      B,(HL)        ;B=name length
        INC     HL            ;HL=> NAME
CAP:    LD      A,(DE)        ;spec character
        CP      'A'           ;is it alfa?
        JR      C,MATCH       ;no, else
        AND     0DFH          ;make caps
MATCH:  CP      (HL)          ;match?
        INC     HL            ;next in NAME
        INC     DE            ;next in SPEC
        JR      NZ,STOP       ;no match
        DJNZ    CAP           ;else more?
        LD      A,(DE)        ;SPEC end
        CP      13            ;carriage ret?
        JR      Z,FOUND       ;yes, else
STOP:   POP     HL            ;HL=> LAST
        LD      E,(HL)
        INC     HL
        LD      D,(HL)        ;DE=> end mod
        EX      DE,HL         ;HL=> end mod
        POP     DE            ;DE=> SPEC
        POP     BC            ;trash HEAD
        JR      TRY           ;try next if any
FOUND:  POP     BC            ;trash LAST
        POP     BC            ;trash SPEC
        POP     HL            ;HL=> HEAD
        RET
;-----------------------------------------
```

The listing is for Mod-III. The only change in Mod-4 is to replace the second line by 4

lines required by SVC 100 to find the current HIGH$ address

```
LD    HL,0      ;find
LD    B,0       ;high$
LD    A,100     ;SVC number
RST   40        ;do it
```

or "cheat" as we did from BASIC

```
LD    HL,(1038) ;get Mod-4 high$
```

The cheating works here, but SVC is the recommended method.

First of all EX to put the address of our SPEC buffer to DE, because in the next instruction we need HL to find current HIGH$ address. At the label TRY increment that address. Here we hope to find the first byte of a standard module, which should be 24, the machine code for the JR instruction. So we put this byte into register A and compare with 24. If it's not 24 then search ends and we return with NZ flag. Either a non-standard routine sits there or we have reached the end of physical memory. How come end? Well, if HIGH$ address was 65535 (end of 64-K) and we incremented it, then the value in HL "wrapped around" to 0, and at address 0 in Mod-III and Mod-4 we will usually find the instruction DI (disable interrupts) but never JR. By the way, the "wrap around" works like this:

65535 = binary 1111 1111 1111 1111

Add 1 to the rightmost 1, the result 2 is binary 10, so the rightmost bit becomes 0, carry 1 is added to the next bit, and so on, until all bits are 0, and the final carry "falls out" from the leftmost bit and is lost.

If JR has been found then we assume it's a header. PUSH HL to save this entry address in case it's the module we are looking for, and PUSH DE to save our SPEC address. We may need it again if the module is not the one we want. Then increment HL twice to point to the LAST address in header. Save it, we may also need it later to search for a next module if the current one is not what we need. Increment HL twice again to point to NICK where the length of module name is stored. Put that length into the "counter" register B and increment HL one more time to point to the first letter in NAME.

At the label CAP we start a DJNZ loop to compare one by one the characters in our SPEC (pointed by DE) with characters in the module's NAME (pointed by HL). Notice that upper and lower case letters make a difference. The NAME in the module should be all caps. The instructions between CAP and MATCH assure that the characters in SPEC will be also evaluated as caps, even if typed in lower case (this is the same CAP conversion as described in CN80 1/90 and Z80 Tutor I:35). After the characters are compared at the label MATCH, we increment HL and DE in case there is more to compare. Incrementing register pairs does not affect any flags, so if the comparison failed (flag NZ) then we jump out of the loop to STOP. Obviously the names don't match. Otherwise DJNZ until all characters are matched, and "fall through" to the next instruction. Since we have incremented DE after the last comparison, it now points to a byte in SPEC right after the last successfully compared character. We expect it to be carriage return byte 13, the terminator of our "search name", and put it into register A to compare with 13. If Z-flag is set then we know for sure the names matched exactly, and jump to FOUND. But if that character is not a carriage return then it means that the name we specified is longer than the name in the module. Even though all initial characters of the specified name have matched all characters in the module, the names are not identical, and we fall through to STOP.

At STOP we POP the previously saved address of LAST and copy the value stored at that address into DE (low byte to E, increment pointer, high byte to D). Then EX and now HL is the address of the end of the module. We will need it to continue the search for any next module, but first POP our SPEC address back into DE, and finally POP into BC the HEAD address which we won't need anymore. It's not the module we are looking for. We use the register pair BC as a sort of "trash can" simply to clear the stack. Now we can JR back to TRY and search for next module, if any.

If FOUND then again use BC as a "trash can" to clear the stack and discard LAST and SPEC which are not needed anymore. Finally POP HL to restore the HEAD address which in this case is the correct one. Notice how the order of POPs must be the reverse of previous PUSHes. Remember that we jumped to FOUND on Zero flag, so now we RET with Z-flag set and the desired address in register pair HL.

Jumping to HL

In the past we always used JP instruction with a specified address, either expressed as a number or as a label, eg.

```
JP LOOP
```

But Z-80 has also a special kind of JP.

```
JP (HL)
```

Jump to address contained in the register pair HL. It is always written this way. It cannot be a "short" jump JR and cannot be "conditional" like other JP instructions.

Thus if we successfully return from MOGET with the address of the desired module, we can immediately JP (HL) to it. For example, let's say we want to execute such a module from DOS, assuming it is some module which makes sense when executed from DOS. The following stand-alone program would do it. It could be assembled as MODEX/CMD.

```
;-----------------------------------------
;MODEX  execute module in high-memory
;-----------------------------------------
        ORG   32000
MOGET:  ... here type MOGET subroutine
RUN:    CALL  MOGET     ;get address
        RET   NZ        ;not found
        JP    (HL)      ;else go for it
        END   RUN
;-----------------------------------------
```

Here we take advantage of the fact that on entry to any /CMD program executed from DOS, the register pair HL always points to the first non-blank character in the "DOS command buffer" after the name of the program. For example if we enter from DOS

```
MODEX UNIQUE
```

then on entry to MODEX the pair HL points to the beginning of the word UNIQUE. The DOS command has been terminated by pressing 'enter' so at the end of UNIQUE in the command buffer there is a carriage return byte 13. This, of course, are the "entry conditions" needed by our MOGET subroutine, and we can CALL it right away when the program starts RUNning.

If the module has not been found then on return from MOGET the Zero flag is reset NZ and we return to DOS as usual without accomplishing anything. This could be dressed up by adding a displayable message such as "module not found". We leave such extras for the reader to play with if desired, since they are not essential to our "lessons". Anyway, if Z-flag is set then the conditional RET NZ is ignored and we jump to the address contained in HL. Since every module exits via a RET instruction, that RET will be used to return directly to DOS. The control will not return to MODEX.

Calling HL

But suppose we wanted to CALL the module and return not to DOS, but to the calling program. The program fragment could look like this:

```
;-----------------------------------------
        CALL  MOGET     ;get address
        JR    NZ,ERROR  ;no good, else
        LD    BC,MORE   ;ret address
        PUSH  BC        ;onto stack
        JP    (HL)      ;and go for it
MORE:   ... program continues here
;-----------------------------------------
```

Assuming the address of our SPEC buffer is already in HL, call MOGET as usual. On NZ-return (module not found) jump to some error processing routine at the label ERROR elsewhere in the program. On Z-return we have the address in HL but CALL (HL) is not a valid Z-80 instruction. Some processors, such as Intel 8088 in IBM-PC do allow such calls. But recall how the stack works (CN80 10/89:6, Z80 Tutor I:26). We want to return from the module to the label MORE to continue the main program. The CALL would automatically put the return address of MORE onto the stack. Here we do it "manually". Put the address of MORE into register pair BC and PUSH it onto the stack. Then JP (HL). When the subroutine in the module is done, it RETurns to the address of MORE which we have sneaked onto the stack.

Another popular trick is to let the program modify itself. For example:

```
;-----------------------------------------
        CALL  MOGET       ;get address
        JR    NZ,ERROR    ;no good, else
        LD    (MORE-2),HL ;stuff addr
        CALL  0000        ;into call
MORE:   ... program continues here
;-----------------------------------------
```

Recall the picture of a program as it sits in memory (CN80 5/89:8, Z80 Tutor I:10). The CALL instruction is encoded in 3 bytes: first the call itself, then 2 bytes for the address. MORE is the memory location just after the CALL. Therefore MORE-2 is the location of the call's address. In the source listing we write a "dummy" call to 0000.

During program execution the instruction
LD (MORE-2),HL
"stuffs" the value of HL in place of the dummy. While we normally don't promote such "creative" tricks, sometimes they are necessary to compensate for the processor's limitations.

Note: Z80 Tutor I:26 etc, refers to the pages in the revised collection of our CN80 1989 tutorial series, now available in book form from CN80 ($9.95). Copyright 1990 by Christopher Fara Assembly Language Tutor is copyrighted by the author with all rights reserved. It is reprinted here by permission of the author.

MORE ABOUT COMPUTERS
by David Dalager

Sorry I've not written for the last two issues. A heart attack on the first Saturday of January prevented me from getting that one in. Catching up on getting stuff shipped that people had paid me for, stopped the February article.

No, my body did not betray me, I had betrayed it. Sitting at my workbench and computer, not giving the body the exercise it needed caused the heart attack. The moral in this is: "If you are going to do sedentary (sitting around) work or play and don't exercise the body, you are setting the stage to have an heart attack." For crying out loud, be sure to exercise your body as well as your mind. I'm doing excellently, far beyond most doctor's expectations. Thank you. Now, let's have some fun.

Thanks to Tandy no longer providing software support, there are many new programs coming out. Several new graphics programs have come upon the scene. Two of which could be said to be several in one package, one is by Robert Doerr, another is by Bill McInnis, another by Bill Bowman. There are many more than I'm aware of, and remember, I try to keep up with all as my time allows.

Robert Doerr has an interesting story about writing his group of programs. Seems he sent his $15 to Paul F. Barnett for the shareware fee for P2DOTx (a model III program) that converted Printshop to Dotwriter format, allowing the Printshop icons to be printed. Robert got his letter back with "addressee unknown" on the envelope. Robert phoned Paul for a better address. Robert points out that if Paul had not released P2DOTx that the model 4 version would not have come into existence. Remember that the programs that Robert and Paul wrote are shareware, that means that if you use any shareware programs, please remit the requested fees. For darn sure if you want to see more programs written. This fee is both their acknowledgement and encouragement. There are 13 programs in all.

Permit me to take the liberty to point out that any program you are not familiar with is new. I have not gone through all of The File Cabinet yet, so I still sit with about yumpteen disks, all loaded with new programs. New simply because they have not yet been tried.

UTILITIES and APPLICATIONS
The File Cabinet is chock full of tools (utilities) that can do many things for you. Probably the very thing you've been looking for. I had two pointed out to me the other day. A friend who reached into my disks, pulled one out that had the very application I needed. I didn't know it was there. Well, that's not exactly true, I hadn't looked in a while.

COMMUNICATIONS
There are a number of communications programs that will help you use a modem for communicating with other as well as Bulletin Board Systems in the section of The File Cabinet. A very interesting one is MULTICOM/CMD that permits idiots like me to use the modem to transfer files to another computer with Multicom very easily. I kidded it's author, James Reed, of Arlington, TX, who also wrote STARTEXT/CMD about tailor-writing Multicom especially for me. James has recently updated Multicom so it would also be capable of operating at 2400 BPS as well as 300, and 1200. There is also XT4/CMD, XT3/CMD for the model 3, FasTerm by Mel Patrick in B.C. Canada. The latest version will even keep track of your "modem-ing" costs.
-David Dalager

MY ADVENTURES WITH HARD DRIVES
Part 5
by Roy T. Beck

I have a VR DATA HARD DISK III which I acquired for a few dollars one time. The few dollars was because there was no "bubble" in it. The previous owner had removed the original 10 Meg bubble and replaced it with a larger one. Later he moved the larger one to an IBM, leaving the HARD DISK III sans bubble. However, it does have the power supply, host adapter and controller board in it.

The unit is about 14" x 15" x 5", resembles the Mod 4P in style and paint job, weighs about the same as a 4P, and contains a linear power supply and a hard disk controller (HDC). The power supply is set up for two bubbles, although the front panel has only one opening. Since the HDC also has provisions for a second bubble, it is clear that VR DATA really intended the unit to operate two bubbles; but the selling price when it was new in the summer of 1983 was over $1300, and probably few customers could afford (or needed) the second bubble. The nameplate showed this particular unit originally had one Tandon TM-502S bubble with a capacity of 10 Meg. The "III" in the nameplate evidently indicated it was intended to work with the Model III, but since the Models 4 and 4P have the same I/O port, there is no reason it should not work with a 4P.

Study of the hardware reveals the HDC is a Xebec board. After exploring the remains for a while, I put it aside on a shelf and went onto other projects. After getting a RS work-alike 35 Meg drive running very happily at home, I began to consider setting up something for use in my office at work. I already had a 4P running there, but having tasted the joys of HD operation at home, I became anxious to add an HD to the machine at work.

After letting the HARD DISK III "mature" on the shelf for a long time, I decided to make it work. The first question was what bubble to put in it? I have two identical, working, Tandon TM602S bubbles on hand, for which I paid $15 each, used. They worked on my IBM clone until I outgrew them. The front cover plate of the Hard Disk III has only one hole in it. Rather than indulge in my not-so-elegant tinsmithing, I simply took the front panel off. I then proceeded to install the two bubbles. Made a hefty package when completed, but it is compact and pretty good looking, (even without the front panel). I added a suitcase handle on one side and some rubber feet on the other side and the bottom. Presto, a "portable" hard drive!

The next question was software, specifically HD drivers for the DOSes I wanted to use. To digress a bit, in reading back issues of The MISOSYS Quarterly I had seen a reference to a VRHARD driver in a letter from a reader to Roy Soltoff. The letter did not clearly identify the driver, but the context indicated it might be a TRSDOS driver for the HARD DISK III unit. I called Roy, and he confirmed he still offers the driver (even though it is not in his current catalog) and yes, it should be right for my unit. (Thanks, Roy!) I bought it and installed TRSDOS 6.3 on one drive of the two in the box. The driver also allows for two bubbles in the box. I assigned all of one 5 Meg bubble as drives 0, 1, 2, and 3 for TRSDOS 6.3 running on a 4P. This package I took to my daytime office, where I use it for word processing, mostly. I have AllWrite and Electric Webster running on it, plus SuperCross so I can turn over an IBM disk to the word processors elsewhere in the office who mostly use (ugh) IBM clones. At this point, I was happily using one of the two bubbles, but the other was simply keeping itself warm as it revolved, doing nothing useful.

Recently my boss indicated all of us engineer types ought to learn dBASE and LOTUS. I didn't want to have one of the firm's IBM's issued to me, and it is always a hassle to find an unoccupied one when I need it. Further, I have a copy of dBASE II which I have dabbled with for 3 years while I kept the books for a computer club. Ironically, the club is IBM oriented, and I was amused to occasionally remind the members that their roster was being kept on dBASE II, running under CP/M on a TRS Model 4! The combination has worked well, but I really never got past the command mode of dBASE II.

My question now was how to put CP/M on my HARD DISK III at work. I can't use the 35 Meg drivers, since that 35 Meg drive has

the RS 26-1138 Western Digital controller in it, and the HARD DISK III has the Xebec S1410A SASI controller. Obviously I needed a driver for CP/M on the Xebec S1410A.

The only legitimate option seemed to be our old friend Monte of Montezuma Micro, for whom Software Wizard Jesse Bob Overholt has written much good stuff. Suiting the action to the thought, I called Montezuma Micro, and inquired if by any chance they had a HD driver for their CP/M on a HARD DISK III with 5 Meg bubbles in it. The initial response was essentially "Say What?". After repeating my request, and being transferred a couple of times, I reached Kevin, the manager, who knew what I wanted, but could only say no, they did not have it.

I next inquired what it would cost to have the necessary driver written for me? The cost would be $475, the time frame about 90 days, and I would have to ship my HD to them for testing. I said this was uneconomic and I could not pursue that course of action.

However, I have a partial listing of the HD drivers they have done, and on it there is listed a driver for an Aerocomp 5 Meg HD (Aerocomp is another branch of John Lancione's empire, Montezuma Micro being the CP/M arm of it). Since I knew the Aerocomp unit also used a SASI controller, I decided to buy the Aerocomp driver and try to patch it to work with the SASI controller in my HARD DISK III box. Kevin warned me several times that they could not guarantee the Aerocomp driver would work on my HARD DISK III unit, and it was entirely my responsibility and no guarantees applied. (When the driver arrived, the same notice was even on my invoice!) I assured Kevin I would not try to hold them responsible, and I understood I was strictly on my own. I think he was a little too cautious about my application of the Aerocomp driver, but they have probably had some unjustified complaints in the past.

By the way, if you are inclined to go for a new hard drive (or other TRS add-ons), Aerocomp should be considered. John Lancione is offering new components, good drivers, and has submitted his equipment for the required FCC testing. Not all vendors do that. John has stayed with us TRS users, and deserves consideration when you are planning to spend money.

Anyway, the driver disk arrived, and on it was the promised Aerocomp driver. But, Surprise!, there were two VR DATA drivers on the disk, also! However, they were for a VR DATA 17 Meg drive, and I have only 5 Meg bubbles in the box. The copyright date is 1983, so I guess everyone at Monte's abode had simply forgotten these drivers ever existed. What to do? Since both VR DATA drivers were for a 17 Meg bubble with 4 heads and 480 tracks, I began cogitating.

The head count is correct for the bubbles I have, but the track count is wrong, as my bubbles have 153 tracks. One of the two VR drivers was written to partition by head offset, and the other by track offset. The latter looked promising.

If I use this 17 Meg driver on one of my bubbles and tell the driver that the first 120 tracks (25% of 480) of each head are to be used for drive A, and simply don't assign the other 360 tracks, then I will have lost the use of 153 - 120 = 33 tracks or about 1 Meg, but the other 4 Megs should operate as drive A. For my immediate purposes, this would be fine and dandy. After all, dBASE II runs OK on a couple of floppies, so a 4 Meg hard disk would be like a skating rink for it to rattle around in.

My next step was to try out the 17 Meg driver and if it works, go ahead and use it. The only potential problems I could see were the matters of write precompensation and write current reduction. Since the driver might have been written to shift at track 240, then it would not shift at track 128 where the Tandon bubble expects it. Either of these two discrepancies might be enough to prevent successful operation, and if that happens, I must go on to the next option.

I attempted to install and run both of the two 17 Meg drivers. The head offset driver wouldn't do anything worthwhile. But the other, track offset, version gave me slightly better results. I ended up with CP/M OPERATING from the Hard Disk III, but I could not read files sent to it via PIP. Well, nice try.

Now on to the second option, which would consist of disassembly of the driver, discovery of how and where the precomp and write current reduction events occur, and then patch the correct values into the code.

But how to disassemble the driver? I don't have all the nice tools of TRS to massage a CP/M program. If the mountain won't come to Mohammed, maybe Mohammed can travel to the mountain. I wanted to use Soltoff's DSMBLR because it allows masking of data and text areas, (there are a lot of these in the driver), and I wanted to use NewDos80's DISASSEMbler because of its feature which gives you all the back references within the code. How to move the CP/M program to TRS? I used DDT to load the driver at 0100H, the usual load address, and then block moved the driver to 8100H in memory. The driver was less than 1300H in length. After making the block move, I rebooted the machine under TRSDOS 6.3 and then DUMPed the still resident block of memory at 8100H to my 35 Meg hard disk under an appropriate TRS file name. Next I used one of Soltoff's Golden Oldies to check the file on the hard disk to verify I had indeed gotten the file I wanted. All OK in this regard. I moved all three of the MM drivers to my TRS hard disk this way. Next, I ran the two disassemblers to create files for study.

After sufficient study, I was able to determine where the total track count, the precomp and the reduce write current track numbers are stored in the driver. All told the disassembly of the 17 Meg VR Data driver took a good 2 months of spare time study. But I did it!

Once I had the necessary patching locations and contents identified, I took DU and a fresh copy of the 17 Meg driver in hand and went to work. My first effort was almost successful. Off by one bit, it turned out! What happened was that the second bubble would accept CP/M on its system tracks, but when I tried to move the other files over to it, it gave me an error message to the effect that my directory was full!

One night's thought pointed me in the right direction. Given its druthers (defaults), the Xebec controller will format all sectors with the hex character 6C. CP/M, however, insists that the first byte of every directory entry be hex E5, as this is how CP/M determines if a directory slot is in use or is vacant. To accomplish this, the driver sets up a buffer in the HDC full of E5's. My problem was that I was also following Soltoff's code for general guidance, and since he was writing for TRSDOS and LDOS, which don't care what the formatting byte is, he did not set the bit which requires the HDC to USE the contents of the HDC buffer. Another aspect of my problem is that the Xebec data available to me is inconsistent, and at first I had no clue to the purpose or significance of the bit which turned out to control the formatting. Once I understood the problem, I set the one flag bit involved, and tried again. Success! I now had the driver patched to match the 5 Meg, 4 headed drive, and I assigned head #4 to CP/M as drive A:.

I used the other 3 heads of the drive for LDOS, and, just for convenience, I told LDOS it could share head #3 of the other bubble with TRSDOS. This allowed me to move files between DOSes, as both TRSDOS and LDOS can read the same files.

At this point, and for a week, I was feeling great with my pride of accomplishment spilling all over anyone who would sit still for a minute or two. I then decided to take the drive to a club meeting to demo what I had accomplished. Bad decision! I gently carried the drive to my car, took it home, took it to the meeting, and now it wouldn't boot CP/M or LDOS. I could still boot TRSDOS on the first bubble, but nothing on the second. Wha' Hoppen?

After further analysis, I came to the conclusion the Xebec HDC would no longer access the second bubble. I still don't know why. In any event, I had to do something. Since I still had another bubble laying around, a 12 Meg unit of questionable virtue and unknown history, I decided to plug that one into the HARD DISK III box and try to use one large bubble in place of the two smaller ones. But, talk about the fickle finger of fate! This bubble turned out to have two bad heads in it, so instead of being a 12 Meg, 6 head bubble, it was effectively only an 8 Meg, 4 head unit. But the 4 heads worked and reported no bad sectors, so now I have a HARD DISK III with one 8 Meg bubble in it. (I didn't even

consider repairing the 2 bad heads in the bubble, as I think I only paid $20 for it, and a technician with a clean room won't touch a bubble for less than $75).

By patching the VR DATA driver again, I now have CP/M on head #4, with TRSDOS and LDOS sharing the other 3 heads. Again, I set up drive :2 as common for TRSDOS and LDOS. I now have all 3 DOSes on the one "8 Meg" bubble, I use them regularly, I did do a demo at a later meeting, and the only question still open is why the Xebec HDC won't access a second bubble. Since I want to do other things, I am not going to chase that bug. I even put the front panel back on and the HARD DISK III box looks very nice.

Implementation of this old HARD DISK III has been a long, interesting road, but I feel I have accomplished something in the way of personal satisfaction, and have shown there is life yet in some of our antiques!
-Roy T. Beck

TIME TO RENEW?
If your mailing label ends with 90/04
IT'S TIME TO SEND YOUR RENEWAL IN.

A VISIT WITH DAVID GOBEN
by David Goben

TRIALS AND TRIBULATIONS
The subject for this month was a toss-up. Originally I had planned on showing you how to turn your Model I/III/4/4D into a digital recorder, then I decided that I would first show you (us!) ORCHESTRA-90 fans how to automate music file playing via an intelligent menuing interface, and finally (after some initial trouble getting problem reports with VIDX ironed out) I decided that I should share a common plight of programmers when trying to write programs for various TRS-80 computer configurations. Therefore the digital recorder and Orchestra-90 interfaces will be presented in the near future.

If you are a regular with CN-80 and my column, you'll recall that in the January 1990 issue of CN-80 (Volume 3 # 1, page 14), under the heading of "Scroll Protect for I/III" I presented 2 programs; VIDX/CMD and PROTECT/CMD. I had of course written these programs in machine language, but for presentation in the pages of CN-80 (and to save lots of space), I converted the files into a BASIC "data-poke" format that most anyone can key in. Unfortunately the DATAPOKE/BAS program I used creates files targeted for the Model 4 mode, so after the conversion I was forced to modify the resulting program to run on the Model I and III. In the process I accidentally removed an important statement in line 70 of both program listings (One and Two), as I had reported in the March 1990 issue. Basically what the fix detailed was that you should change the :GOTO 50 statement at the end of the line to :PRINT#1,CHR$(A);:GOTO 50. This fixed the problem and allowed the programs to create workable CMD files.

Other problem reports stated that after the inclusion of the above-named fix, the programs still did not work. So I went to the trouble to key the programs in as listed in CN-80 and run them (of course adding the extra statement in line 70 of each). They worked like a champ. So if you are having trouble in that department then you may have keyed something in wrong, but did it in such a way that the checksums still came out right. For those of you with that problem I strongly suggest that you get the CN-80 Disk Series Disk Number Eight (8), which is presently available for $5 from CN-80 (see the PRODUCT ORDER page later in this issue). Besides, this saves you a LOT of time and trouble, AND the programs VIDX/CMD and PROTECT/CMD are already on disk, pre-assembled for you.

Anyway, another problem report had me totally baffled. The writer reported that PROTECT/CMD worked fine, but that poking both 16916 and 16428 did nothing. ARGH! I work so hard to make life easier for you. I gnash my teeth (violins play in the background) when I do something that makes it less easy.

His report of nothing happening when he poked a value to 16916 on the Model III had me baffled because on my re-keyed copy (and the original -- the copy that you will find on the Disk Series disk) it worked fine.

But when I applied the optional patch mentioned on page 15 of CN-80 Vol 3 # 1 for the Model III to make the I and III version use the same poke address, this caused it to fail. Double-ARGH! Model I users were not able to scroll-protect except by using PROTECT/CMD.

After digging through the source code for the programs I found that there was NOTHING wrong with the programs themselves (whew!). However I did find that in my original program design I had selected address 16428 (hex address 402C) as the scroll protect address, but I had later discovered that this caused a problem on the Model III, and so I had no choice but to change the address to a commonly safe address I had found at 16543 (hex 409F) so that the Model III would not choke when PROTECT/CMD was used. Unfortunately for you (and me) when I wrote my column to accompany the program, I referred to my older notes that had still specified 16428 as the proper poke address, although the current programs no longer supported this older address. Rats!

So, as also reported in the March 1990 issue, the PROPER Model I poke address is 16543. Actually, this is a kind of easy address to remember. So you Model I users who were frustrated, use 16543 (hex 409F) instead and all will be roses. Also, those Model III users out there who were having trouble, use 16916. If it does not work then you did something wrong, as the program -does- use this 16916 address (hex 4214). This is of course the "standard" Model III scroll-protect poke address. If you had applied the patch to make the III use the same address as the Model I then you should use the Model I 16543 address instead. Whew. Beat me fifty lashes with a wet noodle.

But this brings me to yet -another- subject:

MACHINE SENSING: WHERE ARE WE?

How many times have you written a real gem of a program, debugging it until it runs flawlessly on your computer. Then, in a moment of pride and glory, you give a copy to friend who has a different model TRS-80. But instead of hearing ooh's and aah's and gasps of amazement (and them kissing your shoelaces for a particularly astounding project), they instead turn around and say "Hey. I thought you said you debugged this stupid thing. Look, it doesn't work!"

Well, instead of killing all witnesses, you may find the following information quite useful. You should know something about such terms as word-sized values, bytes, hex addresses and such to follow this. If you don't understand this then you should not bother reading further, or you should read a good introduction to assembly language which covers such subjects, such as "Assembly Language for the Models III and 4" by Chris Fara, or "Z-80 Machine Language Techniques" by Don Ady. Both books are available from CN-80.

It used to be that to check which computer you were on you simply looked at address X'0125'. If the byte there had a value of X'49' (the ASCII code for the letter 'I') then you were using a Model III, otherwise you were using a Model I. Things got more complicated when the LOBO "clone" computers came along, as well as the Model 4. Many of us take for granted that we can try poking a value into low memory, and if it takes this means we have a Model 4, otherwise it is a I or a III, and so the test first mentioned would be used to get the final verdict of the computer type. This is no longer true as many programs such as the hardware interface kit for LDOS 5.3 and other MEMDISK programs for the III mode of a Model 4 place the ROM image in RAM, and so eliminates the reliability of this poking test. Due to this I tried to develop a list of PEEKs that could reveal the proper computer type.

If the byte at address X'0000' is X'C3' then it is a Model 4 running under Model 4 Multidos.

If the byte at address X'0200' is X'C3' then it is a Model 4 running under DOSPLUS IV.

If the byte at address X'020F' is X'49' then it is a Model 4 running under TRSDOS/LS-DOS 6.

If the hex address at address X'0006' is X'4000' then the computer is a Model I/III.

If you know the computer is a I/III (as tested from above), then if peeking at hex address X'0125' results in a byte value of X'49' (the ASCII letter 'I') then it is a Model III -- otherwise it is a Model I.

If the Computer is a Model I, then you can tell if you are using a LOBO LX-80 Model I work-alike by looking at the byte at address X'3000'. If the value is X'F3' then it is an LX-80; otherwise it is a "real" Model I.

If you know that the computer passes the Model III tests then if the word at address X'36FF' is X'1B60' then it is a Model 4/4P/4D running the the III-mode.

If you know you that the computer is a III and is not a 4/4P/4D, then if the bytes at hex addresses X'37F8' and X'37F9' are the same then you are running on a LOBO MAX-80 Model III work-alike, otherwise you are operating on a real Model III.

But what is so important about knowing such things? Well, for one thing a program will often require different system calls depending on what type of machine is being used, such as a standard I and III and 4. Some other machines, such as the LX-80 and MAX-80 may require special initializations that its different architecture might dictate, such as its expanded RS232 interfaces. Other more complicated things result from the use of the printer port, like if we should send a byte directly to the printer via hex address X'37E8' or port X'F8'. It is due to these simple little things that allows a program to run on one machine and not to run on another. There are many differences between the clones and the Tandy computers as well. More than once I have heard from MAX-80 owners "I thought you said that this program ran on the Model III? I can't get it to run on my MAX?" I can only answer with: "That's right; I said it would run on a Model III. I did not say it would run on a MAX."

Problems usually sprout from a program's use of ROM calls. On the surface these calls are gems because they save us so much labor, but when you try running on EVERY machine possible you run into a lot of trouble, often resulting in a program growing quite large just to cover initialization; machine testing and adjusting for them. This problem has troubled me to this day. I therefore try to make my programs run on only "real" Model I and III and 4's, and try to make them operate on as many operating systems that support only these 3 computer configurations.

Of course this test list may still be incomplete. Since I do not have access to a LX-80 or a MAX-80 I can only go on information provided for me, which currently is next to nothing. But what about the Video Genie Model I work-alike? Any of you have it? How can a program test for it? Using 20-20 hindsight I wish I had the knowledge that Peter Ray down at Anitek has concerning machine sensing. Considering the impressive array of TRS-80 environments that LeScript supports, his knowledge is obviously vast and respectable.

DATE EXTENDING LS-DOS 6.3 (#2)

I understand that LS-DOS 6.3.1 contains code to extend the dating of LS-DOS to December 31, 2011. If you are a regular reader of CN-80 then you'll recall that I had already provided you with the patches needed to do this in Volume 2 Number 6, page 16. I don't know what patches Roy down at MISOSYS applied to add this feature, but I suspect that they will emulate in most respects my own patches, as I had submitted them to him in October of 1988.

At the time I submitted them he told me there wasn't much chance of adding such patches as he did not see the future of the TRS-80 going through to the year 2000. Apparently something has changed his mind -- YOU! If it had not been for you, the users and supporters of TRS-80 equipment, things such as this would never have come about. Thank you for supporting those who support you! May this trend ever continue.

But while we are on the subject of date extending, I thought that I would share with you some more news. I have managed to modify my own 6.3 extension patches so that those of you who have added extensions to your DOS, such as patches to support the XLR8er board, the Alpha Technologies Board and such will not have a head-scratching session when using my patches. I have now found a way to modify LS-DOS 6.3.0 in such a manner that the date extension patches will not interfere with the memory enhancement boards, and in fact will no longer require any low-memory driver space. I sat down the other day rethinking my approach and found an easier way to install the patches and to have enough room in patch areas to apply my modifications. I am sure that the new

LS-DOS 6.3.1 changes will do pretty much the same.

Also included within these patches is the ability to simplify date entry upon boot-up and when using the DATE library command. After installing the patches you will be able to enter a date such as April 5, 1990 as 4.5.90. Thus if you had once installed my patches mentioned in this column sometime ago to do this one feature, you will not need to re-install them. Further, those of you who had to de-install them due to conflicts with the code with your XLR8er board system support software can now breath easier because this new code will not interfere with it.

These new listings can be found in the program listing section of this month's magazine as Patch Listing Number One through Patch Listing Number Six. Once you have created all 6 listings using either BUILD or a word processor that is capable of saving a file in ASCII format (avoid using TED because its end-of-file character confuses PATCH when used with FIX files), you can install them by placing a working copy of LS-DOS 6.3 in Drive :0 and enter DO =DTX63, and they will automatically be installed for you. For best results be sure to use a fresh work copy of your master LS-DOS 6.3.0 disk. You can add your other patches afterward.

Once these patches are installed, to enter a date beyond the year 1999 you must enter the year as you did before; using the last two digits. For example, to enter January 1, 2001 you would enter 01/01/01, or since with the patches we now have simplified date entry; 1/1/1.

CONCLUSION

I hope that I have helped you out in this "special edition" column. I hope also to have given you some insight into (and compassion for) the trials and tribulations a programmer must go through to get a program to run on more than just one machine. It can be a real can of worms.

Be it as it may, in my next column I'll show you Orchestra-90 fans how to spiff up your music collection by using ORCHKEY/CMD, a special keystroke feeder that will allow you to take advantage of OIL (Orchestra Interpretive Language -- a PILOT-like language) to simplify your music selection. It emulates the "demo" programs you may have once seen at Radio Shack which advertised Orchestra-90 "live". After that you may want to dig out your cassette cables and dust your recorders off because next we'll enable your I/III/4/4D computer to digitally record and play back music and even your own voice! So until next time -- HAPPY COMPUTING!

-David Goben

(Editors Note) David's patches that appear in this issue will be included on our disk series number nine as usual, if you need these patches on disk prior to then, just send $2.00 to pay for postage and disks costs and we will send you a special copy of the patches. And don't forget that the File Cabinet has 81 disks with pre-programmed music selections. With the average of 20 song programs per disk that would make about 1620 music selections waiting to be played on you TRS-80, with more selections coming in the future. And with David's upcoming articles more of us might get the music bug.

We had two of the Orchestra-90 RS Cat. #26-1922 for sale. There were many disappointed users who missed out because we just didn't have enough to go around for all the people who wanted one. The RS 1986 catalog was the last catalog ($79.95) we found this unit in, and they have become very scarce, we even let the one we were hanging onto for ourselves go. (One less disappointed user.) What did it do? It allowed you to create your own electronic music and sound effects and play it on your home stereo, or tape cassette recorder.

Maybe some of you hardware hackers can come up with a home grown unit to accomplish the same task as the Tandy unit did. If you come up with the hardware, I know that one of our expert programmers can come up with the software. If not, we may hear a "Swan Song" for the Orchestra-90 fans. Let us know if you have any ideas. CN-80 will be happy to assist you in the distribution and marketing of such a product, or publishing a "How to build your own" design and instructions.

CAR MAINTENANCE PROGRAM REVIEW
CN80 Staff Review

Last month we promised you a look at a car maintenance program called "Auto-Support" that was written by Jerry McAllister and Henry Leno. Henry Leno is in the Navy and submitted the program to us to publish or review. The program is written in Basic and only runs under DosPlus Ver. 3.5, however we ran it using LDOS 5.3 and it ran quite well with the exception of a few line errors. We feel that the author or another programmer could rewrite the program with very little effort so that it could work under LDOS 5.3 or a later DOS. As it stands there are 17 pages of basic program, much too long to be printed here. (The program will be available on our disk number nine, and perhaps a version that will run on a dos other than DosPlus.)

All in all the concept of the program intrigued us. It comes in 5 BASIC program modules. The first is the data base initializer which you run first to set up the other programs to fit your own auto or truck.

The program and its menu is self-explanatory, and at this point has no documentation, but after running it through once on a trial basis, we found that there really wouldn't be any need for any documentation, except maybe it needs a readme file to explain the start up procedures.

Entering the present Odometer mileage, and either using the maintenance checks that are prewritten or changing them to your own liking, the program then proceeds to the main menu, where you enter your gas purchases; date, odometer mileage, and amount of gas purchased, and then proceeds to tell you the miles per gallon for each fillup. Assuming that you entered your gas purchases for a month and then ran the program it will calculate and tell you how many miles you are getting per gallon for the month. It also has the ability to accept either entries in gallons or liters.

A monthly or anytime you choose, reading the menu for maintenance data will give you what maintenance items are due and what items are past due and need to be done.

One disk backed up from the original disk and initialized for each vehicle would serve as a good maintenance control. The program displays the data on your screen or prints the records to give you a printed maintenance record for each vehicle.

Mr. Leno first asked that we list the program and anyone who liked it could send $10 to him and he would send them a copy. To clarify our policy, we wrote back that if he wanted to sell the program then he would have to advertise it in our ad section and that we would write a review of the program. His reply was "I am not interested in selling my "Auto-Support" program, but rather interested in sharing information and programs with others like myself who still use and appreciate the TRS-80 Model I/III/4/4P computers. Having said that please find enclosed my diskette containing the full "Auto-Support" program. I would like to have it placed in public domain. The reason I requested $10 initially for it was just to cover postage and handling. By placing it in public domain, that job is done for me. The diskette is formatted using DosPlus Ver. 3.5, 42 cylinders, single sided double density, no password. The only stipulation is that it needs DosPlus Ver 3.5 to run. If another Dos is used, the program will error out on the 'INPUT@' lines. I would like to see these programs printed in your magazine, or at least a review. This was my first major software undertaking and it is kind of sentimental, if you know what I mean!"

CN80 would like to suggest that even though Mr. Leno has placed his program in the public domain, that if you like the program and use it, that you treat it as shareware and donate $10 to the author for his work. In any event some of you who like to work in Basic might enjoy updating it to work under LDOS or LS-DOS. -CN80

USING THE WORD PROCESSOR TO LAYOUT DIAGRAMS FOR YOUR BASIC PROGRAMS.

by Robert L. Mensch, PE

Have you ever tired of the tedious task of counting spaces to get your PRINT and PRINT TAB text and symbols to appear at the right spot on the video or printed page.

Now I have an easier way. Just use your word processor and make the layout on the screen as if you were writing on a blank sheet of paper. I am using DISK:SCRIPSIT, but any word processing program should work.

```
1001 PRINT "                        "
1002 PRINT "                        "
1003 PRINT "     (BLANK SCREEN)     "
1004 PRINT "<---80 columns max--->"
1005 PRINT " including quotations "
1006 PRINT "                        "
```

STEP 1. Use your word processing program to create a blank screen with quotation marks at L and R margins of desired area. If you want the BASIC program to put the display on video then limit width between the quotation marks to 78 columns and length to 22 lines. Be sure to put an end-of-line marker after each quotation mark at the R margin. For display widths greater than 66 columns, set your window width, so the line numbers and PRINT can be shifted off to the left out of sight. Hint: Use Block Command to repeat the top line as many times as needed, then correct the line numbers.

```
1001 PRINT "  ________________________  "
1002 PRINT "*  |                   |   |"
1003 PRINT "*     |   GIZMO   |        |"
1004 PRINT "*    /\ ]----[ /\          |"
1005 PRINT "*    <------------->       |"
1006 PRINT "*__x__x__x__x__x__x__|"
```

STEP 2. Make design within the blank screen using words and symbols in your word processing system. If you need some special symbols, then you must write additional BASIC statements to print them to screen or paper before or after this design is printed.

STEP 3. Save the DESIGN shown in step 2 in ASCII and then RUN the program in BASIC.

The screen should look like this:

```
   ________________________
*  |                   |   |
*     |   GIZMO   |        |
*    /\ ]----[ /\          |
*    <------------->       |
*__x__x__x__x__x__x__|
```

STEP 4. If you want to make your design flash ON and OFF then add the following lines to your program:

```
10 CLS
20 FOR T = 1 TO 500: NEXT T
1010 FOR T = 1 TO 1000: NEXT T
1020 CLS: GOTO 20
```

STEP 6. OH, you want to shift the whole design to the center of the screen. Insert line '30 PRINT@ (15,30)' and Use the GLOBAL command to replace the word 'PRINT' with 'PRINT TAB(30)'. Now your screen may look like this, depending how you set the window.

```
1001 PRINT TAB(30) TAB(30)
"  ____________________  "
1002 PRINT TAB(30)
"*  |                 | |"
1003 PRINT TAB(30) "*  | GIZMO  |
 |"
1004 PRINT TAB(30) "*   /\ ]----[ /\
 |"
1005 PRINT TAB(30)  "*   <------------->
 |"
1006 PRINT TAB(30)
"*__x__x__x__x__x__x__|"
```

Don't forget to save your new program in ASCII. Try RUNning it in BASIC.

This method is certainly a lot faster than using the video display worksheet and counting squares and calculating many TAB statements.

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BIGPRINT/ONE and BIGPRINT/TWO

by Jack H. Haren

I was intrigued by Danny Mullen's VCRGEM10/BAS program in the November issue of Computer News 80. It seemed to offer a challenge to be expanded well beyond what it was designed to accomplish. Since I am constantly on the lookout for program's to write, this seemed like a welcome opportunity.

The result was BIGPRINT/ONE and BIGPRINT/TWO (see program listing one) both of which have the following features:

(1) Ability to print numbers, letters and special characters !"#$%&'()*=:-@+;<>?, /.
(2) Choice of either horizontal or vertical printing.
(3) Unlimited 14 character lines (13 on some printers) when using horizontal printing.
(4) Unlimited width for 7 lines when using vertical printing.
(5) Either automatic or user line formatting.
(6) Left, center or right line justification.
(7) Half character centering when using horizontal printing.
(8) Preview of the sign or labels before printing.
(9) Automatic centering of the seven lines when using vertical printing. A single line of text will be placed on line 4, the center line. 2 lines of text will be placed on lines 3 and 5 while 3 lines will be placed on lines 2, 4 and 6.
(10) Printing of one or more labels of 1 to 5 characters each.

BIGPRINT/ONE was written to work with the GEMINI-15X printer which I use at home and other printers which have BLOCK Graphic capabilities. Everything went fine until I tried to move the program over to an MS-DOS computer that was connected to an old EPSON printer which didn't have the block graphics capability of my GEMINI. Conversion to GW-BASIC was easy but the Epson printer was another matter because I was forced into an area new to me, Dot Graphics. After a considerable struggle the necessary modifications were added and the new program BIGPRINT/TWO worked on either the GEMINI or EPSON printer. Since BIGPRINT/ONE which uses the block graphics runs much faster, I have included BIGPRINT/ONE as well as BIGPRINT/TWO which uses Dot Graphics. You can use which ever one works with your printer.

PROGRAM OPERATION

After typing RUN, the program warns the user to turn on the printer.
You are then asked to answer the following formatting questions:

"Are you printing signs or labels? (S/L)"
If labels, some of the following questions are skipped.

"Please select Left, Center or Right Justification (L/C/R)."

"Enter the desired text."
There is a limit of 255 characters.
User format control is accomplished by using a backward slash (\) <CLEAR><⁄> in place of a space between words where you want a line to end.
Blank lines can be created by using two backward slashes (\\).

"Do you want Horizontal or Vertical printing? (H/V)?"

A PREVIEW of the sign or labels is then displayed on the screen followed by:
"Is the format OK (Y/N)?"

If the answer is "Y" the sign is printed. If "N", you are asked,

"Another? (Y/N)"

That's all there is to it. After a few minutes playing with the program, you will be an expert and won't even use any paper until you have an acceptable sign ready to be printed.

PROGRAM NOTES

Because descriptive variable names are used and the various routines in the program are identified with remark lines, I will not spend a great deal of time explaining how the program works. There are however, a few things which may be of interest.

The 9000 series of DATA lines contain the codes which are used to construct characters line by line. Ten codes are used, each one representing a particular geographic block used to build the characters. 0 represents a blank block while

9 is a solid black block. 1 through 4 are lower right, lower left, upper right and upper left triangles. 5 and 6 are left half and right half blocks while 7 and 8 are upper half and lower half blocks. These are read into array A$( ) at lines 120 and 130 in BIGPRINT/ONE or lines 110 and 120 in BIGPRINT/TWO. You may wish to modify the type font or to substitute graphics of some sort for some of the special characters. Since you know the codes used, changes to the DATA stored in the 9000 series of lines is easily accomplished.

BIGPRINT/ONE converts those codes to the ASCII codes for GEMINI block graphics. At line 100, the DATA from line 110 is read into arrays VPC( ) AND HPC( ). Array HPC( ) is for Horizontal Print Control and VPC( ) is for Vertical Print Control. These ten ASCII codes correspond to the ten character codes zero through nine which are used to construct the characters on the 9000 DATA lines.

BIGPRINT/TWO required six dot graphic codes to create the equivalent of a single block graphic code. Twenty sets of these, ten for horizontal and another ten for vertical printing are on the 8000 series DATA lines. These are read into array PIN( ) at line 100.

Of special note is function FNUC$(X) on line 90. I don't remember where I learned about this function but have used it in many programs. In order to understand how it works, you must have a little knowledge of how the computer treats BASIC comparative statements. When the statement is TRUE the computer generates a -1 in its place. (Try this on your computer in BASIC by typing PRINT 1 = 1). When the statement is FALSE a zero is generated (Type PRINT 1 = 2). When two comparative statements joined by AND exist as in FNUC$, if neither or only one is TRUE the total statement is considered FALSE and a zero is generated. If BOTH are TRUE then a -1 is generated. When 32 is multiplied by a zero (FALSE), the result is zero but when multiplied by -1 (TRUE) the result is -32. If the character under consideration is a lower case alpha, -32 will be added (or if you prefer, +32 will be subtracted) and the resulting ASCII will be the upper case equivalent of the character. If the character is not a lower case alpha, zero is added and no change takes place. This function is used on text entries and to modify answers to questions to assure upper case.

If you have trouble printing the 14th character when using the Horizontal mode, change line 2030 to CHAR.MAX = 13.
-Jack H. Haren

(Editors Note) Due to the length of these two programs only the BIGPRINT/TWO has been printed in this issue. And because it worked quite well on our Panasonic printers in the Epson FX80 mode. BIGPRINT/ONE for the Gemini printer will be available on our Disk Series Number 9 which will cover the programs printed in the April, May and June issues, or by advance special purchase if you don't want to wait for number 9, $2.00 please, to cover disk cost and mailing. We thank Mr. Haren for sharing his work with us and for his continued support of the TRS-80. It is efforts such as his and Danny Mullen's and others that will keep the TRS-80 computers working long into the future with new and interesting applications. It goes without saying that there is a great deal of pride and satisfaction in being able to say "look what I can do with my computer, I wrote that program". Try saying that about a MS computer, without relying on their fixed application programs. -Ed.

CHECK WRITER PROGRAM
by Elton Wood

For the past several years I have been involved in the management and administration of a small non-profit water system. In conjunction therewith I have used my Model 4 and LeScript word processor as the tools for printing the monthly accounts payable checks. While the work processor approach has served well, I always had in the back of my mind that someday I should develop a check writing program, however lack of motivation and inspiration left the project undone.

Well, along comes Issue 26 of CodeWorks magazine which contains a program entitled "Ckrite.Bas", written by editor Irv Schmidt

for the MS computers. This program takes an integer dollar amount and changes it to the equivalent words used in writing checks.

A detailed study of this program provided the necessary stimulus for brainwork and efforts, as I incorporated the concept of Irv's program as a subroutine into a finalized check writing program.

The enclosed program listing (see program listing number two) and diskette which is in ASCII, is written for a TRS-80 Model 4 and is the result of this effort. It is provided for your perusal and disposition. My experience indicates that there are about as many ways to code a program as there are people who write them and that most people who have enough interest to type in a program will incorporate some of their own personal touches. Therefore, I think the program is remarked sufficiently so as to be self-documenting. It obviously has somewhat limited application but I have found it to be most useful as the tool for the purpose I intended. If not to practical for many, it may at least be of some amusement value.
-Elton L. Wood

(Editors Note) You will find an advertisement in the Product Source of this issue where CodeWorks is offering its first four years of CodeWorks magazine which were written for the TRS-80 Model III and IV along with the programs on disks. We had the idea since CodeWorks has now changed its support to the MS computers and GW-Basic that many of you may not be aware that there were many good programs, plus good instruction in Basic programming provided by CodeWorks in its first four years of publication. So we called Irv Schmidt and discussed the idea that he should not let those years of productive work just revert to never-never-land and that there were many of our subscribers who would be interested in knowing about the CodeWorks TRS-80 programs. Because many of our subscribers are new owners of their TRS-80 computers or were perhaps unaware of CodeWorks. The resulting advertisement and effort by Irv to keep his programs available to the TRS-80 user is the result of that conversation and is greatly appreciated by all of us TRS-80 users.
-Ed.

OPEN FORUM

Q: I haven't been able to get David Goben's Model III enhancements software in the January issue to create a command file from Basic. Well, actually it creates the file, but writes nothing to it, as though it's not reading the data lines.
H. A. B. Jacksonville, FL

A: At the end of Line 70 in both programs change
:GOTO 50
to
Print#1,CHR$(A);:GOTO 50

Q: In Vol 3 No. 2 page 2 you had a hint on Deskmate date upgrades. I tried this on my Model 4P and it went fine until I go to the:

SET *CL COM <ENTER>

When I did this I got the message "program not found". I would appreciate it if you could help me figure out what I didn't do or what I did do wrong.

I really enjoy your magazine and appreciate your efforts in getting us something worthwhile for us to use with our Model 4's.
-R. G. B. Stuttgart, AZ

A: You did nothing wrong. For the Set *CL COM to work the COM/Drive program must be on the disk you are working on. If the COM/Driver program does not exist, then you do not need to use the SET *CL COM command step in our suggestion to upgrade your Deskmate. The one thing we left out was the DATE/CONV, that should be, but not necessary, last step. This command updates your existing programs that were stored on DATA storage disks with the new dating, if not used on your old data disks you may get garbaged dates when you read the directory of the older files, but nothing will happen to the data that you stored in those programs.

LTR: The File Cabinet Library disk MD4 Business Volume 17 has a Special Occasion program in which you can enter all your friends' special events for the year.

It has a menu which shows: add occasion; delete occasion; or display listing. The display listings then asks for the month you would like displayed. After entering the month desired, it shows the name, date and occasion for each person entered. This can then be printed for the month's reminder list so you don't forget someone important to you.

It is a rather handy and convenient program.

However, I was not able to change or delete and entry after it wa once entered. Perhaps someone could solve this problem for us.
H. P. A. Coldwater, MI.

A: We would welcome any readers efforts to rewrite this program to allow for editing of the entries. We will even send you a copy of the program to work with if you don't have one. One solution we think of (untried because of lack of time at this point) is to use TED to edit the data storage file that this program would set up.

LTR: I would like to make a suggestion for a new column in CN80, which I read from cover to cover as soon as it arrives. I would like to see a Hints and Tips column where the readers could write in their "how to do it tips, patches and so forth".

There would be a great advantage to those of us users who could read about how someone else solved a problem or patched a program. Maybe you could have a hint of the month contest. With the best hint being listed first and with some sort of prize being offered each month.
K. P. Boston, MA

A: We are all for that. We have run a hints and tips section since the beginning of CN80, the only problem is that we have had to author all the hints and tips. We would be more than willing to provide 25 free disks to the Hint and Tip winner of the month. So charge up your word processors and get the ideas flowing.

One request however, please put your hint on a disk in ASCII format. And please label the disk with the format used, and which Basic you are using. We have received articles with hard copy printouts and disks with no labels. It is very easy to get the disks mixed up with other unlabeled disks, then we have to spend time to match the disks up with the proper author.

While we are on the Subject of submissions please help us by following these simple rules.

1. Provide a hard copy of your article, letter etc. It does not need to be double spaced.

2. Provide your letter, article, hint and tip text, etc. on a disk in ASCII format. If you are unfamiliar with how your word processor stores files in ASCII format drop us a note and we will help you, or just send us your original file - but please tell us what word processor you used and what DOS was used to format the disk.

3. Always save your BASIC programs in ASCII to a disk, and label the disk with the programs name and what BASIC was used to write the program.

4. Always provide a hard copy of your BASIC program with the disk.

As the magazine grows, which is more information for everyone each month, your help is needed and these four simple rules will greatly assist us in getting that information to you.

Most of all thanks to all the contributors for their support and submissions.

Next month we hope to start printing the first part of our long overdue "How to Use Laser Printers with the TRS-80 Computers" research on this project has taken a little longer that we had hoped, and we want to make sure that the information is correct the first time. Your patience is appreciated and will be rewarded with some fine articles on this subject.

Till then - Happy Computing.

Patch Listing Number ONE -- David Goben

```
. DTX63/JCL
. Patch LS-DOS 6.3 for date extensions to Dec 31, 2Ø11
. David Goben. February 199Ø
.
PATCH BOOT/SYS.LSIDOS (DØ5,94=CD C7 Ø4:FØ5,94=1A 36 2F)
PATCH SYSØ/SYS.LSIDOS DTXSØ63
PATCH SYS6/SYS.LSIDOS DTXS663
PATCH SYS7/SYS.LSIDOS DTXS763
PATCH SYS7/SYS.LSIDOS DTXS763B (O=N)
PATCH BACKUP/CMD.UTILITY DTXBU63
.END -------------------------
```

Patch Listing Number TWO -- David Goben

```
.DTXSØ63/FIX
.Extend dating for LS-DOS 6.3 to Dec 31, 2Ø11
.David Goben, February 199Ø
.Install using: PATCH SYSØ/SYS.LSIDOS DTXSØ63
.
DØD,5E=CD B3 21 FE 2Ø
FØD,5E=4F D6 5Ø FE 14
DØD,C9=ØF
FØD,C9=Ø7
DØD,EC=BE 21
FØD,EC=C7 Ø4
DØD,FE=CD D3
FØD,FE=47 2E
DØE,ØØ=21
FØE,ØØ=DC
DØE,24=21 6C Ø7 85 6F 11 4F
FØE,24=D6 2Ø 2E 38 FE 3A 38
DØE,2B=21 3E 61 EF 21 4E 21
FØE,2B=Ø3 2C D6 ØA 67 22 52
DØE,32=CD 2D Ø5 ØØ ØØ ØØ ØØ
FØE,32=21 21 4E 21 CD 2D Ø5
DØF,9F=57 CD D8 21 38 Ø2 AF 53 82 37
FØF,9F=5F CD 2F 21 3Ø Ø4 83 5F 37 7B
X'Ø4C7'=1A 36 2F FE 64 D8 36 25 C9
X'21B3'=FE ØC 3Ø Ø3 C6 64 12 4F D6 5Ø C9
X'21BE'=53 75 6E 4D 6F 6E 54 75 65 57 65
X'21C9'=64 54 68 75 46 72 69 53 61 74
X'21D3'=47 21 DC Ø4 C9
X'21D8'=7E D6 3Ø FE ØA DØ 23 C9
.EOP ---------------------
```

Patch Listing Number THREE -- David Goben

```
.DTXS663/FIX
.Extend dating for LS-DOS 6.3 to Dec 31, 2011
.David Goben, October, 1988
.Install using: PATCH SYS6/SYS.LSIDOS DTXS663
.
D05,32=D9 04
F05,32=7A 2D
D08,D3=DC 04
F08,D3=7D 2D
D08,FB=D6 64
F08,FB=3E 63
D0D,6E=7E FE 0C 30 03
F0D,6E=4A 61 6E 46 65
D0D,73=C6 64 77 D6 50 C9
F0D,73=62 4D 61 72 41 70
D0F,89=CD 7D 2D
F0F,89=7E D6 50
.EOP ------------------
```

Patch Listing Number FOUR -- David Goben

```
.DTXS763/FIX
.Extend dating for LS-DOS 6.3 to Dec 31, 2011
.David Goben, February 1990
.Install using: PATCH SYS7/SYS.LSIDOS DTXS763
.
.fix DATE
D05,44=CD 15 27
F05,44=1A D6 50
D05,4B=20
F05,4B=14
D05,B2=0F
F05,B2=07
D06,04=21 6C 07 85 6F 11
F06,04=D6 50 FE 0A 38 09
D06,0A=45 27 3E 61 EF 18 07
F06,0A=47 3E 39 32 48 27 78
D06,FE=57
F06,FE=5F
D07,00=20 27 00 00 82
F07,00=F0 25 30 04 83
D07,39=1A FE 0C 30 03
F07,39=4A 61 6E 46 65
D07,3E=C6 64 12 D6 50 C9
F07,3E=62 4D 61 72 41 70
D07,44=CD F0 25 D8 AF 53 2B C9
F07,44=72 4D 61 79 4A 75 6E 4A
.
.fix PURGE
D10,30=DC 04
F10,30=03 29
D10,51=0E 37 0C D6 0A 30 FB
F10,51=FE 0A 38 0A 0E 39 D6
```

con't on next page

```
D1Ø,58=C6 ØA 47 CD ØE 29 ØØ
F1Ø,58=ØA FE ØA 38 Ø2 3E Ø9
D12,ØB=CD Ø3 29
F12,ØB=7E D6 5Ø
D13,1A=7E FE ØC 3Ø Ø3 C6 64
F13,1A=4A 61 6E 46 65 62 4D
D13,21=77 D6 5Ø C9 79 FE 3A
F13,21=61 72 41 7Ø 72 4D 61
D13,28=38 Ø3 D6 ØA 4F 78 C9
F13,28=79 4A 75 6E 4A 75 6C
.EOP ---------------------
```

Patch Listing Number FIVE -- David Goben

```
.DTXS763B/FIX
.Extend dating for LS-DOS 6.3 to Dec 31, 2Ø11
.David Goben, February 199Ø
.Install using: PATCH SYS7/SYS.LSIDOS DTXS763B (O=N)
.
.finish fixing DATE
DØ5,E1=DC Ø4
FØ5,E1=15 27
.EOP ----------------------
```

Patch Listing Number SIX -- David Goben

```
.DTXBU63/FIX
.Extend dating for LS-DOS 6.3 to Dec 31, 2Ø11
.David Goben, October, 1988
.Install using: PATCH BACKUP/CMD.UTILITY DTXBU63
.
DØ8,4B=CD DD 36
FØ8,4B=7E D6 5Ø
DØD,82=7E FE ØC 3Ø Ø3
FØD,82=ØØ ØØ ØØ ØØ ØØ
DØD,87=C6 64 77 D6 5Ø C9
FØD,87=ØØ ØØ ØØ ØØ ØØ ØØ
.EOP ------------------
```

BIGPRINT/TWO PROGRAM LISTING NUMBER ONE for the Model 4, by Jack H. Haren

```
1Ø '
2Ø '              > > > BIGPRINT/TWO < < <
3Ø '
4Ø '          > > > Read DATA into the arrays < < <
5Ø '
6Ø CLS : PRINT@(5,17),"PLEASE STAND BY, READING DATA INTO MEMORY. . .";
7Ø PRT$ = CHR$(27)+"@"+CHR$(27)+"A"+CHR$(6)+CHR$(27)+"U"+CHR$(1) ' 6/72" line &
 unidirectional printing.
8Ø DEFINT A - Z : DIM A$(7,6Ø) , LAYOUT$(15) , HALF.SPC(15) , PIN(9,2,6)
9Ø DEF FNUC$(X$)=CHR$(ASC(X$)+32*(ASC(X$)>96 AND ASC(X$)<123))'Change LC to UC
```

con't on next page

```
100 FOR X = 1 TO 9: FOR Y = 1 TO 2: FOR Z = 1 TO 6: READ PIN(X,Y,Z): NEXT Z,Y,X
110 FOR X = 0 TO 50 STEP 10 : FOR J = 1 TO 7 : FOR I = X TO X + 9
120 READ A$(J,I) : NEXT I,J,X
1000 '
1010 '          > > > Main Routine begins here. < < <
1020 '
1030 CLS : PRINT@(5,12),"This program prints large characters using PIN GRAPHICS."
1040 PRINT@(7,6),"Be sure that the paper or labels are adjusted and the printer is on."
1050 PRINT@(9,27),; : INPUT "Press <ENTER> when ready";X$ : LPRINT PRT$;
1060 CLS : PRINT@(10,20),"ARE YOU PRINTING LABELS OR SIGNS (L/S)?";
1070 LS$ = INKEY$ : IF LS$ = "" THEN 1070 ELSE LS$ = FNUC$(LS$)
1080 IF LS$ = "L" THEN 1120 ELSE IF LS$ < > "S" THEN 1070
1090 CLS : PRINT@(10,9),"Please select Left, Center or Right justification (L/C/R)";
1100 LCR$ = INKEY$ : IF LCR$ = "" THEN 1100 ELSE LCR$ = FNUC$(LCR$)
1110 IF LCR$ = "L" OR LCR$ = "C" OR LCR$ = "R" THEN 1120 ELSE 1100
1120 CLS : H$ = "" : PRINT@(10,28), "Enter the desired text." : PRINT
1130 I$ = INKEY$ : IF I$ = "" THEN 1130 ELSE I$ = FNUC$(I$) : ASCI = ASC(I$)
1140 IF(ASCI > 31 AND ASCI < 91) OR ASCI = 92 THEN H$ = H$ + I$ : PRINT I$; : GOTO 1130
 ' This is a valid character.
1150 IF ASCI = 13 AND LEN(H$) > 0 THEN 1190 ' ASCII 13 = End of text.
1160 IF ASCI < > 8 THEN 1130 ' This is an invalid character.
1170 IF LEN(H$) > 0 THEN PRINT I$; : H$ = LEFT$(H$,LEN(H$)-1)' 8 = <LEFT ARROW>
1180 GOTO 1130
1190 IF LS$ = "L" THEN HV$ = "H" : LCR$ = "L" : CHAR.MAX = 5 : GOTO 2040
1200 CLS : PRINT@(10,15),"Do you want Horizontal or Vertical printing? (H/V)";
1210 HV$ = INKEY$ : IF HV$ = "" THEN 1210 ELSE HV$ = FNUC$(HV$)
1220 IF HV$ = "H" THEN 2000 ELSE IF HV$ = "V" THEN 3000 ELSE 1210
2000 '
2010 '          > > > Horizontal PRINT routine. < < <
2020 '
2030 CHAR.MAX = 14
2040 GOSUB 4000
2050 IF YN$ = "N" THEN 3170 ELSE PRINT : PRINT TAB(31);"Please stand by."
2060 FOR LN = 1 TO TOT.LINES
2070 N = LEN(LAYOUT$(LN))*36+HALF.SPC(LN)*6 : N2 = INT(N/256) : N1 = N-N2*256
2080 FOR CHAR.LINE = 1 TO 7
2090 LPRINT CHR$(27) "K" CHR$(N1) CHR$(N2);
2100 FOR X = 1 TO HALF.SPC(LN) * 6 : LPRINT CHR$(0); : NEXT X
2110 FOR CHARACTER = 1 TO LEN(LAYOUT$(LN)) : CHAR.ASCI =
 ASC(MID$(LAYOUT$(LN),CHARACTER,1))
2120 FOR CHAR.CODE = 1 TO 5
2130 PC = VAL(MID$(A$(CHAR.LINE,CHAR.ASCI - 32),CHAR.CODE,1))
2140 FOR PIN.CODE = 1 TO 6 : LPRINT CHR$(PIN(PC,1,PIN.CODE)); : NEXT PIN.CODE
2150 NEXT CHAR.CODE : FOR X = 1 TO 6 : LPRINT CHR$(0); : NEXT X
2160 NEXT CHARACTER
2170 LPRINT
2180 NEXT CHAR.LINE
2190 LPRINT : LPRINT : LPRINT : LPRINT : LPRINT
2200 NEXT LN : GOTO 3170
3000 '
3010 '           > > > Vertical PRINT routine. < < <
3020 '
3030 CHAR.MAX = 18 : GOSUB 4000
3040 IF YN$ = "N" THEN 3170 ELSE PRINT : PRINT TAB(31),"Please stand by."
3050 FOR CHARACTER = 1 TO CHAR.MAX
3060 FOR CHAR.CODE = 1 TO 5 : LPRINT CHR$(27) "K" CHR$(223) CHR$(1);
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307Ø FOR LN = 7 TO 1 STEP -1
308Ø IF LEN(LAYOUT$(LN)) < CHARACTER THEN FOR X = 1 TO 72 : LPRINT CHR$(Ø); : NEXT X :
 GOTO 314Ø
309Ø CHAR.ASCI = ASC(MID$(LAYOUT$(LN),CHARACTER,1))
31ØØ FOR CHAR.LINE = 7 TO 1 STEP -1
311Ø PC = VAL(MID$(A$(CHAR.LINE,CHAR.ASCI - 32),CHAR.CODE,1))
312Ø FOR PIN.CODE = 1 TO 6 : LPRINT CHR$(PIN(PC,2,PIN.CODE)); : NEXT PIN.CODE
313Ø NEXT CHAR.LINE : FOR X = 1 TO 3Ø : LPRINT CHR$(Ø); : NEXT X
314Ø NEXT LN : LPRINT
315Ø NEXT CHAR.CODE : LPRINT : LPRINT
316Ø NEXT CHARACTER
317Ø CLS : PRINT@(1Ø,35),"ANOTHER? (Y/N)";
318Ø YN$ = INKEY$ : IF YN$ = "" THEN 318Ø ELSE YN$ = FNUC$(YN$)
319Ø IF YN$ = "Y" THEN 1Ø6Ø ELSE IF YN$ = "N" THEN CLS : END ELSE 318Ø
4ØØØ '
4Ø1Ø '    > > > Subroutine to break text into lines and justify. < < <
4Ø2Ø '
4Ø3Ø CLS : TOT.LINES = Ø : ERASE LAYOUT$ , HALF.SPC : DIM LAYOUT$(15),HALF.SPC(15) : O$
 = H$
4Ø4Ø TOT.LINES = TOT.LINES + 1 : L = Ø
4Ø5Ø IF TOT.LINES > 7 AND HV$ = "V" THEN CHAR.MAX = CHAR.MAX + 1 : GOTO 4Ø3Ø
4Ø6Ø FOR X = 1 TO LEN(O$)
4Ø7Ø IF MID$(O$,X,1) = "\" THEN L = X : X = LEN(O$)
4Ø8Ø NEXT X
4Ø9Ø IF L = Ø THEN 412Ø ELSE IF L-1 > CHAR.MAX THEN IF HV$ = "H" THEN L = CHAR.MAX + 1
 ELSE CHAR.MAX = L-1 : GOTO 4Ø3Ø
41ØØ LAYOUT$(TOT.LINES) = LEFT$(O$,L-1) : O$ = RIGHT$(O$,LEN(O$)-L)
411Ø IF TOT.LINES = 7 AND HV$ = "V" THEN 5Ø1Ø ELSE 4Ø4Ø
412Ø IF LEN(O$) < = CHAR.MAX THEN LAYOUT$(TOT.LINES) = O$ : O$ = "" : GOTO 5ØØØ
413Ø FOR X = CHAR.MAX+1 TO 1 STEP -1
414Ø IF MID$(O$,X,1) = " " THEN L = X : X = 1
415Ø NEXT X
416Ø IF L > Ø THEN 423Ø
417Ø IF HV$ = "H" THEN LAYOUT$(TOT.LINES) = LEFT$(O$,CHAR.MAX) : O$ = RIGHT$(O$,LEN(O$)
 - CHAR.MAX) : GOTO 424Ø
418Ø FOR X = CHAR.MAX + 2 TO LEN(O$)
419Ø IF MID$(O$,X,1) = " " THEN L = X : X = LEN(O$)
42ØØ NEXT X
421Ø IF L = Ø THEN CHAR.MAX = LEN(O$) ELSE CHAR.MAX = L-1
422Ø GOTO 4Ø3Ø
423Ø LAYOUT$(TOT.LINES) = LEFT$(O$,L-1) : O$ = RIGHT$(O$,LEN(O$)-L)
424Ø IF O$ < > "" THEN 4Ø4Ø
5ØØØ '
5Ø1Ø '     > > > Routine to JUSTIFY the text on each line < < <
5Ø2Ø '
5Ø3Ø IF LCR$ = "L" THEN 6Ø3Ø
5Ø4Ø FOR X = 1 TO TOT.LINES
5Ø5Ø IF LCR$ = "C" THEN SP! = (CHAR.MAX - LEN(LAYOUT$(X)))/2 : HALF.SPC(X) = (SP! -
 INT(SP!))*6 : LAYOUT$(X) = SPACE$(INT(SP!)) + LAYOUT$(X) : GOTO 5Ø7Ø
5Ø6Ø LAYOUT$(X) = SPACE$(CHAR.MAX - LEN(LAYOUT$(X))) + LAYOUT$(X)
5Ø7Ø NEXT X
6ØØØ '
6Ø1Ø '  > > > Routine to adjust line spacing of Vert. printing layout. < < <
6Ø2Ø '
6Ø3Ø IF HV$ = "H" THEN 7Ø3Ø
6Ø4Ø ON TOT.LINES GOTO 6Ø5Ø,6Ø6Ø,6Ø7Ø,6Ø8Ø,6Ø8Ø,7Ø3Ø,7Ø3Ø
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```
6050 LAYOUT$(4) = LAYOUT$(1) : LAYOUT$(1) = "" : TOT.LINES = 4 : GOTO 7030
6060 LAYOUT$(3) = LAYOUT$(1) : LAYOUT$(1) = "" : LAYOUT$(5) = LAYOUT$(2) : LAYOUT$(2) =
 "" : TOT.LINES = 5 : GOTO 7030
6070 LAYOUT$(6) = LAYOUT$(3) : LAYOUT$(3) = "" : LAYOUT$(4) = LAYOUT$(2) : LAYOUT$(2) =
 LAYOUT$(1) : LAYOUT$(1) = "" : TOT.LINES = 6 : GOTO 7030
6080 FOR X = 6 TO 2 STEP -1 : LAYOUT$(X) = LAYOUT$(X-1) : NEXT X : LAYOUT$(1) = "" :
 TOT.LINES = 6
7000 '
7010 '    > > > Routine to eliminate trailing spaces from text < < <
7020 '
7030 CW = CHAR.MAX : CHAR.MAX = 0
7040 FOR X = 1 TO TOT.LINES
7050 IF LEN(LAYOUT$(X)) > CHAR.MAX THEN CHAR.MAX = LEN(LAYOUT$(X))
7060 NEXT X
7070 PRINT@(5,24),"Here is a preview of your layout";
7080 PRINT@(7,0),;
7090 FOR X = 1 TO TOT.LINES
7100 IF CW > 80 THEN PRINT LAYOUT$(X) ELSE PRINT TAB((80-CW)/2);LAYOUT$(X)
7110 NEXT X
7120 PRINT : PRINT TAB(29); "Is the format ok? (Y/N)"
7130 YN$ = INKEY$ : IF YN$ = "" THEN 7130 ELSE YN$ = FNUC$(YN$)
7140 IF YN$ = "Y" OR YN$ = "N" THEN RETURN ELSE 7130
8000 '
8010 ' > > > PRINTER PIN CONTROL CODES < < <
8020 '   /  HORIZONTAL \  /  VERTICAL  \
8030 DATA  1, 3, 7,15,31,63, 63,31,15, 7, 3, 1
8040 DATA 63,31,15, 7, 3, 1,  63,62,60,56,48,32
8050 DATA 32,48,56,60,62,63,   1, 3, 7,15,31,63
8060 DATA 63,62,60,56,48,32,  32,48,56,60,62,63
8070 DATA 63,63,63, 0, 0, 0,  56,56,56,56,56,56
8080 DATA  0, 0, 0,63,63,63,  7, 7, 7, 7, 7, 7
8090 DATA 56,56,56,56,56,56,   0, 0, 0,63,63,63
8100 DATA  7, 7, 7, 7, 7, 7, 63,63,63, 0, 0, 0
8110 DATA 63,63,63,63,63,63,  63,63,63,63,63,63
9060 '
9070 '            > > > Character DATA < < <
9080 '
9090 '              ASCII CHARACTERS 32 - 41
9100 '   /SPC\ / ! \ / " \ / # \ / $ \ / % \ / & \ / ' \ / ( \ / ) \
9110 DATA 00000,00900,09090,09090,00900,99065,19200,09900,00090,09000
9120 DATA 00000,00900,09090,09090,19992,99090,90900,00900,00650,06500
9130 DATA 00000,00900,09090,99999,90900,00650,39400,09400,00900,00900
9140 DATA 00000,00900,00000,09090,39992,00900,19209,00000,00900,00900
9150 DATA 00000,00000,00000,99999,00909,06500,90965,00000,00900,00900
9160 DATA 00000,00000,00000,09090,39994,09099,90390,00000,00650,06500
9170 DATA 00000,00900,00000,09090,00900,65099,39949,00000,00090,09000
9180 '
9190 '              ASCII CHARACTERS 42 - 51
9200 '   / * \ / + \ / , \ / - \ / . \ / / \ / 0 \ / 1 \ / 2 \ / 3 \
9210 DATA 00900,00000,00000,00000,00000,00065,19992,00100,19992,19992
9220 DATA 90909,00900,00000,00000,00000,00090,90009,01900,90009,90009
9230 DATA 09990,00900,00000,00000,00000,00650,90009,00900,00014,00004
9240 DATA 06950,99999,09900,99999,00000,00900,90009,00900,00140,09992
9250 DATA 09990,00900,09900,00000,00000,06500,90009,00900,01400,00009
9260 DATA 90909,00900,00900,00000,09900,09000,90009,00900,14000,90009
9270 DATA 00900,00000,09400,00000,09900,65000,39994,09990,99999,39994
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9280 '
9290 '              ASCII CHARACTERS 52 - 61
9300 '   / 4 \ / 5 \ / 6 \ / 7 \ / 8 \ / 9 \ / : \ / ; \ / < \ / = \
9310 DATA 00190,99999,19992,99999,19992,19992,00000,09900,00140,00000
9320 DATA 01490,90000,90009,00009,90009,90009,00000,09900,01400,00000
9330 DATA 14090,90000,90000,00014,30004,90009,09900,00000,14000,99999
9340 DATA 90090,39992,99992,00140,19992,39999,09900,09900,90000,00000
9350 DATA 99999,00009,90009,01400,90009,00009,00000,09900,32000,99999
9360 DATA 00090,90009,90009,14000,90009,90009,09900,00900,03200,00000
9370 DATA 00090,39994,39994,90000,39994,39994,09900,09400,00320,00000
9380 '
9390 '              ASCII CHARACTERS 62 - 71
9400 '   / > \ / ? \ / @ \ / A \ / B \ / C \ / D \ / E \ / F \ / G \
9410 DATA 03200,19992,19992,01920,99992,19992,99920,99995,99995,19992
9420 DATA 00320,90009,94009,09090,65009,90009,65032,65000,65000,90000
9430 DATA 00032,00009,9019,65065,65004,90000,65009,65000,65000,90000
9440 DATA 00009,00194,90909,90009,69992,90000,65009,69990,69990,90999
9450 DATA 00014,00900,90394,99999,65009,90000,65009,65000,65000,90009
9460 DATA 00140,00000,92001,90009,65009,90009,65014,65000,65000,90009
9470 DATA 01400,00900,39994,90009,99994,39994,99940,99999,95000,39994
9480 '
9490 '              ASCII CHARACTERS 72 - 81
9500 '   / H \ / I \ / J \ / K \ / L \ / M \ / N \ / O \ / P \ / Q \
9510 DATA 90009,09990,06995,90014,90000,95069,95009,19992,99992,19992
9520 DATA 90009,00900,00090,90140,90000,99099,99009,90009,65009,90009
9530 DATA 90009,00900,00090,91400,90000,96959,96509,90009,65009,90009
9540 DATA 99999,00900,00090,99000,90000,90909,90909,90009,69994,90009
9550 DATA 90009,00900,90090,93200,90000,90009,90659,90009,65000,90909
9560 DATA 90009,00900,90090,90320,90000,90009,90099,90009,65000,90099
9570 DATA 90009,09990,39940,90032,99999,90009,90069,39994,95000,39954
9580 '
9590 '              ASCII CHARACTERS 82 - 90
9600 '   / R \ / S \ / T \ / U \ / V \ / W \ / X \ / Y \ / Z \ /DMY\
9610 DATA 99992,19992,99999,90009,90009,90009,65065,90009,69995,00000
9620 DATA 65009,90009,00900,90009,90009,90009,09090,65065,00090,00000
9630 DATA 65009,90000,00900,90009,90009,90909,06950,09090,00650,00000
9640 DATA 69994,39992,00900,90009,65065,90909,00900,06950,00900,00000
9650 DATA 65090,00009,00900,90009,09090,96959,06950,00900,06500,00000
9660 DATA 65065,90009,00900,90009,06950,99099,09090,00900,09000,00000
9670 DATA 95009,39994,00900,39994,00900,65065,65065,00900,69995,00000
```

DMY EXPLODE

12345 ABCDE

HO2 BIGPRINT

```
100 ' WOODCHIP Software
110 ' Basic Code Programs
120 ' Elton L. Wood
130 ' 2536 W. Old Hwy Rd
140 ' Morgan, Utah 84050
150 ' Check Writer (CHEKRITR/BAS) (*** Dec 1989 ***)
160 ' For TRS-80 Model 4
170 ' Concept in Lines 630 to 940 taken from CodeWorks Magazine (Issue 26)
180 ' Input check amount as a numeral and it will be converted to words
190 '
200 POKE &HB94,PEEK(&HB94) OR 8 ' Enable Special Character Codes Without Toggle
210 PRINT CHR$(15);: ' Turn cursor off
220 '
230 ' Define important variables
240 ' C Sets starting column to print pointer
250 ' R Sets starting row to print pointer
260 ' ML Sets maximum length for inkey input routine
270 ' PO Sets print @ position for inkey input routine
280 HP$=CHR$(191)+CHR$(244)+CHR$(245)+CHR$(246) ' Creates Hand Pointer
290 HE$="   " ' Erases Hand Pointer
300 LE$=STRING$(68," ") ' Erases line
310 DIM MI$(14) ' Sets array size for number of menu items (Payees, etc.)
320 DIM Z$(27) ' Sets array size for numbers to words
330 '
340 GOTO 990
350 '
360 ' Inkey input subroutine
370 PRINT @(20,3),HP$;
380 PRINT @(21,0),CHR$(191);: PRINT @(21,79),CHR$(191);
390 A$="": L=0: PRINT @PO,STRING$(ML,46);
400 I$=INKEY$: IF I$="" THEN 400
410 IF I$=CHR$(13) THEN RETURN
420 IF I$=CHR$(9) OR I$=CHR$(10) THEN 400
430 IF I$=CHR$(8) AND L=0 THEN 400
440 IF I$=CHR$(8) THEN L=L-1: PRINT @PO+L,CHR$(46);: A$=LEFT$(A$,L): GOTO 400
450 IF ML=L THEN 400
460 PRINT @PO+L,I$;: A$=A$+I$: L=L+1: GOTO 400
470 '
480 END ' Payee data items subroutine (Replace with payees of your choice)
490 DATA PAYEE NUMBER ONE,PAYEE NUMBER TWO,PAYEE NUMBER THREE,PAYEE NUMBER FOUR,
 PAYEE NUMBER FIVE,PAYEE NUMBER SIX,PAYEE NUMBER SEVEN
500 DATA PAYEE NUMBER EIGHT,PAYEE NUMBER NINE,PAYEE NUMBER TEN,      PAYEE NUMBER
 ELEVEN,PAYEE NUMBER TWELVE
510 DATA TYPE YOUR OWN,EXIT TO DOS
520 RETURN
530 '
540 END ' Read words subroutine (For conversion of numbers to words)
550 DATA ONE,TWO,THREE,FOUR,FIVE,SIX,SEVEN
560 DATA EIGHT,NINE,TEN,ELEVEN,TWELVE,THIRTEEN
570 DATA FOURTEEN,FIFTEEN,SIXTEEN,SEVENTEEN
580 DATA EIGHTEEN,NINETEEN,TWENTY,THIRTY,FORTY
590 DATA FIFTY,SIXTY,SEVENTY,EIGHTY,NINETY
600 FOR Z=1 TO 27
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```
61Ø   READ Z$(Z)
62Ø NEXT Z
63Ø '
64Ø ' Convert number to words subroutine
65Ø IF ZA>99999.99ØØØØØØØ19# OR ZA<.Ø1 THEN END
66Ø ZA#=ZA
67Ø IF INT(ZA#)<>ZA# THEN ZA#=ZA#+.ØØ5
68Ø ZA$=STR$(ZA#)
69Ø IF INT(ZA#)=ZA# THEN ZA$=ZA$+".OO"
7ØØ ZF=INSTR(ZA$,"Ø"): IF ZF<>Ø THEN MID$(ZA$,ZF,1)="O": GOTO 7ØØ
71Ø ZX=INSTR(ZA$,".")
72Ø ZA$=LEFT$(ZA$,ZX)+MID$(ZA$,ZX+1,2)
73Ø IF LEFT$(ZA$,ZX)=" ." THEN ZA$="O"+RIGHT$(ZA$,3)
74Ø ZC$=MID$(ZA$,ZX+1,2)
75Ø IF LEN (ZC$)=1 THEN ZC$=ZC$+"O"
76Ø IF ZC$="OO" THEN ZC$="NO"
77Ø ZY$="& "+ZC$+"/lOO"
78Ø ZB$=STR$(INT(ZA#))
79Ø ZB$=RIGHT$(ZB$,LEN(ZB$)-1)
8ØØ ZL=LEN(ZB$)
81Ø FOR Z=1 TO ZL
82Ø   Z(Z)=VAL(MID$(ZB$,Z,1))
83Ø NEXT Z
84Ø Z=Z-1
85Ø IF Z(Z-1)=Ø THEN ZZ$=Z$(Z(Z))
86Ø IF Z(Z-1)=1 THEN ZZ$=Z$(Z(Z)+1Ø)
87Ø IF ZL=1 THEN 95Ø
88Ø IF Z(Z-1)>1 THEN ZZ$=Z$(Z(Z-1)+18)+" "+Z$(Z(Z))
89Ø IF ZL=2 THEN 95Ø
9ØØ IF Z(Z-2)<>Ø THEN ZZ$=Z$(Z(Z-2))+" HUNDRED "+ZZ$
91Ø IF ZL=3 THEN 95Ø
92Ø IF Z(Z-4)=Ø THEN ZZ$=Z$(Z(Z-3))+" THOUSAND "+ZZ$
93Ø IF Z(Z-4)=1 THEN ZZ$=Z$(Z(Z-3)+1Ø)+" THOUSAND "+ZZ$
94Ø IF Z(Z-4)>1 THEN ZZ$=Z$(Z(Z-4)+18)+Z$(Z(Z-3))+" THOUSAND "+ZZ$
95Ø ZZ$="** "+ZZ$+" "+ZY$
96Ø IF LEN(ZZ$)<15 THEN ZZ$="** ZERO "+RIGHT$(ZZ$,8)
97Ø RETURN
98Ø '
99Ø ' Main program starts here
1ØØØ C=3: R=5
1Ø1Ø FOR I=1 TO 14: READ MI$(I): NEXT
1Ø2Ø PAYEE$=""
1Ø3Ø '
1Ø4Ø ' Print menu on screen module
1Ø5Ø CLS
1Ø6Ø X$=STRING$(8Ø,131)
1Ø7Ø PRINT @(Ø,Ø),STRING$(3Ø,131);" WOODCHIP Software ";STRING$(3Ø,131);
1Ø8Ø PRINT @(3,Ø),STRING$(8Ø,176)
1Ø9Ø PRINT @(19,Ø),X$
11ØØ PRINT @(22,Ø),X$;
1111Ø FOR Y=4 TO 18: PRINT @(Y,39),CHR$(149);: NEXT
1121Ø FOR Y=Ø TO 21: PRINT @(Y,Ø),CHR$(191);: PRINT @(Y,79),CHR$(191);: NEXT
1131Ø PRINT @(1,3Ø),"Basic Code Programs";
1141Ø PRINT @(2,33),"CHECK WRITER";
1151Ø PRINT @(2Ø,8),"USE ARROWS TO MOVE POINTER TO DESIRED PAYEE THEN PRESS <ENTER>";
1161Ø FOR I=1 TO 7: PRINT @(2*I+3,8),MI$(I);: NEXT
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117Ø FOR I=8 TO 14: PRINT @(2*I-11,47),MI$(I);: NEXT
118Ø PRINT @(R,C),HP$;
119Ø '
12ØØ ' Move pointer module
121Ø I$=INKEY$: IF I$="" THEN 121Ø
122Ø IF I$<>CHR$(8) AND I$<>CHR$(9) AND I$<>CHR$(1Ø) AND I$<>CHR$(11) AND I$<>CHR$(13)
 THEN GOTO 121Ø
123Ø IF I$=CHR$(9) AND C=42 THEN PRINT @(R,C),HE$;: C=C-39: PRINT @(R,C),HP$;: GOTO 121Ø
124Ø IF I$=CHR$(9) AND C=3 THEN PRINT @(R,C),HE$;: C=C+39: PRINT @(R,C),HP$;: GOTO 121Ø
125Ø IF I$=CHR$(8) AND C=3 THEN PRINT @(R,C),HE$;: C=C+39: PRINT @(R,C),HP$;: GOTO 121Ø
126Ø IF I$=CHR$(8) AND C=42 THEN PRINT @(R,C),HE$;: C=C-39: PRINT @(R,C),HP$;:GOTO 121Ø
127Ø IF I$=CHR$(1Ø) AND R=17 AND C=3 THEN PRINT @(R,C),HE$;: R=R-12: C=C+39: PRINT
 @(R,C),HP$;: GOTO 121Ø
128Ø IF I$=CHR$(1Ø) AND R=17 AND C=42 THEN PRINT @(R,C),HE$;: R=R-12: C=C-39: PRINT
 @(R,C),HP$;: GOTO 121Ø
129Ø IF I$=CHR$(1Ø) THEN  PRINT @(R,C),HE$;: R=R+2: PRINT @(R,C),HP$;: GOTO 121Ø
13ØØ IF I$=CHR$(11) AND R=5 AND C=3 THEN PRINT @(R,C),HE$;: R=R+12: C=C+39: PRINT
 @(R,C),HP$;: GOTO 121Ø
131Ø IF I$=CHR$(11) AND R=5 AND C=42 THEN PRINT @(R,C),HE$;: R=R+12: C=C-39: PRINT
 @(R,C),HP$;: GOTO 121Ø
132Ø IF I$=CHR$(11) THEN PRINT @(R,C),HE$;: R=R-2: PRINT @(R,C),HP$;: GOTO 121Ø
133Ø IF C=3 AND R=<17 THEN PAYEE$=MI$(INT(R/2)-1)
134Ø IF C=42 AND R=<17 THEN PAYEE$=MI$(INT(R/2)+6)
135Ø IF PAYEE$="EXIT TO DOS" THEN CLS: SYSTEM
136Ø IF PAYEE$="TYPE YOUR OWN" THEN PAYEE$=""
137Ø '
138Ø ' Print check on screen and input amount and memo module
139Ø PRINT @(2Ø,8),LE$;
14ØØ PRINT @(R,C),HE$;
141Ø FOR Y=4 TO 18: PRINT @(Y,8),LE$;: NEXT
142Ø PRINT @(5,5),STRING$(7Ø,131);: PRINT @(17,5),STRING$(7Ø,131);
143Ø FOR Y=5 TO 16
144Ø PRINT @(Y,5),CHR$(191);: PRINT @(Y,74),CHR$(191);
145Ø NEXT
146Ø ' OBVIOUSLY: Replace string$ in 146Ø, 147Ø & 148Ø as desired
147Ø PRINT @(6,11),"MR. I. M. YOUR CHECKWRITER";
148Ø PRINT @(7,16),"LOST RAM ADDRESS";
149Ø PRINT @(8,16),"SOMEWHERE, U.S.A.";
15ØØ PRINT @(8,6Ø),DATE$;
151Ø PRINT @(1Ø,8),"Pay to the";
152Ø PRINT @(11,8),"Order of:";STRING$(4Ø,95);"  $";STRING$(12,95);
153Ø PRINT @(11,19),PAYEE$;
154Ø PRINT @(13,8),STRING$(64,95);
155Ø PRINT @(15,8),"Memo: ";STRING$(22,95);"     ";STRING$(29,95);
156Ø IF PAYEE$<>"" THEN GOTO 163Ø
157Ø PRINT @(2Ø,8),LE$;
158Ø PRINT @(2Ø,8),"TYPE PAYEE'S NAME THEN <ENTER> -->";
159Ø ML=32: PO=1644
16ØØ GOSUB 37Ø
161Ø IF A$="" THEN 157Ø
162Ø ...EE$=A$
163Ø PRINT @(11,19),PAYEE$;
164Ø PRINT @(2Ø,8),LE$;
165Ø PRINT @(2Ø,8),"TYPE IN CHECK AMOUNT THEN <ENTER>  -->";
166Ø ML=7: PO=1648
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167Ø GOSUB 37Ø
168Ø IF A$="" THEN 164Ø
169Ø ZA=VAL(A$)
17ØØ IF ZZ$<>"" THEN GOSUB 65Ø: GOTO 172Ø
171Ø GOSUB 55Ø
172Ø PRINT @(11,6Ø),ZA$;
173Ø PRINT @(13,8),ZZ$;" ";STRING$(55-LEN(ZZ$),"*");" Dollars";
174Ø PRINT @(2Ø,1Ø),LE$;
175Ø PRINT @(2Ø,8),"TYPE IN MEMO IF DESIRED THEN  <ENTER> -->";
176Ø ML=22: PO=1651
177Ø GOSUB 38Ø
178Ø MEMO$=A$
179Ø PRINT @(15,16),MEMO$;
18ØØ PRINT @(2Ø,1Ø),LE$;
181Ø PRINT @(2Ø,1Ø),"<F1> TO PRINT, <F2> TO REDO/WRITE ANOTHER, <F3> TO EXIT TO DOS";
182Ø PRINT @(21,Ø),CHR$(191);: PRINT @(21,79),CHR$(191);
183Ø I$=INKEY$: IF I$="" AND I$<>CHR$(129) AND I$<>CHR$(13Ø) AND I$<>CHR$(131) THEN 183Ø
184Ø IF I$=CHR$(129) THEN 185Ø ELSE IF I$=CHR$(13Ø) THEN 1Ø2Ø ELSE IF I$=CHR$(131) THEN
 SYSTEM
185Ø PRINT @(2Ø,1Ø),LE$;
186Ø PRINT @(2Ø,1Ø),"GET PRINTER READY THEN PRESS <ENTER>";
187Ø I$=INKEY$: IF I$="" THEN 187Ø ELSE IF I$<>CHR$(13) THEN 18ØØ
188Ø '
189Ø ' DMP 2ØØ Printer module (Replace as required to match printer)
19ØØ LPRINT CHR$(27);CHR$(31);
191Ø LPRINT CHR$(2Ø);: LPRINT CHR$(27);CHR$(56);
192Ø LPRINT CHR$(1Ø);
193Ø LPRINT TAB(42)LEFT$(DATE$,5);TAB(53)RIGHT$(DATE$,2)
194Ø LPRINT: LPRINT
195Ø LPRINT TAB(11)PAYEE$; TAB(48)ZA$
196Ø LPRINT
197Ø LPRINT TAB(4)ZZ$;" ";STRING$(55-LEN(ZZ$),"*")
198Ø LPRINT: LPRINT: LPRINT: LPRINT CHR$(27);CHR$(28);
199Ø LPRINT TAB(8)MEMO$
2ØØØ LPRINT CHR$(19);
2Ø1Ø GOTO 1Ø5Ø
```

(Editors Note) Again if there is a space between the last character in a line and the next line of a wrap-around line then we have shown it by indenting the second line one space. This will not show on a printout of the program after you have typed it in, but will help to clarify where spaces are located in this printed text. -Ed.

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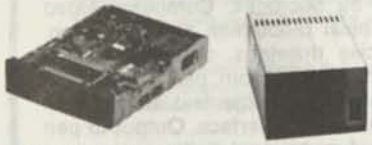

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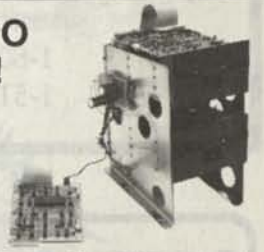

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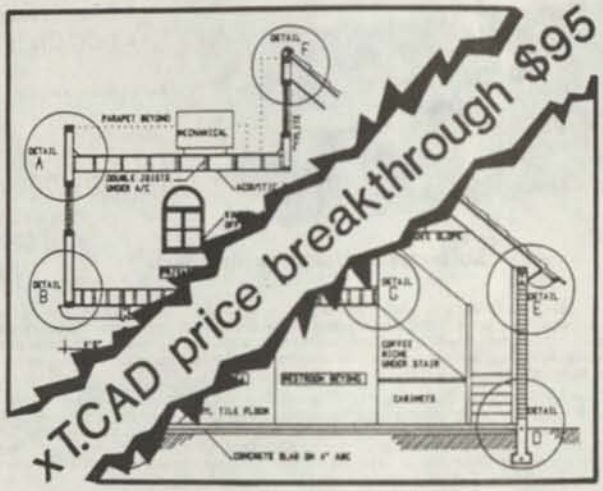

xT.CAD PROFESSIONAL by Microdex. Computer Aided Drafting software for technical production and education. Create, edit, modify precise drawings, details. Features include overlays, grids, cursor snap, zoom, pan, block copy, enlarge, reduce, rotate, mirror, clip, merge, text labels, more. Requires hi-res screen and RS-232 interface. Output to pen plotters. Input from keyboard, or optional digitizer.
Friendly, competent support since 1984. Software is backup-free. Was $345 in 1986 catalog.
Model 4 4p 4d or MSDOS $95 ~~$145.00~~

xT.CAD BILL of Materials by Microdex. Software utilizes text labels from xT.CAD drawings to automatically generate invoices, parts requests, shipping lists, etc. Includes a mini-editor for customizing line printer output.
Model 4 4p 4d or MSDOS $ 45.00

CASH PROFESSIONAL by Microdex. Bookkeeping software with automatic double-entry ledger distribution in user-definable accounts. Reports by period, account, project, etc. Ideal for small business, professional or personal accounts.
Model 4 4p 4d or MSDOS $45.00

S/XT software by Microdex. Enables disk directory review and special character printing from within standard Scripsit.
Model III or 4 4p 4d $15.00

MICRODEX

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Computer News 80

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HERE'S SOME *Exciting* NEWS!

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

xT.CAD

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

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

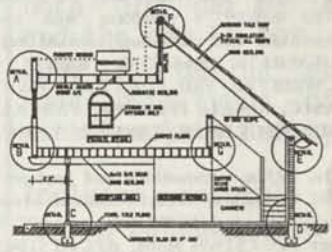
INPUT: xT.CAD is designed for easy cursor control from the keyboard, but you may also use a **mouse.** MSDOS packages support selected mice such as Microsoft, Logitech or Tandy. However, depending on hardware and operating system the mice may not always work with MSDOS versions of xT.CAD. TRS/LSDOS packages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

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

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

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

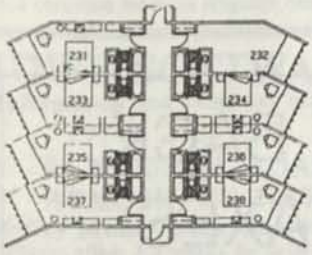
Also, any serial plotter 100% compatible with current **Hewlett-Packard HP/GL** language, or current **Houston Instrument DM/PL** language, should also work with all current versions of xT.CAD.
Screen-print utility for selected dot-matrix printers is included in all TRS/LSDOS packages. On MSDOS computers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

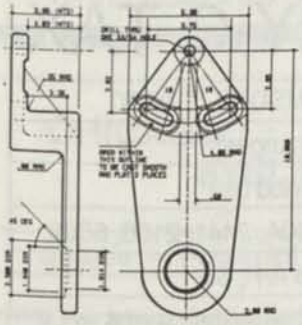


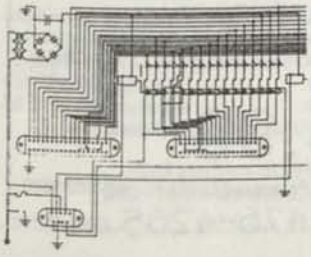
TRS/LSDOS package: **Models 4/4p/4D** require 64K memory, 2 disk drives, floppy or hard, RS-232 interface and a high-resolution graphics board, Tandy or Grafyx Solution from Micro-Labs. Runs in fast machine language under TRSDOS 6.2 or LSDOS 6.3.

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

New reduced price $ 95.00







ALSO AVAILABLE

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

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

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

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

xT.CAD w/manual	was $345.00	$ 95.00
xT.CAD Demo $15.00 Manual $10.00	combo	$ 20.00
xT.CAD BILL of Materials software		$ 45.00
CASH Professional software		$ 45.00
S/XT Scripsit enhancement software		$ 15.00
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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

CLASSIFIED AND DISPLAY ADS RECEIVED AFTER THE DEADLINE WILL BE PLACED IN THE FOLLOWING MONTHS ISSUE.
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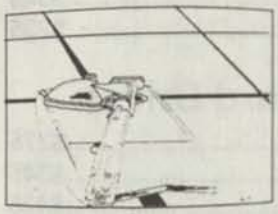

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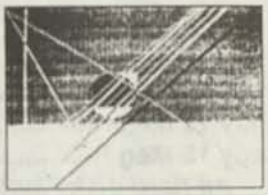

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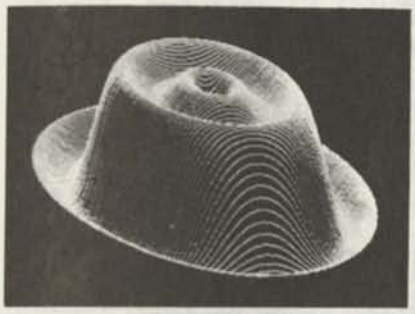

Superior Hardware. The Grafyx Solution provides 153,600 pixel elements which are arranged in a 640 × 240 or on the Model III a 512 × 192 matrix. Hundreds of new business, personal, engineering, and educational applications are now possible. The hi-res display can be shown on top of the standard display containing text, special characters, and block graphics. This simplifies program debugging, text labeling, and upgrading current programs to use graphics. The Grafyx Solution fits completely within any tape or disk based Model 4, 4D, 4P, or III. Installation is easy with the plug-in, clip-on Grafyx Solution board.

Superior Basic. Over 20 commands are added to the Basic language. These commands will set, clear or complement points, lines, boxes, circles, ellipses, or arcs. The hi-res screen can be printed on any of 30 popular printers or saved or loaded to disk without leaving Basic. Areas may be filled in with any of 256 patterns. Sections of the screen may be saved and then put back using any of five logical functions. Labels can be printed in any direction. The viewing area can be changed. The entire screen can be complemented or cleared. Graphics Basic provides dot densities of 640 × 240, 320 × 240, 160 × 240, and 160 × 120, all of which can be used in the same display.

Superior Software. The board comes with over 40 programs and files which make it easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software works with TRSDOS 1.3, 6.1.2, 6.2, 6.3; Dosplus 3.4, 3.5, 4; LDOS; and Newdos80. The Grafyx Solution is also supported by 30 optional applications programs: Draw, Bizgraph, xT.CAD, 3D-Plot, Slideshow, Mathplot, Surface Plot, Chess, etc.

The Grafyx Solution package is shipped complete for $129.95 (reduced from $299.95). The manual only is $10. Payment may be by check, Visa/MC, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 7% tax.

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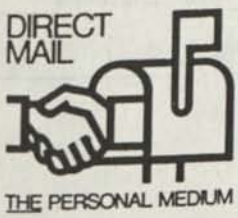

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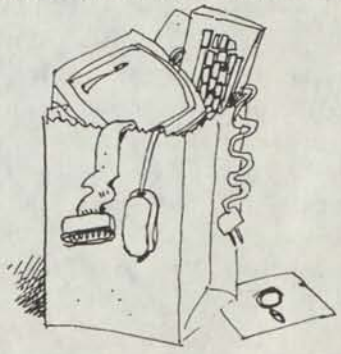

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INDEX

EDITORIAL COMMENT,

So far it has been a very busy spring, chasing down new software and products to make your computing with TRS-80 more productive and enjoyable.

We still have a fairly large collection of 80 Micro magazines, from 1985 forward, and a few issues from the previous years. These magazines hold a wealth of information for the Model I, III and 4 users. Our deal is still $3.00 each for shipping and handling. Send us your list and we will fill it and bill you for the magazines we ship.

We still have a few TRS-DOS 6.2 manuals and systems disks. They are new original packages from Radio Shack. These manuals and systems disks are the bedrock for all TRS-DOS and LS-DOS 6.3.1 disk operating system programs. $20 ea. plus $4.00 S&H.

As we promised here are the results of "the Peoples Choice" survey, where readers have told us what they were most interested in seeing published in CN80.

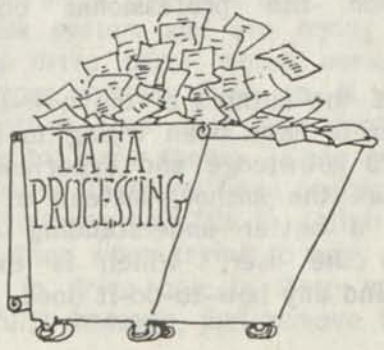
It is difficult to rank a survey of this type, even then people's interest change from month to month. Also, as one's skill progresses their needs change. So we have devised three groups of classification.

First: those things that people feel is the most important to them.
Second: those that would fall in the middle of the want list.
Third: those that are of least importance to them.

The results of our survey are:

87 per cent of those who responded listed the following as being the most important to them, but not necessarily in the order that they appear.

Problem Solving Articles
Hints and Tips
How-To-Do-It Articles
Program Reviews
News Items - New Product Announcements.



Second in importance to our readers were:

Hardware installation & upgrade instructions
Open Forum

Third and last in importance was listed as:

Product Advertising and Program Listings.

But everyone said that every item was important to them, so the ranking of these items only reflect which items are most important to readers.

13 per cent of those who responded put program listing at the top of their list or where it would fall into the first classification group. Surprising to us, printer graphics programs came out as the last choice of readers.

The majority of readers who responded still said "Don't change a thing, but keep the "Old" CN80 format just the way it is.

We want to thank all those who took the time to respond, and for their comments of encouragement for our efforts. We always want to know what your feelings are.

It is quite evident from these responses and the many letters we receive from subscribers that our original concept of publishing those articles that make for a better understanding of how to use the TRS-80 computers to their full advantage are the most important to the majority of readers.

Hundreds of books have been published on almost every subject that there is for using our computers and everything is covered in the manuals that were published for each computer. Well, almost everything, there are very useful things that were never documented in the manuals. But the books are out of print. The manuals seem to be written for the professional computer expert.

So many of the authors of the how-to-do-it books seem to have been trying to impress those who's knowledge and experience was greater than the author, instead of trying to impart a better understanding of the subject to the user. Which is the real reason behind any how-to-do-it book. There are a few notable exceptions of course. As we come across these exceptions we will try to pass on the fact that they still exist. These works should be rescued from the used bookstore shelf and users who no longer have a need for them. They definitely should not be left to the trash man.

Our goal is and always has been to aid and assist those users, at every level, to either find the sources for advancing their computer knowledge and skills. And to help them unravel those damn manuals.

The publishing of Mod 4 by Jack first, and now the complete series of Mod III and Mod 4 by Chris, which have been written to include the latest version of the DOSs, is just one of our efforts to simplify the use and understanding of those technological terms and instructions found in the manuals by placing the instructions in as simple and understandable format as possible. These publications will assist you greatly on the road to becoming that computer expert. Even the experts have reported that they found the manual series by Chris to be useful.

Chris Fara's continuing Assembly Language Tutor articles by all reports is successful in doing just that; providing a simple "plain english" and understandable guide to a very complex and confusing subject. Even made easier when taken in small doses.

In any event we will continue with the "Old" and original concept of first assisting our readers in anyway we can to give them a better understanding of how to use their computers to do the things they want to use them for and how to increase their own skills. We are learning too, right along with our readers, because we are in no way "experts" either. We are just more advanced users than some and less advanced than others. It certainly has been exciting, learning as we go along.

What we need is your help. We need more people who are willing to share their experience with other users by writing articles, hints and tips, and stories on how you do it.

WANTED
Model 100 columnist or any input.

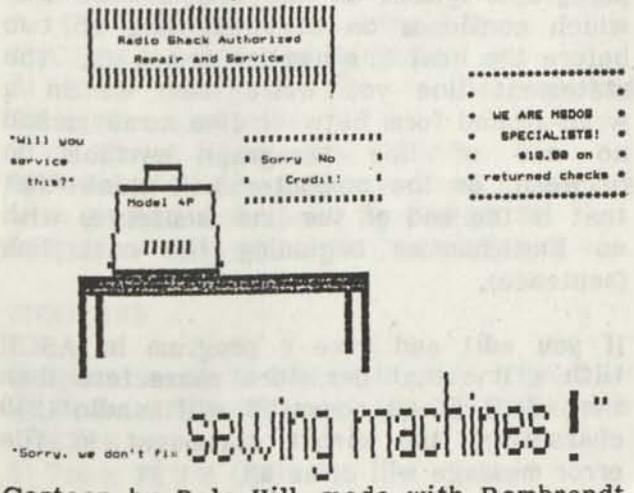
Model I, columnist or any input.
Model III, more articles, and or columnist.
CPM columnist or any input.

Of course Model 4/4P/4D input is always welcome. If you are interested in writing a monthly column let us know or just send what you have time for. The rewards are great in the satisfaction of knowing that you have helped a fellow user. Even the beginner's tip that we publish always finds a reader who benefits from it. And it can even be read by an expert who writes telling us that they either didn't know that or they had forgotten it.

We look forward to hearing from you, and if you don't get an immediate response from us, don't dispare, you will. NOTHING at CN80 is EVER thrown away! With your help and comments CN80 will become even better. And our renewal and new subscribers already have us committed to publish CN80 thru 1992. Program presentations by Roy Soltoff and David Goben have our computers committed to 2000 plus.

So to make a long story short, there has never been any question as to whether we would continue to publish CN80 or not. We will continue as long as there is a green glow in the night coming from some user's trusty TRS-80. We expect ours to keep glowing and growing for a long time yet, even into 2000+. Body and circuits willing!

This is the last of the soap-box editorial comments that we will make for some time into the future. - We promise. Thank you one and all for your support. -CN80



Cartoon by Dale Hill, made with Rembrandt 3.0 and a DMP 120, and no hi-res board.

NEWS ITEMS

David Goben has assured us that we will have the finished version of his Busy-Calc program and manual so that it may be shipped starting June 1 or before. This has been a major project on David's part and we wish to thank all those beta testers that took the time to assist in its creation.

With VisaCalc not available any longer and with a need for a simple spreedsheet still existing David's spreedsheet will be a welcome addition to the new programs available for the TRS-80 user. At a price of $79.85, it is much lower than the original VisaCalc program sold for, but the BUSY-CALC program is reported to have many new features over the old VisiCalc program. Look for a full review of the program soon, but if you have been trying to get a good spreadsheet program and can't, don't wait till the review, order one now - we are sure that you won't be disappointed.

HINTS AND TIPS

Hint One; is a hint from Roy Soltoff. If you have a disk that has a crease in the edge of the a disk jacket, try laying it on a flat surface and rub the crease out with the barrel of a plastic pen. The small crease in the jacket can add resistance to the disk inside, and cause the disk to slow down and cause a read/write error. Rubbing the crease out should in many cases eliminate the problem.

Hint Two: is for DISK FULL Error Message when saving a file to a disk. If you have a two disk system and are trying to save a file to drive zero, which normally would have your system files on it along with some other files that you don't want to remove to make space. Keep a few spare disks handy that you have preformatted and added your systems file to. (Minimum system disk.) Then when trying to copy a file from a disk in drive one to Zero and get the "disk full" message, just remove the systems

disk that is full and insert a working copy of your dos system disk that has no other files on it and copy the file from drive one to it. You can then copy the file from drive zero to a newly formatted disk in drive 1.

FILE CABINET UPDATE
A CN80 Staff Report

Look for our Super Saver Deal for May on File Cabinet Disk Volumes. $3.00 per Volume from any catalog, for orders of 10 or more volumes. Standard postage rates apply, with the offer good till May 31st. 1990.

Answers to some of the questions about File Cabinet programs.

Q: On disk MD3GAM04, there are programs of a collection of sound demonstrations. In trying to work with them I find I cannot get them to work. The programs are listed as, SOUNDA/BAS, SOUNDB/BAS, SOUNDC /BAS AND TSOUND/BAS.

SOUNDA/BAS gives an error message - syntax error in 605

SOUNDB/BAS AND SOUNDC/BAS gives the same error - syntax error in 605

TSOUND/BAS - syntax error in 550

Does anyone have a solution for these?
H. A. Coldwater, MI

A: As the instructions state as you run them, at least 200 bytes of high memory must be reserved when you go into BASIC. Either answer the memory size prompt 65300, or refer to your DOS manual under disk BASIC on how to set memory size.

Q: On MD3EDU06, there is a program called TYPTUTOR/BAS in trying to work with the program I find I cannot get past the first menu screen. Pressing the BREAK key shows a break in line 8040.

A: Change line 8044 to read as follows:

```
8044 A$=INKEY$:IF A$=""THEN 8044 ELSE
 A=ASC(A$)

8045 IF A<49 OR A>51 THEN 8044
```

Add these new lines to get the program to run. Note there is a space between the last character of the first line and the first character of the next line. But this should be written as one line.
H. A. Coldwater, Michigan

Q: The most frequent question that we get on the File Cabinet and on other disk programs is "I tried to load a program and I get the error message. "Direct Statement in File" what does that mean and how do I solve the problem.

A: Because this is the most frequently asked question the following is an explanation of the ERROR MESSAGE - Direct Statement in file.

"Direct Statement in File" error comes up when you specify a file to LOAD into BASIC or RUN in BASIC that is not a BASIC program. The system recognizes that it is not in the standard compressed format so it attempts to load it as an ASCII program file. Then when it finds a line that does not begin with a line number it gives you the error message.

A data file will give you the same error message. Or if you write a basic program with a word processor and leave a paragraph symbol at the end of one line which continues on the next line or two before the next line number comes up. The statement line you write must be in a wrap-around form between line numbers and no end of line paragraph symbols in between, or the computer will think that that is the end of the line (sentence) with no line number beginning the next line (sentence).

If you edit and save a program in ASCII with a line that has more characters than the ASCII LOAD command will handle (240 characters) the direct statement in file error message will come up.

Refer to your operating manual for more

information on BASIC error messages, and

methods to correct them. Don't confuse BASIC error messages with DOS error messages.

TRANSFERRING FILES FROM MODEL 100 TO MODEL 4

by Christopher Swann

In the one of the issues you asked for information on transferring data from a Model 100 to a Model 4. The enclosed may be of help. I use this regularly for transferring TEXT files to my Model 4 (with Aerocomp 40 meg hard-drive) and it works very well - especially if you use MEMDISK, which really speeds it up. I did try transferring file from the Mod 4 to the Model 100 with the aid of the manuals but the data came out pretty scrambled. Obviously I did something wrong. I have no need to do this normally, so I haven't pursued it. Hopefully others will provide that information. This may be ludicrously elementary for your readers. I am no expert, believe me.

DATA TRANSFER FROM MODEL 100 TO MODEL 4 Using MEMDISK.

1) Install Memdisk
2) SET *CL to COM/DVR
3) SETCOM (BAUD=4800,WORD=7,STOP=1,PARITY=EVEN)
4) COMM *CL
   (Do COMM/JCL runs step 2-4)
5) CLEAR 6 followed by CLEAR 9
6) Enter name of file to be received (file:Drive number)
7) CLEAR 6 followed by CLEAR :
8) When file has been received close file with CLEAR 6 followed by CLEAR 0
9) Exit to TRS-DOS with CLEAR/SHIFT -

MOD. 100

1) Move cursor to TELCOM, press <ENTER>
2) Press STAT (F3) and type 77E1E. Press <ENTER>
3) Press TERM (F4)
4) Press UPLOAD (F3)
5) Type in file name (with .DO) <ENTER>
6) Width? (disregard with SuperScripsit files) Press <ENTER>
7) Mod. 100 transmits.
8) Disconnect? YES
9) Press F8 to return to main menu

COMM/JCL Program: Enter steps 2-4 for Mode.4 using Build. End with // STOP

TRANSFER FROM MODEL 100 TO MODEL 4 WITHOUT MEMDISK

1) SET *CL to COM/DVR
2) SETCOM (BAUD=4800,WORD=7,STOP=1,PARITY=EVEN)
3) COMM *CL
   (Do COMM/JCL runs step 2-4)
4) CLEAR 6 followed by CLEAR 9
5) Enter name of file to be received (file:Drive number)
6)Turn dump-to-disk OFF by pressing CLEAR 7 followed by CLEAR -
7) CLEAR 6 followed by CLEAR :
8) When file has been received close file with CLEAR 6 followed by CLEAR -
9) Turn dump-to-disk ON with CLEAR 7 followed by CLEAR :
10) When file has been written to disk, close file with CLEAR 6 followed by CLEAR 0
11) Exit to TRS-DOS with CLEAR SHIFT -

MOD. 100

1) Move cursor to TELCOM, press <ENTER>
2) Press STAT (F3) and type 77E1E. Press <ENTER>
3) Press TERM (F4)
4) Press UPLOAD (F3)
5) Type in file name (with .DO). Press <ENTER>
6) Width? (disregard with SuperScripsit files) Press <ENTER>
7) Mod. 100 transmits.
8) Disconnect? YES
9) Press F8 to return to main menu

COMM/JCL Program: Enter steps 2-4 for Mode.4 using Build. End with // STOP

ASSEMBLY LANGUAGE TUTOR Part 16

by Christopher Fara (Microdex Corporation)

Spring is in the air, so let's vent today some miscellaneous bits and pieces accumulated in the last few months.

Operand expressions

In the discussion of the standard "loader" (CN80 3/90) we have sneaked in without any explanation an instruction

```
LD BC,DONE-HEAD+1
```

and last month we had

```
DEFB HOOK-NAME
```

Since the assembler internally replaces labels DONE, HEAD, etc, by the values of their addresses, the expressions automatically calculate desired values such as the length of a routine, and make our life easier. Some assemblers have dozens of such math and logic "operators". Symbols vary from package to package, but addition and subtraction work identically in all assemblers.

Equates

To assign the value of an address to a label, we simply write the label in the leftmost field next to the instruction whose address we need to reference in other instructions. A handy "pseudo-op" available in all assemblers can be also used to assign any value (not necessarily an address) to any label.

```
label: EQU value
```

EQUate. Assigns 'value' to the 'label'. Once assigned, the value of the label cannot be changed by another EQUate in the same program.

For example

```
CR: EQU 13
```

written near the beginning of a program would establish CR as a symbol for "carriage return". So we can now write

```
LD A,CR
```

or we can still also write

```
LD A,13
```

and in both cases the result is the same. The "equates" are often used for calls to built-in ROM and DOS routines. Those routines have traditional "names" listed in manuals such as "Mod-III by Chris" or "Mod-4 by Chris". For example in Mod-III

```
$VDLINE: EQU 539
```

could be used in

```
CALL $VDLINE
```

Similarly, in Mod-4, the numbers of the SuperVisor Calls such as

```
@DSPLY: EQU 10
```

can be used in the program

```
LD A,@DSPLY
RST 40
```

If your assembler does not allow $ or @ in a label then drop these symbols, they have no significance other than to visually distinguish ROM and DOS routines from user-defined labels. Generally such "equates" are only worth the trouble in longer programs, where the same value is used many times.

The "$" symbol

The dollar symbol in the operand field represents "current value of the program counter". When the assembler stumbles on this symbol, it replaces it by the 2-byte value of the address of the instruction in which this symbol is written. For example suppose we write

```
ORG 64000
LD HL,$
```

which causes LD to sit at the memory address 64000. Therefore the assembler will evaluate the LD HL,$ the same way as if it was written

```
LD HL,64000
```

or whatever the location of LD ends up to be in the assembled program.

The $-symbol is often used in EQUates to "detach" the address label from the instruction to which it corresponds. For example compare the beginning of the MOGET subroutine last month with this equivalent format:

```
;-------------------------------------------------
MOGET: EQU   $
       EX    DE,HL        ;DE=> SPEC
       LD    HL,(17425)   ;get high$
TRY:   EQU   $
       INC   HL           ;HL=> HEAD?
       ... program continues ...
;-------------------------------------------------
```

Whether written this way, or directly next to the instructions, the label MOGET represents the address of the EX instruction, and TRY represents the address of INC.

Another use of the $-symbol is to create labels which represent addresses "embedded"

in an instruction, or to represent "dummy" values which will be later modified during program execution. For example the last listing in last month's essay could be just as well written like this:

```
;-------------------------------------------
        CALL  MOGET
        JP    NZ,ERROR
        LD    (FIXIT),HL
        CALL  $
FIXIT:  EQU   $-2
        ... program continues ...
;-------------------------------------------
```

Compare this side-by-side with the listing last month. In the CALL instruction the assembler will replace the $-symbol by the address of the CALL instruction, and thus produce nonsense: CALL calling itself would quickly crash the program. But we know that this dummy address will be replaced by the value of HL during program execution. So we are in effect writing "I don't care what the assembler puts here, the program will fix it anyway". The next line

```
FIXIT: EQU $-2
```

creates a symbol FIXIT which represents the address within the CALL instruction where

```
LD (FIXIT),HL
```

will "stuff" the value of HL during program execution. Such and similar uses of the $-symbol are generally a matter of the individual programmer's taste and habits.

Macros

Several readers asked how to handle macros in published program listings, for use with assemblers which don't have the macro capability. Also, listings written for one macro assembler may need some editing for use with another. To understand this, we need to look at two concepts

. macro definition block
. macro call

The "definition" block is written only once (usually at the beginning of the program, but in any case before the "macro call" is made) and consists of 3 parts

. macro prototype
. macro model (instructions)
. macro end marker

For example, a frequently needed sequence of 3 instructions "loads" a value stored in memory location addressed by register pair HL, into another register pair such as DE. The macro definition block for this typical operation could be written like this

```
;-------------------------------------------
LDE:    MACRO           ;prototype
        LD    E,(HL)    ;model
        INC   HL
        LD    D,(HL)
        ENDM            ;end marker
;-------------------------------------------
```

The "prototype" line defines the name of the macro, in this case LDE, or whatever. The macro names are like any other label, and must be unique in any given program. The "pseudo-op" instruction MACRO tells the assembler that the lines below the "prototype" should not generate any machine code yet, but should be "memorized" for use in "macro calls" later in the program. The "pseudo-op" instruction ENDM simply marks the end of this definition block. Other macro definitions might follow, or we resume writing of "normal" instructions.

So whenever in the program we need to perform the operation specified by our macro model, we only need to write in the instruction field the name of the macro, and the assembler automatically replaces it by the instructions listed in the model. We say that it "expands the macro call". For instance a fragment of our MOGET routine last month was written like this:

```
;-------------------------------------------
STOP:   POP   HL        ;HL=> LAST
        LD    E,(HL)
        INC    HL
        LD    D,(HL)    ;DE=> end mod
        EX    DE,HL     ;HL=> end mod
;-------------------------------------------
```

Had we defined the LDE macro at the beginning of that routine, we could write the same program fragment with a macro call:

```
;-------------------------------------------
STOP:   POP   HL        ;HL=> LAST
        LDE             ;macro call
        EX    DE,HL     ;HL=> end mod
;-------------------------------------------
```

In both cases the resulting assembled machine code would be exactly the same. Like "equates", macros are only worth the trouble if a typical sequence of instructions is used repeatedly many times in a program. A favorite case are SuperVisor Calls in Mod-4. Unlike simple one-line CALLs in Mod-III, these SVC's always require two instructions, and this gets rather boring. With a macro assembler we could define a

macro named SVC:

```
;-----------------------------------------
SVC:    MACRO #DUMMY ;prototype
        LD    A,#DUMMY ;model
        RST   40
        ENDM           ;end macro
;-----------------------------------------
```

This macro has a new feature, the #DUMMY "operand". It tells the assembler that in the "operand" field of the macro call some value will be specified, and that value should replace any occurence of #DUMMY in the model instructions. Therefore, for example

```
 SVC 10
```

will be "expanded"

```
 LD  A,10
 RST 40
```

Macros combined with EQUates often make published listings quite confusing for a novice. For example if a listing has an equate line

```
 @DSPLY: EQU 10
```

then the macro call

```
 SVC @DSPLY
```

means the same as

```
 SVC 10
```

and will be "expanded" the same way as above, because the assembler automatically substitutes 10 for @DSPLY, and then puts 10 in place of the "dummy" in the expansion.

The rules for naming of the dummy operands vary slightly from package to package. Radio Shack ALDS uses the "pound" symbol with a digit: #0, #1, up to #9. In Misosys assemblers the "pound" symbol is followed by a label-like "name", for example #DUMMY, #M123, and so on. To comply with the rules of your assembler, you may have to edit the "dummies" in published listings.

But if your assembler does not have the macro feature at all, then you must delete all "macro definition" blocks and "manually expand" each macro call, ie. replace it by the instructions listed in the corresponding macro "model". If the macro involves "dummy operands" then in each "expansion" you must replace them by the matching values specified in the macro call.

Readers' input

Or write to the editor... Nothing warms the heart of the author more than letters from the readers. Frank Blunda from Maryland sent a thoughtful comment on our BASIC example of case conversion (CN80 1/90:9, Z80 Tutor I:37). In his method even without a machine subroutine the BASIC conversion alone is speeded up by a "user's function". To convert lower case characters to upper case (UC) the function definition could be added to our listing like this (all in one line, here split to fit in our page format)

```
 115 DEF FNUC$(A$)=
 =CHR$(ASC(A$)+32*(A$>"`"AND A$<"{"))
```

Then line 140 could be replaced by

```
 140 MID$(A$(Y),X)=
 =FNUC$(MID$(A$(Y),X,1))
```

and lines 150-170 should be deleted. In an array of 1000 strings the conversion would run about 1.5 times faster than our original example. Obviously a BASIC programmer who does not wish to use assembly subroutines would be better off with the function. On the other hand our assembly subroutines convert the same 1000-string array about 100 times faster than either our original or Mr. Blunda's approach. Our purpose in that example was not so much to do it most efficiently in BASIC alone, but rather to allow a line-by-line comparison with the logic of the CAP assembly subroutine and to demonstrate the dramatic difference in speed.

An accidental benefit of Mr. Blunda's letter was that we have noticed an omission in our handling of the USR call. When we write

```
 130 X$ = USR ( A$(Y) )
```

the conversion is still sluggish (only about 2 times faster than BASIC alone). Every time line 130 is executed, a new contents of the X$-string is created, and BASIC must do an awful lot of "garbage collection" in the string space. To avoid this, line 130 should be written

```
 130 LSET X$ = USR ( A$(Y) )
```

which allows BASIC to "re-use" the same "dummy" X$-string for the results of all USR calls, eliminates garbage collection, and now the scheme runs indeed 100 times faster. This problem does not arise when we use Mod-4 BASIC command CALL, because no strings are created in this case.

No doubt many readers can find all kinds of such fine points in our essays, suggest improvements, etc. We will always welcome your comments!

DOS IMPROVEMENTS

by Rex A. Basham

TRSDOS/LS-DOS 6.x is a system designed with the programmer in mind. The operating system provides you with some simple but powerful tools for writing extensions to existing commands and for combining commands to come up with new utilities. Two examples of this are the @CMNDI (18H) and @CMNDR (19H) supervisor calls (SVC). The @CMNDI SVC passes a command string to the DOS, executes the string, and then exits to DOS even if the resulting command string produced an error. The @CMNDR SVC acts in much the same manner with one exception. This SVC returns to the calling program and provides the execution results via a return code in the HL register pair.

The accompanying two programs, MOVE/CMD and KILL/CMD demonstrate the use of these SVC's to extend the DOS. Both of these utilities use the fact that when a program is executed, the operating system sends the address (in the HL register pair) of the first nonblank character following the command name. Also note that neither of these programs does any extensive error checking except for obvious syntax errors. They depend instead on the error trapping and reporting mechanisms built into the system COPY and REMOVE commands. Finally, since the programs are executing system commands, they must begin at address 3000H or greater. This is because the DOS overlay area resides in 2600H - 2FFFH and all library commands and utilities use this area of memory.

MOVE/CMD

My system runs on a hard drive and I frequently find myself copying a file from one logical drive to another and then removing the original file. I wrote MOVE/CMD to accomplish this sequence with a single command much like the UNIX operating system 'mv'. Since the command syntax for MOVE is exactly the same as the syntax for COPY, any legal COPY command is also a legal MOVE command.

With this in mind, the program begins by storing the command line into a buffer (IOBUFF) to be used by the system COPY command. It then begins moving characters from the IOBUFF to the SOURCE buffer until one of three possibilities occur.

If it finds a carriage return, it's a syntax error because there is no destination filespec. If it tries to move more than 24 (18H) characters, it's an error because the source filespec is too long. The limit in TRSDOS/LS-DOS is 24 bytes for filename/ext.password:d + CR. Finally, if it encounters a space character, the assumption is that it found a valid filespec for the source. Either of the error conditions will cause a brief message to be displayed and the program then exits to DOS. Otherwise the copy operation is attempted via the @CMNDR SVC. When control is returned from the operating system, the results of the copy are sent back in the HL register pair. If the copy fails for any reason, the error causing the failure is displayed by the system COPY command and HL contains the error number. In this case, the program immediately aborts to the operating system to prevent the remove from being attempted. Conversely, if the copy is successful, the HL register pair contains a zero return code and processing continues with the remove operation. The system REMOVE command is executed on the source file via the @CMNDI SVC and it's back to TRSDOS or LS-DOS Ready after completion of the command. Any chance of an error occurring during the remove operation is slight because the copy has already verified the source filespec as legal. The REMOVE command could fail if the source file is password protected or resides on a write protected disk.

KILL/CMD

This program originally began as a conversion of a Model III C source listing in an old LSI Journal. Since I was just beginning to learn the C language, I wanted to see if I could make the program run under TRSDOS 6.x on the Model 4. During the testing of the C version, I discovered a slight design imperfection in the system REMOVE command. I then decided to write the assembler version to bypass the defect in the REMOVE command. An additional

benefit is a return of the KILL command from the Model III without resorting to patching the Model 4 DOS system overlays.

For a demonstration of the flaw in the REMOVE command, try entering the following command line on your own system... REMOVE filespec1 :d filespec2:d filespec3:d filespec4:d ...where the filespecs are valid legal TRSDOS/LS-DOS filenames. Notice that when REMOVE hits the :d following filespec1 the command aborts execution back to DOS. This is true for any error that REMOVE encounters in a command line. Even if you had really intended to remove all four files, only the first one would have been deleted. You would then have to reenter the command for the remaining three files. I found this idiosyncrasy in the REMOVE command to be rather annoying on more than one occasion.

The KILL/CMD program begins by testing for a carriage return (CR) as the first nonblank character following the command name. Since the presence of a CR implies an empty command line, this is obviously a command syntax error. If this is the case, a usage error message is displayed and control is returned to the operating system. Otherwise the command line is copied to a holding buffer (IOBUFF) for subsequent remove commands. This is necessary because each call to the system REMOVE command overlays the command line buffer resident in low memory and effectively destroys any residual characters from previous commands.

The program next copies single characters from the IOBUFF to the filespec buffer (FSPEC) until it encounters a delimiter character in the form of a CR or a space. When it finds either of these, a test is made at TESTLEN to ensure that at least one character has been moved to the FSPEC buffer. If one or more characters have been moved, a CR is placed in the buffer to terminate the REMOVE command for the @CMNDR SVC and the resulting string is sent off to the operating system via this SVC. Since the program is only sending one filename argument, it is irrelevant whether or not the REMOVE command aborts execution. The system will report any errors in the single argument supplied and take the appropriate action. Control is then passed back to the KILL utility and any error flags are cleared for the next filespec. This process is continued until the end of the original command line is encountered. At that point, control is returned to the operating system through the @EXIT (16H) SVC.

Program Usage

From DOS Ready type

MOVE filespec1 filespec2 <ENTER>

Where; filespec1 is the source file and filespec2 is the destination file.

From DOS Ready type

KILL filespec1 :d filespec2:d filespec3:d filespec4:d <ENTER>

Where filespec1 is the file you want to remove, and :d is the drive location.

...which yields the following results...

filespec1 => File not in directory (it was previously removed)

:d => File spec required

filespec2:d => Removing: FILESPEC2:d

filespec3:d => Removing: FILESPEC3:d

filespec4:d => Removing: FILESPEC4:d

Basic Versions

I have included the Basic programs MOVE/BAS (Program Listing Number Three) and KILL/BAS (Program Listing Number Four) which will generate MOVE/CMD and KILL/CMD respectively. To use these programs, type them in as listed and be sure to save the Basic programs before you run them. Note that both of these programs exit to the operating system after execution. If you haven't saved them prior to execution and you have an error in the data statements, you will have to enter the entire listing again. The method I use when debugging Basic programs which I want to exit to the operating system is to insert a line at the start of the program which saves it to disk. For example; the first line of the MOVE/BAS program would be:

10 SAVE "MOVE/BAS".

-Rex A. Basham

A VISIT WITH DAVID GOBEN

by David Goben

In an attempt to satisfy both Model III and Model 4 users who are often disappointed when I focus exclusively on "the other" computer during an individual visit, I will attempt to rectify this by at least providing some useful information for "the other" system when I am focusing on an individual system, such as the Model III (mode) Orchestra-90 system, which is the focus this month.

MODEL 4 HARDWARE CLOCK

If you have purchased the LS-DOS 6.3.1 DOS upgrade from Misosys, or simply entered my date extension patches to LS-DOS 6.3.0 which were featured in my last visit, you now have a DOS that will be date-capable through December 31, 2011. This is a comfortable feeling. However, you may eventually notice that some programs work -directly- with the date format (manipulate the date fields themselves rather than let DOS take care of it for them), and may not work properly with the beyond-1999 dating extension. Fortunately these can be narrowed down to only a minute number of programs. Probably the most notable is MCLOCK6/CMD (version 1.0.1), which is the hardware clock support program which is supplied with the Model 4 20-Meg or 40-Meg pre-assembled harddisk kits available from Misosys (Model III support is equally available). Even with the date extension patches installed in the DOS, MCLOCK6/CMD will still not accept a date after December 31, 1999 due to the fact that it manipulates the dating fields itself. Fortunately this problem was a relatively simple one and was quite easy to fix. So if you have this hard disk kit with the hardware clock feature installed and your DOS is capable of accepting dates through December 31, 2011, you can modify MCLOCK6/CMD with the following patch.

Use BUILD to create a file called DTXMCLK6/FIX and enter the following lines:

```
. DTXMCLK6/FIX
. Upgrade MCLOCK6/CMD 1.0.1 for
. supporting dating to 12/31/2011
. David Goben
.
D01,C8=CD 37 29 D6 50 FE 20
F01,C8=FD 7E 00 D6 50 FE 14
D02,3A=0F
F02,3A=07
D02,8A=21 6C 07 85 6F 11 53
F02,8A=D6 50 21 56 2C 34 D6
D02,91=2C 3E 61 EF 18 0A
F02,91=0A 30 FB C6 3A 47
D03,6D=FD 7E 00 FE 0C D0
F03,6D=00 00 00 00 00 00
D03,73=C6 64 FD 77 00 C9
F03,73=00 00 00 00 00 00
. change version to 1.0.2
D04,13=32
F04,13=31
. EOP ----------------
```

Press BREAK or CTRL-SHIFT-@ to exit the build mode and apply the patch to a backup copy of MCLOCK6/CMD by entering PATCH MCLOCK6 DTXMCLK6. Once these patches are in place you can enter dates beyond 1999 by using the last two digits of the year, just as you did previously. For example, to enter the date March 22, 2009 you would enter 03/22/09.

Those of you who had installed my date extension patches for LS-DOS 6.3 may have noticed that if you afterward tried to install the SYS0CLK6/FIX (supplied on the Model 4 harddisk support disk -- MSCSI6 -- which supports the hardware clock option) to SYS0/SYS that you will come up with a find line mismatch. This is because my date extension patches HAD to modify a certain portion of the code area that was -also- required by this optional clock support patch (note that SYS3CLK6/FIX for SYS3/SYS will still install OK). However, this problem is EASY to solve. This is due to the fact that -my- patch is only needed when you are -manually- entering the date at boot-up. If the date is to be set automatically then that particular patch is -not- needed. Therefore you can install the SYS0CLK6/FIX patch by using the (O=N) parameter in the format: PATCH

SYS0/SYS.LSIDOS SYS0CLK6 (O=N). Please note that this is an OH and not a zero inside the parenthesis. Simply adding the (O=N) parameter to the patch will force PATCH to ignore the FIND list and patch over -anything- that is at the specified patch positions. Please be aware that this is a very powerful (undocumented) parameter and can also be very dangerous to your software if it is mis-used.

ORCHESTRA-90 MENUING

Now for the Model III (mode) goodies. This month's focus is on the Orchestra-90 Music Sythesizer (with percussion) hardware interface for running in the Model III mode of a Model 3 or 4. This product was produced by Software Affair, LTD (also of 13 GHOSTS and GRAPHICS-90 fame) and distributed by Radio Shack. It allows you to play or compose music with 4 voices, or 5 if your computer can run at 4 MHz, such as on the Model 4/4P/4D. You will also find this month's subject interesting if you are looking for a PILOT-like language interface for producing multiple-choice instructional programs.

Had you ever walked into Radio Shack once upon a time and saw a demonstration program for Orchestra-90 running, happily playing music from a selection menu? All you had to do was select a key from a menu and that song or a list of songs was played? Nice, wasn't it?

If you are like me and have a large disk-based Orchestra-90 music collection, you will probably find yourself constantly listing a directory to find a desired musical selection. But how would you like to design custom menus for your collection disks, complete with descriptions of the songs and prompts for music selections? It is suprisingly easy to do!

The first step is to patch a backup copy of the disk-version of the Orchestra-90 program, ORCH90/CMD. Because Orchestra-90 works with various Model III DOS configurations, use the BASIC program in Program Listing Number One to apply the patches to a backup copy of ORCH90/CMD from any of the Model III DOSes (please -do not- apply the patch to a copy that has had a certain number of voices saved to it, as the disk file offset will be different). After typing the program in and insuring its accuracy, enter RUN to apply the patches.

Once patched, you can still use ORCH90/CMD just as you always did, but you will also be able to use it with a special program called ORCHKEY/CMD. ORCHKEY/CMD works much like the DOS system's JCL or BLD file processor in that it feeds keystrokes from a disk file instead of reading them from the keyboard. The major difference is that ORCHKEY/CMD can -also- work with programs that simply strobe the keyboard for a -single- key without needing to use the line input routine as JCL and BLD files require. Also, ORCHKEY/CMD features commands designed specifically for use with Orchestra-90.

ORCHKEY/CMD can be created by typing Program Listing Number Two into Model III (mode) Disk BASIC and running it. This will create the needed ORCHKEY/CMD file.

ORCHEKEY/CMD is used in conjunction with an ASCII file, such as a file that was created using BUILD, TED, or a word processor capable of saving files in ASCII, such as Disk SCRIPSIT and LeScript. Although ORCHKEY will work with files having any file extension, it will default to /KEY if none is supplied. For example, to use ORCHKEY with a file called SAMPLE/KEY you would enter from DOS Ready the command ORCHKEY SAMPLE. To use a file called DOIT/JOB you would use ORCHKEY DOIT/JOB.

The format of a KEY file (as I call the ASCII files) is fairly straightforward. For example, you can enter standard commands such as:

```
CLS
FREE
LIB
```

in the ASCII file and they will be executed as needed. The only thing that you must be aware of is that the lines must not contain the dollar symbol "$", except within comments and messages, as this has a special meaning to ORCHKEY.

If you want to add non-displayed comments to your KEY files you would begin a line with a simple period "." and a space. This tells ORCHKEY/CMD to ignore anything else on that line. This is nice in that they

will not be displayed on the screen, but you can LIST the file to read comments explaining certain actions that you were taking.

If you would like to print some non-executing comment text you would begin the line with "$P". If it is followed by a space or several spaces, only the first space will be ignored.

If you would like to clear the screen you would start a line with "$C". This tells ORCHKEY to erase the screen. Although you could simply use a straight CLS if you chose (if CLS is supported by your DOS), in using $C the CLS message will not be displayed and the DOS READY message will not be shown afterward. Any text after $C will be ignored.

If you wish to quit from the file before the actual end of file is encountered you can use the "$X" exit command. This tells ORCHKEY to -immediately- stop processing the KEY file and return control to the keyboard, no matter where you are within the KEY file.

You can force a Carriage Return in the middle of a command line by using the "$L" Line command. This tells ORCHKEY to replace $L with an ENTER Key code. Please be aware that the next command (if it is a DOS command) should follow immediately behind the $L command. Thus CLS$LFREE$LLIB would do the same as entering CLS, FREE and LIB on individual lines.

But how do we select options from a menu that we may have created using the $P commands? Easy, when we use the "$K" Keyboard Read command. Be aware that $K will only read -alphabetic- characters, "A" through "Z", and will convert any lower-case letter input to upper case. Thus you should set your menus up so that the option selections are to be keyed off of an alphabetic list of choices. Further, the format of the $K key command requires that you follow $K with a list of acceptable selection characters. For example, suppose you had a menu that offered selections from "A" through "E", and you used "X" for an "exit" option. To check the user's response for these characters you would enter the following line into the KEY file:

```
$K ABCDEX
```

Any key outside this range will not be accepted; it will wait until the user types a valid key as specified by the list following $K. Please note that for clarity that you can separate the key list with spaces and/or commas, thus $K A, B, C, D, E, X is acceptable.

But how do you take advantage of keyboard selections? That is where the "$M" and "$N" command come into play. You can look at $M as a Menu Option command to use while -within- the Orchestra-90 program, and $N as a Menu option command to be executed while -not- within the Orchestra-90 program. The reason for the difference is that Orchestra-90 ignores the first character sent to it from a disk file (I noticed that even the Radio Shack demo programs have to deal with this problem). Thus a ignorable character must be sent through the keyboard filter before an -actual- key. Therefore the "$M" option as well as the "$O" option (mentioned later) are designed to take this into consideration.

To use $M or $N, you follow the letter "M" or "N" immediately by the desired selection key, and then follow that with the command line for that key, lead by an optional space. For example, to process the command for when the user typed the letter "A" (and A is a menu option acceptable by the $K command), you would start a line with $MA. As a practical example, suppose that the selection of "A" played the song "ADDAMS/ORC", you would have the $M option for the letter "A" processed as:

```
$MA G ADDAMS
```

The "G" of course being the Orchestra 90 command for "GET".

You can have as many lines featuring $MA as you require, and you can even chain commands together on a line using the $L Line feature. Please be aware that when using $L for specifically Orchestra-90 commands that you -must- have a dummy character, such as a space, follow the letter "L", as otherwise ORCH90 will do unpredicatable things (this again due to the fact that Orchestra-90 will ignore the first

character of a disk-based command).

The $N command allows you to key off a menu selection but perform a non-Orchestra 90 command, such as a DOS command.

The "$O" command (OH) allows you to issue an Orchestra-90 command that is -not- "key" selection specific. You can imagine this as being a straight Orchestra command.

Finally, the "$G" Goto command allows you to skip around code and go to a specified label, which must be an alphabetic character "A" to "Z", which is at the start of a line immediately following a period ".". For example, if ORCHKEY encountered $GD, it will scan for a line beginning with ".D", and then begin executing from that line onward. The label is marked as a comment line so that it will be ignored by a program flow that may "fall" into it from above. Please be aware that Goto -cannot- go to a label that was defined -before- the associated $G goto command.

A practical example is in order. Suppose we had an ASCII file called TEST/KEY with the following lines in it:

```
. Sample KEY file
$C Clear the screen
$P ======================
$P (A) On the Water Front
$P (B) Addams Family
$P (C) Cry, Cry, Cry
$P (D) Thriller
$P ======================
$P Select A-D, E to play All,
$P or Q to Quit
. get a key from user
$K A,B,C,D,E,Q
$NQ $X — exit from file on "Q"
. else load ORCH90 and select
.   5 voices and No save
ORCH90$L 5$L N
.Now do A-E selections
$MA G WATER
$MA $GA skip around to "A" label
$MB G ADDAMS
$MC G CRYCRY
$MD G THRILLER
$ME G WATER ADDAMS
$ME G CRYCRY THRILLER
.A -- here is the "A" label
$O Q
.return to DOS via Q above, then
.   re-run TEST/KEY file
ORCHKEY TEST
```

Notice that due to the width of the CN-80 columns that we did not spread the options out in the menu. Notice also that the $GX command for option "A" was not necessary (in this particular case), but was used to demonstrate the GOTO command. Had the goto command not been used, the program outcome would have been the same. Also notice that if ORCHKEY had run to the very end of the KEY file, it would have exited automatically as though $X had been used, returning control to the keyboard.

Of course much more complex structures can be developed from this that would make the use of various GOTO commands practical. In fact, by avoiding the use of the $M and $O commands a teacher could construct a sophisticated multiple choice system to test students. Various answers could be responded to quickly, and various KEY files could be chained together, since you can re-execute ORCHKEY with a different KEY file from within a $N (or $M) selection. For example, the following key file, called EXAM/KEY could be the first in a series:

```
. EXAM/KEY
$C
$P HISTORY EXAM
$P ============
$P Question # 1:
$P When was the Declaration
$P of Independence signed?
$P <-------------------->
$P A) June 4, 1776
$P B) July 4, 1776
$P C) July 4, 1777
$P <-------------------->
$K ABC
$NA $P Wrong. Too Early
$NA ORCHKEY EXAM
$NB !!!RIGHT!!!
$NB ORCHKEY EXAM2
$NC $P Wrong. Too late
$NC ORCHKEY EXAM
```

In the above example, if the student had selected choices A or C then the EXAM/KEY file would have been re-run after telling them they chose incorrectly. By selecting the right answer, B in this case, the next question in a KEY file chain called EXAM2/KEY would have been gone to.

As a bonus example, in the program Listing

section is a sample KEY file called ORCH001/KEY designed specifically for ORCH001, the first of about 80 Orchestra-90 Music disks that can be found in the File Cabinet Collection, available from Computer News 80. This file shows some practical examples of how to construct nice-looking music selection files for use with a patched version of ORCH90/CMD when used with the ORCHKEY/CMD program.

I could go on and on with variations, such as saving a new version of the patched ORCH90/CMD after selecting the number of voices, and using that file (perhaps called ORCH/CMD) so that voice selections from the KEY files would not be needed. You could even get creative if you are running with double-sided disks so that a single KEY file could contain -several- different menus, and you could simply initially select a particular sub-menu from a master menu (you can re-use key selections A-Z by using $G Goto to keep the various separate sections from running into each other). The commands, pet-named OIL (for Orchestra Interpretive Language), though simple, can be used to develop very complex and powerful menuing systems.

CONCLUSION

As I had promised, my Orchestra-90 support program has been delivered. Hopefully you will find even more creative ways to exploit it than what was presented here. Also as promised, in my next visit I will be showing you how to turn your Model I and III (and III-mode Model 4/4D) computer into a crude digital recorder, so get those tape recorders and cassette cables ready!

Until next time, Happy Computing.
-David Goben

(Editors Note:) Our challenge last month for some hacker to come up with a music interface for the Model III and 4 that would utilize the Orchestra-90 type programs has been met. We soon hope to announce that either we will have a unit available in kit form or a completely assembled interface. The next step is to locate, Jon Bokelman the author of the original Orchestra-90 program, if possible. If you know how we can contact Mr. Jon Bokelman, please let us know. -CN80

TRS-80 AND LASER PRINTERS Part One
by CN-80

We started our laser printer quest some years ago, more or less off and on. But the costs were high and the real need was low. Coming as we did from the cut-and-paste hot wax world of graphic arts, we knew that we didn't need a laser printer to put together a newspaper, magazine or advertising flyer. But wouldn't it be nice to have the type setting abilities that laser printers could give us. Big bold headlines, tiny small print for the small print copy that seems to be required in every ad these days. After all we had a good Canon copier that would copy any line art, it would even turn a photograph into a reasonable screened picture for the camera-ready makeup for our printers. (In this case "printers" refer to commercial ink and paper press print shop.)

We had put out 40 and 50 page "Construction Buyers Guides" that advertised products and suppliers that were available to construction contractors. Much like the yellow pages, but all display ads, and sent free to everyone in a state who had a need for a construction product. We had made full page flyer layouts for everything from lighting fixtures to purely promoting a companies image. We had over a period of 30 years put out all types of direct mail pieces, from return mail cards to full product catalogs. Plus designing many in house forms for sales reports, inventory control, order forms, billing forms and the many little forms you need to keep the paper work flowing for a major distributing company with over 8 million dollars in annual sales. We had in the course of our electrical consulting practice, designed many forms from spreedsheets for estimating, to profit analysis forms, to 8-1/2 by 11 construction detail sheets, to blueprint size drawings and 4 foot by 10 foot lighted graphic flow charts for control panels used in industrial plants. And we did all this without the use of a laser printer or a desktop publisher program. Why did we need a laser printer now? And why did we have to invest in an expensive MS-DOS PC computer to make the laser run?

Not planning on ever giving up our investment in our TRS-80 computers we started our quest.

What we wanted to know first, was what was the cost per page of using a laser printer, who's coping engine did they use and how expensive was the unit to replace and maintain? Could we justify a laser printer to print our business letters? We are certainly not General Motors, and certainly not IBM. Secondly, we wanted to know who's laser printer would work on our TRS-80 Model 4 computers, and if they would work on the existing word processing programs that were available. Better yet would they work on the word processor that we were most familiar with and our employees were trained on. It's one thing to personally learn the ins and outs of another word processor, but its' quite another thing to have to pay four or five other people to learn a new system. And thirdly, did we really have a use for a laser printer? Did we really need one or were we just falling for the advertising hype for desk top publishing? Or were we just trying to keep up with the Joneses, because the hypesters of the glossy publishing world keep telling us we - have - "to keep up with the Joneses"?

WHAT IS A LASER PRINTER

What is a laser printer anyway? Well, simply put, laser printers are plain bond paper copiers without the light platform that scans the original document and creates the electrical charge on a drum, which then picks up the carbon toner, and sets it, or bonds it to the paper. Laser printers are just plain bond copiers that use the computer as the source of the item to be copied. It takes the text or graphic image in that you stored in the RAM computer memory and stores it in its own RAM memory, then sends the signals to a drum which in turns creates the image on paper the same way that a plain bond paper copier does.

It is important here to remember that each laser printer will have a copying engine, and a memory buffer, plus its printer signal emulation which is the same as the printer signal emulation that you would be familiar with in using dot matrix printers.

PRINT DRIVER EMULATIONS

We know that the later series of Tandy and Radio Shack dot matrix printers had two printer emulations, the IBM emulation and the Tandy or Radio Shack emulation. Other printers on the market in the last two to three years offered the IBM emulation and some other choice of printer emulation. For us Model III 4/4P/4D users, we needed the Epson FX80 mode in our printers to be able to use the most popular word processing software and print drivers developed for our computers. In most cases FX-80 is the standard emulation in the System/Application programs that were sold by Radio Shack. And of course we need the centronics parallel interface for the printer cable connections.

COPIER ENGINES

Tandy/Radio Shack Laser printer uses the Richo copier engine. Cleaner and maintenance kit. $99.95, Drum/cleaner/ maintenance kit. $199.95 Duty cycle 3000 sheets per month. Messy to install unless you are very careful. Don't move it from one room to another or you will have toner all over the inside of the laser printer.

Hewlett-Packard LaserJets use the Canon engine. Easy to replace, as the whole thing comes in a cartridge and you replace the drum each time you replace the toner. Neat and clean. Toner cartridges cost about $95 dollars to replace new, and about $40 dollars to have someone do a recharge. You can recharge the toner cartridge about three times before you need to replace the whole thing with a new cartridge with a new drum in it. Duty cycle: about 2000 copies a cartridge. Depending on the amount of text per page that is copied. (Average cost per copy is 4.2 cents. plus paper costs. Remember that this cost per "copy" and not per page. If you printed both sides of a sheet of paper it would cost you 8.4 cents per "page" plus the cost of the paper.)

Panasonic Laser Printers use the Canon engine the same as Hewlett-Packard does.

Alps Laser Printers use the Sharp copier engine which use a toner cartridge and developer cartridge that is separate from the drum cartridge. The toner kit is about $45 and will give you about 2000 copies per kit. (Average cost 2.9 cents per copy plus paper costs.) The photocopy drum is good for 200,000+ page life, with replacement costs at $165.

COPY QUALITY

Unfortunately, we could not test all the printers on our budget, and have to rely on the reports of others and the reviews in other publications. However we saw very little in the way of reviews for the ALPS laser printer. But it is advertised to have text and graphics output using a blacker black toner than any other on the market, because of its Sharp copier engine. Great for camera-ready artwork.

Most copiers that use plain bond paper have a heat element that "melts the toner and fixer to the paper. That's what gives a copy made on a copier the "dried ink look" that you get with an ink press printed image that we recognize having been done by a commercial print shop, versus a typewritten page. (In the case of the computer user, we all recognize the dot matrix ribbon printed page, regardless of the quality of the type. We even can tell when we receive a letter that has been typed on a daisywheel printer using a fabric ribbon. The closest thing that anyone ever came up with that looked like it was "printed", meaning printed at a print shop, was the electric typewriter or a letter quality daisywheel printer using a carbon ribbon. Even then a single strike ribbon did a better job than the multi-strike ribbon. Most of us might remember when the IBM Executive typewriter was first introduced, and only the secretary to the boss got one! At that time, that one typewriter was a must for the ad man who wanted to save money on typesetting.

DO WE NEED ONE

So, what use does anyone have for a laser printer, beyond making their business and personal letters look the same as a letter from the president of General Motors? Impressive. Costly.

Draft copies, no. Not at a cost of 4 to 10 cents a page, not counting the cost of paper. A laser printer, like the copier has a lot of working parts and will need some maintenance work done sooner or later. A dot matrix printer is still the most economical for that job. The cost per copy is not much more that the cost of your paper (under a penny a sheet) and a little ink from your ribbon.

SPEED

Well, yes. A full eleven pages of a manual printed out in about 2.5 minutes on a 6 pages a minute laser, where it took about 9 minutes on the dot matrix in 290 cps, draft mode. But you can only save time on all the draft copies you might have to make before your document is ready for the final version, with the sacrifice of the additional cost. Let's say the laser copies cost you 5 cents each. And you had to make at least 10 rough draft printouts to get to the final version. That would cost you 11 pages times 10 drafts at 5 cents each, or 110 copies at 5 cents each; $5.50 for rough drafts and 55 cents for the finished version. There goes the cost of about a 1/4 case of fan fold paper, just in copying costs. But you did save about an hour. By the way laser printers do not take fan fold paper, but use single sheet paper, feed either from paper trays or manually. Some laser printers will not print envelopes without extra attachments which will add to your cost if you need that function.

An impact type setter, or daisy wheel printer at about 30 cps, takes about six hours to print out a 56 page double column book. Where as a laser printer could have the job done in 10 minutes. Provided of course that you are downloading text copy that has no graphics, download font selection and is pure text in nature.

When the laser printer advertisements and specifications talk about pages per minute they are referring to six or four or eleven, pages per minute of just one page of original text after that page has been installed into the RAM memory of the laser printer. All other speed questions depend on how fast your program sends out the text, how much graphics you have in the text, how big the RAM memory of the laser printer is, and several other factors. All and all it is the fastest full page printing technology we have today, no question about that.

But just as it is with hard drives, and other peripheral equipment, the application that it is put to determines whether or not you need it.

RAM MEMORY

With few exceptions like the Tandy Laser Printer that comes with 1.5 Megabyte

memory (1500 K) with no expansion later, and hence the higher price. Most laser printers are sold with a basic memory size of 512 K of memory, expandable to 1.5 Mbyte or 2.0 Mbyte depending on the manufacturer.

500 K of memory will print out about one business letter of text. And has no room to store downloadable fonts, or graphics on the same page with text. In other words it will do about the same job as your present dot matrix printer will do, but with a better quality of type.

Additional memory will cost you at least $340 if you purchase it already added when you purchase the printer, or about $450 to $600 to have it installed later. So if you are going to purchase a laser printer it is best to get the maximum memory size with your original purchase. You will find that you will need that extra memory as you put your laser printer to work.

RESOLUTION

The copy that laser printers put out are rated in dots per inch, and the laser printers that we looked into, ones that seemed like the best bet for the average desk top computer user, and dictated by our pocket book are all 300 x 300 dots per square inch. Super high resolution can go as high as 1200 dots per square inch and cost as high as $30,000. These are lasers for the special application users like multi-color graphic art houses.

Just to give you an idea, 300 dpi is about the standard that you receive from a desk top copier or fax machine. 300 dpi is good enough for any black and white camera-ready art sent to a commercial printer.

MULTIPLE COPIES

You might just have an application where you need 10 copies of your latest sales report, or club report and not own a copier. A laser printer will serve you well in this case, or in the case of up to 50 copies of one document. Over that you are better off to take your original to a quick-copy printer and have him do the job. Today you can get pretty good prices from a quick-copy printer for up to a 1,000 copies, which they would normally do on a high speed copier like Xerox builds. Over a 1,000 copies of one original and you would be better off to take it to a standard ink press printer, who would run your work on an offset press.

If you have a good 9 or 24 pin dot matrix or daisy wheel printer, and a pair of scissors and a pot of school paste, and a copier at your disposal, and you are happy with not having the ability to have all kinds of type styles and sizes on your page. Then you don't need a laser printer to be able to make some very professional looking reports, flyers, or advertising layouts.

If you use your bosses copier to make a 100 copies of your club report, at least offer to pay for the copies, even if it only goes into the coffee fund. You might be surprised - the boss may even help you with some suggestions for dressing up your next report.

PRICES

There are as many prices on laser printers as there are laser printers.

The four laser printers we used as comparison are priced above the new 4 page per minute printers that Epson, Brothers, Canon and Hewlett-Packard have recently brought to the market at direct mail order and street prices of under $1,000.

A couple of the 4 page per minute copies are:

Canon LBP-4 4 page pm 512K	$949.00
HP Laser Jet II 4 page pm 512K	$919.00

Higher Speed Printers:

Tandy 6 page pm 1.5 Mbyte	
Catalog Price Retail	$2,599.00
Street price	$1,475.00
Panasonic KXP 4450	
11 pages pm 512K	$1,339.00
Expansion to 1.5 Mbyte added	$1,689.00
Alps LPX600 6 pages pm 512k	$1,269.00
Expansion to 2.0 Mbyte added	$1,699.00

EMULATION

Tandy: Tandy, IBM, and HP LaserJet Plus.

Panasonic: IBM, Epson FX286e, HP Laser Jet+, IBM Proprinter, and Panasonic KX-P10921

Hewlett-Packard: HP LaserJet Plus

Alps: HP LaserJet+, IBM Proprinter, IBM Graphics Printer, Epson Fx-80 and Diablo 630.

DO WE NEED TO SCRAP OUR TRS-80 TO USE A LASER PRINTER

No, we don't! Not unless we want to buy a $500 to $1,000 desktop publishing program package, that was only written for the IBM MS-DOS.

SOFTWARE

By the time the laser printer came to the market at reasonable prices, it was after the time major software developers and Tandy had stopped their TRS-80 program development, and there were no software programs developed for the TRS-80s using laser printers. Or at least we didn't think there were any. Because those who did develop programs no longer advertised their TRS-80 products.

But during our quest, we found out that Allwrite already had software out using their LaserJet Option for Allwrite ($100) package, which would address the HP LaserJet emulation of the laser printers.

LeScript had included HP LaserJet support in their latest version of LeScript.

Alps software, had a print driver for SuperScripsit which supported the HP LaserJetII+.

Dr. Lee C. Rice, Dept of Philosophy at Marquette University, Milwaukee, Wisconsin and Gary Shanafelt of McMurry College in Abilene, Texas, were a long way into adapting the Allwrite programs for use on the HPLaserJet. And have placed some of their work into the public domain.

David Goben had modified Superscripsit with some patches to control the line feed to the laser printers using the FX80 mode. And is working on a print driver program that will download soft fonts from the Model IV, to work as a generic print driver. If that proves to be possible.

We will explore each of these areas in the future articles in this series. And we encourage anyone who has already been working with laser printers and their TRS-80 computer to jump on board and send us any information on your experience with the laser printers and your TRS-80 computer.

Before you all start calling! Which printer did we select? We selected the Alps LPX600. We don't know yet if this was the best choice, we will learn in time as we develop our own skills using that printer. So don't take this as an iron clad endorsement of the Alps printer - yet.

If you would like a sample of what the Alps printer will do - using Superscripsit and PowerSoft's FX-80 driver for SuperScripsit (now available from Misosys) take a look at our Printer Ribbon ads, they were created using that laser printer. We have simply just been too busy to check out all the features and test all the setup choices. So far we have found that many graphics can be printed and we want to give fair treatment to each of the developers of software that supports both any new technology such as the laser printers and our TRS-80 computers.

So, as we mentioned before, look for the following articles that will discuss in depth all of the application programs.

Please let us know how you feel about this series of articles. We have heard from some of our subscribers concerning this project already. We know that some of you will never have a need for a laser printer and this information may only be of interest to you if only to prove to yourself why you don't need one.

But one thing is for sure, you don't have to give up you TRS-80 computer to use a laser printer. -CN80

TIME TO RENEW?

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THIS IS YOUR LAST ISSUE
IF THE LAST DATE ON YOU MAILING LABEL IS 90/05
Time to renew your subscription.

3.5 INCH DISK DRIVES AND DOSPLUS 4 AND SPEED-UP KITS

by Paul Wilcox

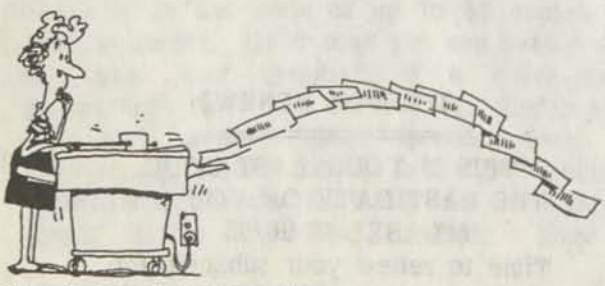
Dosplus 4 is probably not the most widely used DOS any more but I like it and I use it with LeScript and I like it very much. I have a friend that has two Model 4's, both non-gate array, and he uses Dosplus 4 exclusively. I have two Model 4's one gate and one non-gate array.

Last November I purchased a Teac 3.5" drive and put it in my non-gate machine. I have a 360k 5.25" drive in Zero so the DOS and LeScript 2.0 fit just fine with the dictionary just fine, so I do not use drive one a lot.

Now the reason for telling you all this background is I put a Teac in my friends Model 4 and it works just fine, so I put one in his other machine, it seemed to work just fine. Well to my surprise it gave all kinds of strange errors like "drive not available" when I asked to Format a disk. Now it did not do it every time just sometimes, so we sent the drive back and got another, same deal. I was talking to another friend and he reminded me I had put a speed-up kit in that machine. When I removed the speed-up kit everything worked perfectly.

The problem I was left with was that the machine I use also has a 3.5" Teac in it as drive 1 and I have a speed-up kit in that machine also. Well I had noticed some trouble but I figured it was in the Config file because Dosplus 4 will automatically recognize a double sided drive. Well to get on with the story my friend David has a 3.5" Toshiba drive in his MSDOS machine and I traded him. The Toshiba Drive works perfectly in my non-gate machine with Dosplus 4 with the speed-up kit running it at 5.1 meghz. Dosplus 4 will not work a 6.0 meghz gate array machine because it operates to fast for the 5.25" drive in Zero.

I am told by people who should know that the author of Dosplus 4 shortened up on the "timing loops" and this is why DOS cannot find the drive everytime. I do know that the standard interleave is 2 with Dosplus where the standard interleave is 3 with LDOS and 6.? and Multidos, but Multidos has a way to change the interleave to 2 if you would wish to do this. An Interleave of 2 does make the disk I/O about 35% faster.
-Paul Wilcox



OPEN FORUM

==========

Q: I particularly like Christopher Fara's "Assembly Language Tutor" articles. Little by little, I am learning some Assembly Language Programming.

There is a question which has been bothering me lately about completing FOR/NEXT loops in BASIC. I was taught that they should always be closed or completed as follows:

```
100 FOR X = 1 TO N
110 IF A$ = T$(X) THEN Y = X : X = N
120 NEXT X
```

No one seems to be doing this any more and I have wondered if I am wrong.

I have about 40 10 minute audio tapes with cases for storage of programs. I no longer use tapes, so if one of your readers could use them, I would be happy to donate them to the cause if someone will pay the shipping costs.
-J. H. H. Strongsville, Ohio

A: First we will leave the answer to your BASIC program up to those expert basic programmers to answer. We will pass on the information as soon as we receive a reply. The same goes for anyone who would be interested in your tapes. If you are interested in these tapes drop us a card and we will forward it to J H H.

Ltr: I can hardly wait for info on how to hook up a laser printer. How about some info on how to hook up HP's "InkJet" printer to the Model 3/4.

Also does anyone, you or your readers, have any programs to run the TRS plotter.

Order on another page for CN80 index. AT LAST... Much thanks to Louis Carson.

And last an idea for you. Why not put a "Control Number" at the beginning of each letter to the editor.

Example = ww/xx/yyyy

ww = Volume number
xx = issue number
yyyy = letter number

Reason: That way people writing in could refer to a particular letter/info. request in a past issue. Also it would be easy to build up a reference file on a subject. Disk drives, DOS, TRS models, programs etc. It would also be easy for the editor to refer the reader back to other questions and/or letters with info. on a subject (put at the end of the letter to the editor.)

Thanks to all the staff at CN-80 for keeping my TRS-80 alive and well.
-S. B. W. Blythe, California

A: Thanks for the input and praise. We would think that the hook up to the InkJet would be very similar to the LaserJet, cable hookups are of course with the standard centronics parallel cable we all use for our printer connections now. The software drivers might be different. Having just sprung the budget for a Laser printer, we won't be able to explore the possibilities of the InkJet by buying one. We would hope that some reader can tell us all about his use of the InkJet with a Model 3 or 4.

In your example for letter coding you left out page number. But we really think that once you see the index with all its search functions, and since Lou Carson has gone to all the work of matching up all the open forum questions with where the question is and where the answer is and vice .versa, that additional coding would be unnecessary. When responding to a question in the open forum, use the code name at the bottom of each question, the volume and issue number and page number is right there on the bottom of the page. We have always tried to put the location of the question in the text of the answer when it is printed. But our index program makes it all so easy, plus it identify every question on answer that pertains to a certain subject.

We still suggest that if you have double sided drives or a hard drive, that you append the files together so you can search the whole two years (now two years and four months).

By the way; we just received the beginning 1990 Index from Lou with the first four months indexed, January thru April. We will add this to our next disk series so you can add it to your existing index disks. The next disks series will be available at the end of June. If you can't wait we will send you a disk with this data file on it. $2.00 please to cover disk and mailing costs.

If you haven't gotten your copy of the CN80 Index yet the first of the 1990 index will be added to it. We have sent the CN80 index to as many bulletin boards as we could so if you are a BB'ser, look for the index on you local board. If it isn't there upload it or let us know the name and sysop of the board and we will send them one.

Ltr: The woods are full of decimal-to-binary conversion programs; here is yet another which I wrote for my Model 4P. Seems strange that Microsoft didn't include this process in the BASIC it prepared for the TRS-80, or, for that matter, in the basic it did for IBM and IBM compatibles. Anyway, this one is fast, takes B-I-G decimal numbers, avoids leading zeros, and is easy (I hope) to understand. Although the program seems to exclude decimal numbers above one billion, its range can be extended by factors of one thousand simply by increasing by steps of 10 the upper bound on the range of K in Line 50. Thus if the upper limit were up to one trillion, (10)^12. It would really take numbers up to one less than (1024)^4 which, by convention I have rounded down one trillion.

(See program listing on next page.)

```
10 REM DECIMAL TO BINARY
CONVERSION WBK 112089
20 CLS:PRINT"PLEASE GIVE THE
COMPUTER A POSITIVE WHOLE NUMBER"
30 INPUT"NOT GREATER THAN ONE
BILLION ",N
40 P=N:CLS
50 FOR K=1 TO 30
60 D=N/2^K
70 IF D<1 THEN 90
80 NEXT
90 DIM A(K)
100 FOR I=1 TO K
110 N=N/2
120 IF N=INT(N) THEN A(I)=0 ELSE A(I)=1
130 N=INT(N)
140 NEXT
150 FOR I=K TO 1 STEP -1
160 PRINT A(I);
170 NEXT
180 PRINT:PRINT"THE"K"BITS ABOVE ARE
THE BINARY EQUIVALENT OF THE DEC.
NUMBER "P
```

(Note: Basic lines above are written on one line with a space between the last character on the first line and the first character of the following line. We had to do this to make this short program fit our column width. -CN80).

I would like to express my appreciation for your good work in keeping the TRS-80 line alive and vigorous. We loyal TRS-80ers have the facilities, thanks in a large part to you, to learn how to exploit our powerful machines. In contrast, the IBMers must be scrambling to maintain even a surface familiarity with the capabilities of their ever-changing computers.
-W. B. K. Maurertown, Virginia

Ltr: This is a reply to W.M. of Sanford, NC (Vol 3 No. 2 pg 20) and a question I have regarding the "set up" option when using the Multiplan "Print Options".

The page numbers that I am referencing are to be found in the Model 4-Multiplan documentation (Version 01.06.00). Page 193; Paragraph 4, discusses in general how Multiplan recalculates automatically after each cell entry or change, and how it recalculates only upon demand.

Next refer to "Select A Command" on page 197; particularly the first paragraph. Then for further details on using the "recalc" option refer to page 273. It all boils down to this: the default option for "recalc" is (Y)es whenever starting Multiplan from TRSDOS. To turn off the automatic "recalc" function following each call entry or change, execute the "Options" Command; press either (N) or the (Space Bar) (highlight should move from "Yes" to "No"); then <ENTER>. The automatic "recalc" should now be inactive, and now anytime a recalculation is desired press <SHIFT> and <!> keys.

When a file is "saved", a final "recalc" will automatically be executed before it is transferred to disk, if any cell entry was made following the last recalculation prior to the save command. If it becomes desirable while operating within Multiplan to reinstall automatic "recalc", execute the "Options" Command; press either <Y> key or the space bar.

My question is, can someone provide me with the commands or codes(?) that can be used with the "set up:" sub-option under the "Print Options" within the "Print" Command? I am using a DMP 200 printer.
-A. S. Seattle, Washington

Ltr: How much value do you place on your software and data? If, like the average computer enthusiast you have amassed a large quantity of floppies, you know the frustrations of having to back them up. The lack of data security for long term storage, has been the bugaboo of computing. Floppies, hard disks - even the new so-called "erasable optical" (Magneto-optical) disks - are susceptible to accidental erasure and to the vagaries of time and stray RF. Now, more and more private users are following industries lead by using WORMS (Write Once Read Many) technology to protect their investment in software. Even Microsoft has announced it will begin issuing upgrades on CD-ROM - those compact read-only disks that offer huge storage capacities and permanent data storage. Of course, we are talking about technology used by the PC/XT/AT. But, what of the TRS-80? Is it possible to hook

up a Worm or to create a CD-ROM interface.

Having indulged in the proprietary technology of Tandy in the 80's not to mention thousand of dollars in software backing-up becomes a real chore. Imagine libraries and what they have to do to safeguard their huge investment. And remember, once a program is rendered unusable by stray magnetic fields, it is often impossible to replace...at any cost! Some TRS-80 software sources have long gone out of business, others have switched to XT/AT software development. So, what is the solution?

The ideal solution would of course, be to employ WORM technology adapted to the TRS-80. It is a project which I, as a private individual, am working on. Among the things which have to be devised are drivers and configurations and utilities which permit the interfacing of existing WORMS and TRS-80 machines.

I would welcome some input from some of our members. Perhaps, working together, it would be possible to eventually establish some form of permanent backup for TRS-80 programs. It is something, certainly, that CN80 might find of great benefit.

Also, more importantly; although TRS-80 programs may be "old", they are useful even today and can be anticipated as being useful for many years to come. Thus, TRS-80 programs should be kept compatible with changing technology and hardware improvements. The success of CN80 demonstrates this very clearly.

Michael K. Erickson
Anchor Research
Box 250
Monte Rio CA 95462

A: WORM is an acronym for "Write Once, Read Many" times storage. This is where the computer can save programs and data information once. But you can not change it once it has been written to the optical disk storage unit. CD ROM are compact disks that the computer can not write to, but can read the information stored on the CD disk many times over and over.

In one of Tandys newsletter sometime ago they claimed that they were going to be coming out with a read/write optical disk storage unit and that it would sell for under $500. Did we miss it, or hasn't it been brought out yet?

We could not have said it better Michael. There really isn't any reason why the new technological peripherals can not be adapted to the TRS-80 computers, it's just that we may have to do it ourselves folks. No more waiting for the big boys to build our toys. Plus you are so right about these computers doing a fine job for many applications and will be "useful for many years to come", like the garden spade that we had at home that was passed down generation after generation - it wouldn't plow a field, but it sure produced a lot of vegetables in that garden plot out back of the house. And was being used by the third generation at that.

Please keep us informed of your progress, the closest we are now to that WORM is the butterflies, we get when we think of the File Cabinet Library (800 disks - plus) being backed up, twice. Three complete sets, not to mention all the other data and program disks we have. Those backup disks alone would more than pay for a WORM of reasonable cost. Not counting the time it takes to make all those backup, and the upgrades. Would we be interested in supporting such a technological development for the TRS-80s, just figure up the investment we just described, and you got your answer. (A Whopping Yes).-CN80

A small bug from last issue*

In the Bigprint two program by Jack H. Haren Vol 3 No. 4 Page 25

Line 9430 the third number should read 90199 and not 9019. Jack said that this would not create any problem unless you were printing the "&" symbol.

Sorry for the error, just lost a nine somewhere. And the lines beginning with the slash, should have been lined up over the lower lines -one space missing on those lines. Which would have made it easier to read.

PATCH ORCH90/CMD PROGRAM LISTING NUMBER ONE by David Goben

```
10 'PATCH ORCH90/CMD FOR AUTO-KEY INPUT
20 HX$="0123456789ABCDEF"
30 OPEN"I",1,"ORCH90/CMD":CLOSE
40 OPEN"R",1,"ORCH90/CMD"
50 FIELD 1,1 AS A$
60 A=PEEK(VARPTR(A$)+1)+256*PEEK(VARPTR(A$)+2)
70 IF A>32767 THEN A=A-65536!
80 READ A$:IF A$="END"THEN CLOSE 1:END
90 GOSUB 150:C=B+1:GET 1,C
100 READ A$:GOSUB 150:PT=B
110 READ B$:FOR CT=1 TO LEN(B$) STEP 2
120 A$=MID$(B$,CT,2):GOSUB 150
130 POKE A+PT,B:PT=PT+1
140 NEXT CT:PUT 1,C:GOTO 80
150 B=INSTR(HX$,LEFT$(A$,1))*16
160 B=B+INSTR(HX$,RIGHT$(A$,1))-17
170 RETURN
180 DATA 0A,12,"0000"
190 DATA 0A,1F,"16"
200 DATA 0A,43,"CD2B00"
210 DATA 12,20,"C9"
220 DATA "END"
```

ORCHKEY/BAS PROGRAM LISTING NUMBER TWO by David Goben

```
5 'ORCHKEY/BAS
10 CLS:PRINT"BUILDING 'ORCHKEY/CMD'":RESTORE
20 H$="0123456789ABCDEF":OPEN"O",1,"ORCHKEY/CMD":L=100-10
30 CS=0:L=L+10
40 READ A$:IF A$="END"THEN CLOSE:END
50 IF LEFT$(A$,1)="-"THEN IF VAL(MID$(A$,2))=CS THEN 30 ELSE 80
60 A=INSTR(H$,LEFT$(A$,1))*16+INSTR(H$,RIGHT$(A$,1))-17
70 PRINT#1,CHR$(A);:CS=CS+A:GOTO 40
80 PRINT"CHECKSUM ERROR IN LINE"L:END
90 ''' DATA AREA '''
100 DATA 05,06,4F,52,43,48,4B,45,1F,21,43,6F,70,79,72,69,67,68,74,20,-1504
110 DATA 28,63,29,20,31,39,39,30,20,62,79,20,44,61,76,69,64,20,47,6F,-1408
120 DATA 62,65,6E,01,FE,00,52,18,0B,FF,FF,06,24,44,4F,4B,45,59,00,00,-1613
130 DATA 1E,00,AF,32,0E,52,B3,C0,11,9F,53,CD,13,00,28,17,11,00,00,ED,-1522
140 DATA 53,11,44,11,00,00,ED,53,16,40,00,D5,C9,21,00,00,C3,2D,40,B7,-1525
150 DATA 28,E1,FE,1A,28,DD,FE,2E,28,13,FE,24,C0,CD,13,00,20,D6,E6,5F,-2442
160 DATA FE,43,20,10,D5,CD,C9,01,D1,CD,13,00,20,C6,FE,0D,20,F7,18,BB,-2409
170 DATA FE,50,20,1D,CD,13,00,20,B7,FE,20,20,05,CD,13,00,20,AE,D5,CD,-2005
180 DATA 33,00,D1,FE,0D,20,F2,18,9B,18,B8,18,D4,FE,4B,20,57,FD,21,4D,-2235
190 DATA 53,CD,13,00,20,E2,FE,20,28,F7,FE,2C,28,F3,FD,23,E6,5F,FD,77,-2704
200 DATA 00,D6,0D,20,E8,FD,77,00,D5,CD,00,00,B7,28,FA,FE,41,38,F6,FE,-2629
210 DATA 5B,38,0A,FE,61,38,EE,FE,7B,30,EA,E6,5F,FD,21,4E,53,FD,34,00,-2538
220 DATA FD,35,00,28,DC,FD,23,FD,BE,FF,20,F1,32,FF,52,D1,18,A5,18,A7,-2801
230 DATA 18,B2,18,A1,FE,4F,28,25,FE,58,28,3C,FE,47,28,40,FE,4C,20,03,-2033
```

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```
240 DATA 3E,0D,C9,D6,4D,28,04,3D,20,E0,3C,32,0F,53,CD,13,00,20,D9,01,-1610
250 DATA 54,FC,52,E6,5F,FE,00,20,D1,CD,13,00,20,CE,FE,20,28,F7,D5,57,-2573
260 DATA AF,1E,00,32,0F,53,1D,7A,D1,28,BF,32,0E,52,18,BA,3E,21,32,2B,-1488
270 DATA 52,B7,18,B0,CD,13,00,20,AB,E6,5F,32,49,53,CD,13,00,20,A1,FE,-2094
280 DATA 0D,20,F7,CD,13,00,20,98,FE,2E,20,EE,CD,13,00,20,8F,E6,5F,FE,-2248
290 DATA 00,20,E3,18,85,01,FE,D1,54,2B,23,7E,FE,20,28,FA,FE,0D,20,22,-2077
300 DATA 21,29,56,CD,1B,02,21,19,56,CD,1B,02,18,05,F6,C0,CD,09,44,21,-1554
310 DATA FF,FF,C3,2D,40,21,00,00,C3,2D,40,4B,45,59,11,9F,53,CD,1C,44,-1944
320 DATA 20,D6,21,FB,54,CD,E5,55,2A,16,40,22,A3,52,22,25,52,CB,7C,28,-2060
330 DATA 4E,7E,FE,18,20,49,23,23,23,23,11,04,52,1A,47,1A,13,BE,23,20,-1229
340 DATA 3A,10,F8,2A,16,40,11,9F,01,19,E5,EB,21,9F,53,01,32,00,ED,B0,-1855
350 DATA EB,D1,06,00,CD,24,44,CA,F5,54,2A,16,40,23,23,5E,23,56,ED,53,-2023
360 DATA 11,44,2A,16,40,11,25,00,19,5E,23,56,ED,53,16,40,C3,EA,54,21,-1459
370 DATA 29,56,CD,1B,02,2A,11,44,22,1E,52,22,02,52,01,D1,02,A7,ED,42,-1434
380 DATA 22,D9,55,23,E5,11,00,52,D5,ED,52,EB,2A,CE,52,19,22,CE,52,2A,-2185
390 DATA F5,52,19,22,F5,52,22,11,53,2A,16,52,19,22,16,52,2A,20,53,19,-1338
400 DATA 22,20,53,2A,84,52,19,22,84,52,2A,BC,52,19,22,BC,52,2A,19,53,-1469
410 DATA 19,22,19,53,22,11,52,2A,2D,53,19,22,2D,53,E1,D1,ED,B0,ED,5B,-1832
420 DATA 16,01,B6,CD,55,52,21,32,00,19,CD,24,44,C2,EA,54,21,00,00,22,-1573
430 DATA 11,44,23,22,16,40,C3,F5,54,D5,E5,EB,23,06,09,7E,FE,2F,28,0D,-1971
440 DATA 38,0E,FE,3A,38,04,FE,41,38,06,23,10,EE,E1,D1,C9,01,0F,00,09,-1772
450 DATA 54,5D,13,13,13,13,03,ED,B8,E1,23,23,0E,03,ED,B8,3E,2F,12,D1,-1746
460 DATA C9,50,61,72,61,6D,65,74,65,72,20,45,72,72,6F,72,0D,4F,52,43,-1925
470 DATA 48,4B,45,59,20,31,2E,30,20,2D,2D,20,4F,72,63,68,65,73,74,72,-1476
480 DATA 61,2D,39,30,20,41,75,74,6F,6B,65,79,20,55,74,69,6C,69,74,79,-1805
490 DATA 0A,57,72,69,74,74,65,6E,20,46,65,62,20,31,39,39,30,20,44,61,-1500
500 DATA 76,69,64,20,47,6F,62,65,6E,2E,20,50,75,62,6C,69,63,20,44,6F,-1742
510 DATA 6D,61,69,6E,0D,02,02,D1,54,-731,END
```

ORCHESTRA KEY FILE LISTING -- David Goben

```
. ORCH001/KEY
$C
$P ============================================================
$P ORCH001       Assorted Orchestra-90 Music Data Files
$P ============================================================
$P A: Agains All Odds              K: Gypsy Airs
$P B: Sonate Pathetique            L: Ajax Theme
$P C: Addams Family Theme          M: Jobim
$P D: Adante Pastorial             N: Gypsy Airs #2
$P E: Addams Family Theme #2       O: Brown October Ale
$P F: A Dingy Slowdown             P: Alexander's Rag Time Band
$P G: Affair                       Q: All Together Now
$P H: A Flower Beautiful to See    R: The Alleycat
$P I: Africa                       S: All Night Long
$P J: Ain't She Sweet              T: Almost Like Being in Love
$P ============================================================
$P Enter Selection A-T, Z to play all, or X to QUIT
. Wait for user selection of a valid key using $K.
. (Note that keys CAN be separated by spaces or commas)
$K ABCDEFGHIJKLMNOPQRSTZX
. ----------------------------------
. Exit selection. QUIT program using '$X' abort feature
$NX $X
```

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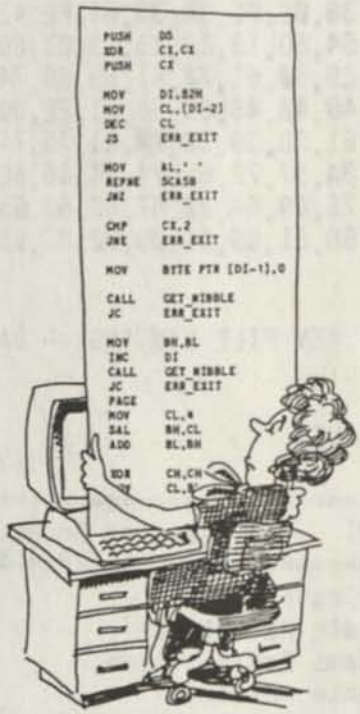
```
. Note use of $N command for 'internal' operations
. ------------------------------------
. Else load ORCH9Ø before processing keys
ORCH9Ø
. now process each selection as required
.   1) select # of voices
.   2) then NO for save
.   3) next "GET" and play file
. ------------------------------------
$MA 5$L N$L G AAODDS
$MB 4$L N$L G ADAGIO
$MC 4$L N$L G ADAMFAM
$MD 4$L N$L G ADANTE
$ME 4$L N$L G ADDAMS
$MF 5$L N$L G ADINGY
$MG 5$L N$L G AFFAIR
$MH 4$L N$L G AFLOWR
$MI 5$L N$L G AFRICA
$MJ 5$L N$L G AINTSWET
$MK 4$L N$L G AIRS
$ML 5$L N$L G AJAX
$MM 5$L N$L G AJOBIM
$MN 5$L N$L G ALAIN1
$MO 5$L N$L G ALE
$MP 5$L N$L G ALEXBAND
$MQ 4$L N$L G ALL
$MR 4$L N$L G ALLEYCAT
$MS 5$L N$L G ALLNIGHT
$MT 4$L N$L G ALMOST
. ------------------------------
. HERE WE PLAY EVERYTHING WITH
. SELECTION "U". DO 4 VOICES 1ST
. ------------------------------
$MZ 4$L N
$MZ G ADAGIO ADAMFAM ADANTE ADDAMS
$MZ G AFLOWR AIRS ALL ALLEYCAT AMOST
$MZ Q
. ------------------------------
. NOW DO 5 VOICES (NOTE we use the
. $N Non-ORCH Command for DOS cmds
. when a command is key specific)
. ------------------------------
$NZ ORCH9Ø$L 5$L N
$MZ G AAODDS ADINGY AFFAIR
$MZ G AFRICA AINTSWET AJAX
$MZ G AJOBIM ALAIN1 ALE
$MZ G ALEXBAND ALLNIGHT
. ------------------------------
. now process 'QUIT' for ALL
. using the $O ORCH command
. ------------------------------
$O Q
. ------------------------------
. Finally, re-run program
. ------------------------------
ORCHKEY ORCHØØ1
```



MOVE/BAS PROGRAM LISTING NUMBER THREE by Rex A. Basham

```
100 '*****************************************************************
110 '
120 '  MOVE/BAS: Used to generate MOVE/CMD for TRSDOS/LS-DOS 6.x only.
130 '
140 '  Programmer: R. A. Basham   Date written: September 1, 1987
150 '
160 '*****************************************************************
170 '
180 CLS: PRINT "Generating 'MOVE/CMD'"
190 RESTORE: OPEN "O",1,"MOVE/CMD"
200 READ A$
210 WHILE A$ <> "EXIT"
220    A = VAL("&H" + A$)
230    PRINT# 1, CHR$(A);
240    READ A$
250 WEND
260 CLOSE: SYSTEM
1000 DATA 01,69,00,30,11,84,30,D5,7E,23,12,13,FE,0D,20,F8
1010 DATA 21,67,30,06,18,D1,1A,13,FE,0D,28,08,FE,20,28,10
1020 DATA 77,23,10,F2,21,41,30,3E,0A,EF,21,00,00,3E,16,EF
1030 DATA 36,0D,21,7F,30,3E,19,EF,7D,B4,28,03,3E,15,EF,21
1040 DATA 60,30,3E,18,EF,55,73,61,67,65,3A,20,4D,4F,56,45
1050 DATA 20,73,6F,75,72,63,65,20,64,65,73,74,69,6E,61,74
1060 DATA 69,6F,6E,0D,52,45,4D,4F,56,45,20,01,07,7F,30,43
1070 DATA 4F,50,59,20,02,02,00,30,EXIT
```

KILL/BAS PROGRAM LISTING THREE by Rex A. Basham

```
100 '*****************************************************************
110 '
120 '  KILL/BAS: Used to generate KILL/CMD for TRSDOS/LS-DOS 6.x only.
130 '
140 '  Programmer: R. A. Basham   Date written: September 1, 1987
150 '
160 '*****************************************************************
170 '
180 CLS: PRINT "Generating 'KILL/CMD'"
190 RESTORE: OPEN "O",1,"KILL/CMD"
200 READ A$
210 WHILE A$ <> "EXIT"
220    A = VAL("&H" + A$)
230    PRINT# 1, CHR$(A);
240    READ A$
250 WEND
260 CLOSE: SYSTEM
1000 DATA 01,88,00,30,7E,FE,0D,28,44,11,86,30,D5,7E,23,12
1010 DATA 13,FE,0D,20,F8,D1,21,DB,30,06,18,1A,13,FE,0D,CC
1020 DATA 31,30,28,2F,FE,20,CC,31,30,28,EB,77,23,D9,4F,3E
1030 DATA 02,EF,D9,10,E6,78,FE,18,20,01,C9,D5,36,0D,21,81
1040 DATA 30,3E,0A,EF,21,D6,30,3E,19,EF,AF,D1,C9,21,55,30
1050 DATA 3E,0A,EF,21,00,00,3E,16,EF,55,73,61,67,65,3A,20
1060 DATA 4B,49,4C,4C,20,66,69,6C,65,73,70,65,63,20,5B,66
1070 DATA 69,6C,65,73,70,65,63,20,66,69,6C,65,73,70,65,63
1080 DATA 2E,2E,2E,5D,0D,20,3D,3E,20,03,01,09,D6,30,52,45
1090 DATA 4D,4F,56,45,20,02,02,00,30,EXIT
```

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Back in 1985 a few of us got together and decided to make a useful publication which would help others get the most of their computers. It wouldn't have advertising. It would have plenty of good information on how to program. It would have programs that could be used in very practical ways. The programs would be explained in considerable detail - not only how they worked, but why they were written the way they were.

We called the publication CodeWorks. The first issue came out in September 1985 and has been published every other month since. Each issue contained at least three major programs. Some turned out to be so-so. Others were good, and some turned into real winners.

In addition to the programs there were ongoing series on learning to program in BASIC. A little at a time - one concept, fully explained. The readers found something to challenge them in each issue. They also contributed with their own ideas and programs.

Our aim from the beginning was to make programs that would run easily on **Tandy Models III and 4,** as well as CP/M and MS-DOS. We did it. We came up with a universal PRINT@/LOCATE subroutine that worked. We added change lines to the programs that needed them.

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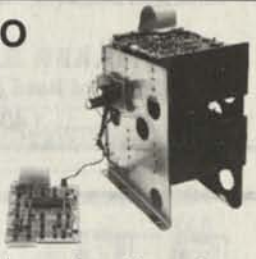

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February 1990 Vol 3 No 2	Jan 15	Jan 29
March 1990 Vol 3 No 3	Feb 12	Feb 26
April 1990 Vol 3 No 4	Mar 12	Mar 26
May 1990 Vol 3 No 5	Apr 16	Apr 30
June 1990 Vol 3 No 6	May 14	May 28
July 1990 Vol 3 No 7	Jun 11	Jun 25
August 1990 Vol 3 No 8	Jul 16	Jul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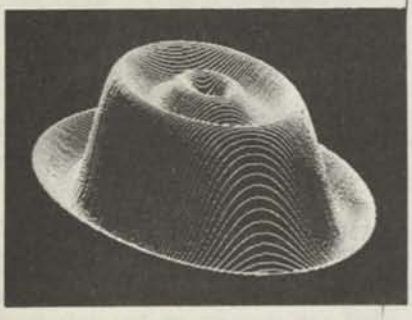

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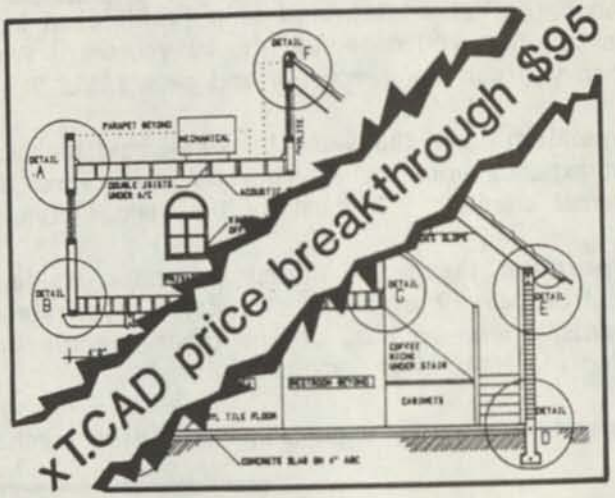

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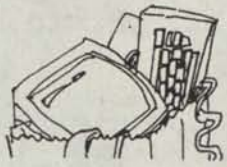

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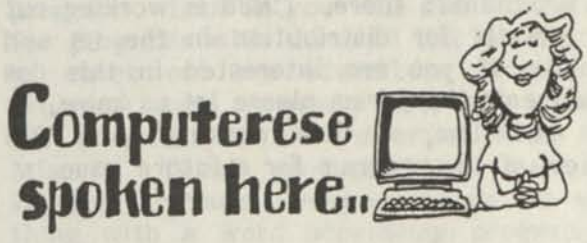
EDITORIAL COMMENT

With all the interest generated in Laser Printers, we certainly do not want to neglect those users who depend on their Dot Matrix Printers. Laser printers for most users are a thing of the future. Either because they have no practical need for one, or because the current street price for a laser is still just under a thousand dollars. As prices fall on the laser printers, they still will remain the most expensive to operate and maintain. Daisy wheel printers are slow but still give that impact type true letter quality for most correspondence, with the new nine pin and 24 pin dot matrix printers producing a near letter quality printout that is hard to tell from the daisy wheel. Then there has been a great improvement in the ink jet printers too. It comes down to one simple fact, all these new technological advances work just fine connected to your trusty TRS-80.

We receive many letters requesting information on how to "make my printer print those large letters and bold print that we see in your letters" or "I have been trying to figure out how to use the SuperScripsit program to print the special characters, but I am thoroughly confused by instructions in the manual". So along with the articles on the laser printer, we will also be concentrating on the dot matrix printers with articles that we hope will help



you understand how to talk to your dot matrix printer. See DMP PRINTER TALK Part 1 in this issue.

If you still want to refer to your computer as TRASH80, ok. But those of us who know these computers know that TRASH stands for T-rusty, R-eliable, A-ccessible, S-imple, H-elpful 80s. But we do not wish to propagate the trash image by over using the term. It's enough to know that we can smugly go our merry way, knowing that those who use the term loosely really don't know what they are missing. The same is true when we read about our computers and the TRSDOS-80 as being "classic" computers. Looking up the word classic in our dictionary, maybe they are paying us a compliment. As the definitions that fit the best are "of recognized value: serves as a standard of excellence: enduring year after year." We used to take exception to being called "classic", when the computer is still brand new, but upon reflection maybe those who refer to our computers as one the classics are really paying the computer the respect that is due.

NEWS ITEMS

Who said there is no more NEWDOSs! We have just receive a copy of the NEWDOS86 written by Warwick Sands of Australia. NEWDOS86 is an Enhancement Package to NEWDOS80 and is used to expand and improve the abilities of those who program using NEWDOS80. It has been reported that the NEWDOS86 has met with wide acceptance in Australia, and is marketed for around $75 there. CN80 is working out the details for distribution in the US and Canada. If you are interested in this dos enhancement program please let us know. In the meantime, we are working on a full review of the program for a future issue.

David Goben's Busy-Calc spreedsheet program is now ready for shipment. For those of you who need a good spreedsheet program and have been frustrated by the lack of availability of VisiCalc, here is the answer. Busy-Calc will be reviewed in depth in our next issue. David has promised that he will create a demo disk for those who want to look before they buy. You can order the Busy-Calc Demo disk, complete 101 page manual and the 12 page Quick Reference Guide for $15.00 plus $4.00 Shipping and Handling. Which will be credited against the purchase price of the full program when it is purchased.

David Goben has also made available on disks in two packages the special utility programs that he has developed over the years for his own personal use. One package is for use with your systems disk operating system, and the second package is for use with your disk files. See the advertisement in the TRS-80 Product Section for a full description of the packages. David has improved and enhanced each package over those that he released earlier either thru 80 Micro or CN80, which you may find on some bulletin boards or in the file cabinet. We have already found a good use for his MAKE1 program, which creates a single-sided disk from a double sided disk, when we have received some programs on double-sided disks, and wanted to send them to one of our reviewers who only had single sided disks. Yes we could have done it by formatting a single sided disk and then copying each file one at a time till one disk was full, and then copying files to the next single sided disk one at a time and so on. But with the MAKE1 program we did it in one fifth the time. One other highlight program that is available is the DSPTXT, which will call up to the screen any data file stored on a disk that your memory will hold and display it on your screen, with pagination and you can scroll forwards and backwards as you wish. You can print the text to the printer by using the "P" command in the menu. This program has been invaluable to us in reviewing disks that have been submitted to us, plus our own work. In this new version David has also, allowed the program to read and print graphics in the text, or you can switch to the ignore graphics mode.

Best of all David has made these programs available at a very low cost. Nine programs on the File Utilities package disk for $9.00 and sixteen programs on the Systems Utilities package disk for $ 16.00. That averages out to one dollar per program,

which has to be the best value for the dollar ever to come out of any TRS-80 programmer. Available of course from CN80. with $2.00 added for shipping and handling per order. We have also put a special Super Saver price on the purchase of both packages for $23.75 plus $2.00 S&H.

HINTS AND TIPS

We looked in the mail bag for your hints and tips, and didn't find any yet. Remember the best one published for the month will earn you a free package of 25 disks.

Our tip: It seems like disk sleeves have a life of their own. At least we know that they have small invisible legs, or wings. Because everytime we have six or seven disks out working on them, when we go to put the disks away, there are only five sleeves. One of those cotton-picken sleeves has decided to escape when we were not looking. Plus, the pile of disks scattered around the desk always made for mass confusion and errors in swapping programs between disks. What is the solution to keeping things straight. We found that using one of the small memo holders that you find in the grocery store or K-mart. The small one that looks like a garden rake turned upside down and is about 3 inches square with about five slots in it, is the best thing for holding 5-1/4" floppies while you have them out of the disk storage box. Still haven't found out how to nail down all the sleeves to keep them for escaping, but keeping a small collection of empty sleeves in that holder sure is handy to replace the one that ran away. If anyone of you knows how to clip the wings of a captive sleeve, please let us know. This might be a simple solution to a small problem, but we thought those who hadn't thought of it first would like to know. -CN80

FILE CABINET UPDATE

A CN80 Staff Report

Q: On the Mod 4 Business Disk Number 17 there is a program called "NEWGENA/BAS" which I can call up on the screen and fill in the information. But when it comes to printing the information that has been put on the screen I get the error message "Error Closing File And Returning to Menu".
R.L.A. Utica, NY

A: The program was written for the C.Itho or NEC 8510 printers, so the LPRINT CHR$(27);?"nn" statements may have to be modified for your printer. Though the program ran alright for us, we did notice one error. In line 15150, the line reference EEL=17560 is wrong, as line 17560 does not exist. To correct it, simply change the line to a remark line:

15150 REM

and resave the program.

Q: I would like to purchase a disk with a program that will do the following on my system. A). Allow me to put a list of addresses on the screen and then allow me to transfer the screen information to a floppy disk without trouble. And also be able to get the same information from the floppy disk and be able to print the addresses onto address labels. To be able to print just one label and not the whole list. B). Allow me to type a sheet of information and transfer the information to a floppy disk for future use, being able to print it out later.
R.L.V. Utica, NY

A: Excuse us if we miss the point but we think you just described what the basic function of all computers are used for. Creating data, saving data, printing data, and sorting data. As for mail list, there are several programs that can do that job, and they are usually referred to as mail list programs. Look in your file cabinet catalog for programs with the mail list description, or check out the advertising section for programs such as Howe Software's Mailing List program. Or the PowerMail Plus, from Misosys. These are powerful mail list keeping programs, and you can do the same thing with a word processing program, or PFSfile and many of the data base programs available. It depends on how large a listing you want to control and how much you want to spend.

ASSEMBLY LANGUAGE TUTOR Part 17
by Christopher Fara (Microdex Corporation)

Relocating fixed data

When we started working with "memory modules", we said that they cannot LD, CALL or JP to "fixed" addresses within themselves. That's not exactly true. Any routine can be relocated, only the "loader" is a bit more complicated. To explain it, we'll dust off our HELLO program (CN80 5/89:9, Z80 Tutor I:11). Don't wince. Its simplicity will help to concentrate on the method we want to study today. Here it is.

```
;-----------------------------------------
        ORG   32000       ;LOADER ...
RUN:    LD    HL,(17425)  ;get high$
        LD    (LAST),HL   ;put in header
        LD    DE,DONE     ;present end
;****
        PUSH  DE          ;save it
        PUSH  HL          ;save high$
        XOR   A           ;reset carry
        SBC   HL,DE       ;HL=shift
        LD    DE,(FIX1)   ;get old
        ADD   HL,DE       ;add shift
        LD    (FIX1),HL   ;store new
        POP   HL          ;HL=high$
        POP   DE          ;DE=> DONE
;****
        EX    DE,HL       ;swap end,high$
        LD    BC,DONE-HEAD+1
        LDDR
        EX    DE,HL       ;HL=new high$
        LD    (17425),HL  ;store it
        RET               ;exit to DOS
;-----------------------------------------
HEAD:   JR    EXEC        ;HEADER ...
LAST:   DEFW  0           ;end address
        DEFB  HOOK-NAME   ;length
NAME:   DEFM  'HELLO'     ;name
HOOK:   DEFW  0           ;reserved
        DEFW  0           ;reserved
;-----------------------------------------
DATA:   DEFM  'HI'        ;HELLO ...
        DEFB  13
EXEC:   LD    HL,DATA
FIX1:   EQU   $-2
        CALL  539
DONE:   RET               ;last byte
        END   RUN
;-----------------------------------------
```

This Mod-III listing can be modified for Mod-4 as usual: to get and store HIGH$ use SVC 100 (see CN80 3/90), to display the message replace CALL 539 by SVC 10 (CN80 4/89:7, Z80 Tutor I:7). But otherwise the relocation method is identical in both models. The first 3 instructions are familiar from our original simple loader (CN80 3/90). Get present HIGH$ into register pair HL and store it in the header at the label LAST, then copy the address of the last instruction in the routine (labeled DONE) to register pair DE.

For clarity we have separated by asterisked "comments" ;**** that portion of the loader which we are now adding to the original version. Before proceeding with relocation, we want to adjust the value of DATA in one instruction in the HELLO routine

```
EXEC: LD HL,DATA
```

After the relocation of the routine, the address of DATA will be different from the value the assembler assigned to it. The relocation will "shift" the entire routine, including the message stored at the label DATA. Therefore the magnitude of the shift must be added to the value of the DATA address embedded in the LD HL,DATA instruction, so that after relocation the instruction will again correctly refer to the address of the relocated message text.

Recall again the picture of the assembled HELLO program code as it sits in memory (CN80 5/89:8, Z80 Tutor I:10). The instruction LD HL,DATA occupies 3 bytes: one for the LD instruction itself, plus two bytes for the address of DATA. So when we write

```
EXEC: LD  HL,DATA
FIX1: EQU $-2
```

the $-symbol represents the memory address right after the end of the 3 bytes occupied by LD HL,DATA code, $-2 points to a location 2 bytes "back", and so the label FIX1 represents the location of the embedded address we want to adjust.

As you surely remember, the "distance" of the shift equals the difference between present HIGH$ (which we have stored in HL) and the present address of DONE (stored in DE). So we PUSH HL and DE for a while, and calculate the shift by subtracting DE from HL (recall the discussion of SBC instruction and why XOR is needed here, in CN80 9/89:9, Z80 Tutor I:23). Then we get the present value embedded at the location FIX1, add it to the shift, and put the total back in the same place.

Now that the address embedded in the LD HL,DATA instruction has been adjusted, we can relocate the whole thing. The two POP instructions restore the saved registers and the rest of the loader continues as usual. To convince yourself that it works, you could assemble this listing as an improved HELLO/CMD, install it from DOS, and execute from BASIC as described in CN80 3/90: find the entry address Z% to the relocated module, then

```
DEF USR = Z%
X% = USR (0)
```

or in Mod-4

```
CALL Z%
```

The word 'HI' should pop up on the screen, and control will return to BASIC. Or from DOS via our MODEX program (CN80 4/90): install, then from DOS enter

```
MODEX HELLO
```

and again the word 'HI' should appear. Of course this module is not of much use by itself, but simply illustrates how these things work. The loader can be used with any subroutine which has one fixed address reference.

Many adjustments

The loader gets even more complicated, if more addresses in LD, CALL or JP instructions need to be adjusted. But to understand how that works, we can start with a "borderline" case of one adjustment.

Then we will easily see what happens if there are several of the same kind. So let's rewrite our loader again.

```
;-----------------------------------------------
        ORG   32000       ;LOADER
RUN:    LD    HL,(17425)  ;get high$
        LD    LAST),HL    ;put in header
        LD    DE,DONE     ;present end
        PUSH  DE          ;save it
        PUSH  HL          ;save high$
        XOR   A           ;reset carry
        SBC   HL,DE       ;HL=shift
;****
        PUSH  HL
        POP   BC          ;BC=shift
        LD    HL,TABLE    ;HL=> count
        LD    A,(HL)      ;A=count
FIX:    INC   HL          ;HL=> item
        LD    E,(HL)
        INC   HL
        LD    D,(HL)      ;DE=FIX1
        PUSH  HL          ;save pointer
        EX    DE,HL       ;HL=FIX1
        LD    E,(HL)
        INC   HL
        LD    D,(HL)      ;DE=old
        EX    DE,HL       ;HL=old
        ADD   HL,BC       ;add shift
        EX    DE,HL       ;DE=adjusted
        LD    (HL),D      ;put it back
        DEC   HL          ;where it
        LD    (HL),E      ;came from
        POP   HL          ;get pointer
        DEC   A           ;count
        JR    NZ,FIX      ;more? else
;****
        POP   HL          ;HL=old high$
        POP   DE          ;DE=> DONE
        EX    DE,HL       ;swap end,high$
        LD    BC,DONE-HEAD+1
        LDDR
        EX    DE,HL       ;HL=new high$
        LD    (17425),HL  ;store it
        RET               ;exit to DOS
TABLE:  DEFB  1           ;count of
        DEFW  FIX1        ;items
;-----------------------------------------------
```

The header and HELLO routine go below and are not changed. We notice immediately a new feature, the TABLE at the end of the loader. It is a non-executable "data area". At its beginning is a count of items in the table, in this case only one. That item is a "word" defined as the label FIX1. So the assembler will store here the value of FIX1 which is the location of the address embedded in the LD HL,DATA instruction. In this case it is the only location where an

address needs to be adjusted by adding the shift.

Asterisks highlight that portion which is different from today's first listing. Let's try to "walk" through it. The PUSH and POP simply copy the value of "shift" from HL to BC, because next we initialize HL as a "pointer" to our TABLE, and copy the count of items to register A.

At the label FIX we start a loop. Increment HL to point to the first "word" FIX1 in the table, and use the typical 3-line operation discussed last month to copy that word to DE. Next we save our pointer for a while, and EX to get FIX1 into HL. Then we repeat the 3-line operation and now get into DE the value which is stored at the location FIX1. This value is the address embedded in the LD HL,DATA instruction, which needs to be adjusted. So we must again EX to put it in HL, while DE will hold the location FIX1. Adjust the address by adding BC (the distance of required shift). Next EX again to put this adjusted value back into DE and restore FIX1 into HL. Then copy the adjusted address back to where it came from.

The first address is now fixed, we POP HL to restore our table pointer, and decrement the count of items which we keep in register A. In this case there is only one item, so the value of A is decremented to zero. Therefore JR NZ,FIX is ignored, and the loader continues normally.

Now suppose we have expanded the HELLO routine to make it really fancy and added a call to some subroutine within it. Suppose that subroutine is labeled FANCY. So within HELLO we might have a call like this:

```
;-----------------------------------------
        CALL  FANCY
FIX2:   EQU   $-2
;-----------------------------------------
```

and in the loader we would change

```
;-----------------------------------------
TABLE:  DEFB  2           ;count of
        DEFW  FIX1        ;items
        DEFW  FIX2
;-----------------------------------------
```

Now the count of items is two, so after the FIX loop is done adjusting the first address, the count is decremented from 2 to 1. Therefore JR NZ,FIX is not ignored and the loop is repeated for the second address.

After the second address is processed, the count is decremented to zero, JR NZ,FIX is skipped, and we "fall through" to continue the rest of the loader. This way we can adjust practically any number (up to 255) of LD, CALL or JP instructions with references to "fixed" addresses within the routine. All we need is to write reference labels such as

```
FIX3: EQU $-2
```

etc, after each such instruction, and include those labels in the TABLE. Nothing else changes in the loader, because all adjustments are processed by the same FIX loop.

To sum up, so far we have three formats of the "loader"

(1) Original simple loader which handles the relocation of routines without any fixed references, as described in CN80 3/90.

(2) Expanded loader which can handle relocation of routines with one fixed address reference (the first listing today).

(3) Universal loader which can handle relocation of any number (1-255) of fixed address references (today's second listing).

Together with our MOGET and MODEX routines (CN80 4/90) we have now the basic tools to write subroutines in "memory module" format, and to access them from BASIC, DOS or other assembly programs.

Note: Z80 Tutor I:26 etc, refers to the pages in the revised collection of our CN-80 1989 tutorial series, now available in book form ($9.95).

A VISIT WITH DAVID GOBEN

This column almost didn't get written. Even as I write this, I wonder if I'll make it. First, my Laser Printer arrived. Being a tinkerer, I could not focus my attention on anything else. Like Stan, I got an ALPS LX600, with 2 Megabytes of on-board memory. This is a real dream machine. Its print output is even better than any of the three Hewlett-Packard LaserJet II printers I have at work. The only problem you have to surmount on this printer is the lack of explanations on the various emulation modes. Although the Printer Command Language (PCL) is laid out, it is lacking in providing full details. For the LaserJet+ mode, there is plenty of third party manuals on the market. The best one I've seen is "THE LASERJET HANDBOOK" by Bennett and Randall. It is a Bradly book, and retails for about $25. Manuals for using the FX-80 are still available in places, but getting scarce. Fortunately, when I was working for 80 MICRO, they gave me an FX-80 manual so that I could consult them on special printer programming. In the near future I will be sharing this information.

The second reason this column almost didn't get written was because my Model 4D tried to die on me. Fortunately I am a VERY strong-willed person (I can be a pain because of it, sometimes), and would not give up until I had the thing at least limping along. Six horses and two chickens couldn't have dragged me away from it. After toying for -many- hours, trying different things, I found that if I applied upward pressure to the bottom of the mother board, I could obtain reliable operation. Of course this reliability meant for me to hold a small screwdriver "just-so" to obtain this end. I managed to rig up a supporter for a window blind (amazing the hi-tech tools we use) to apply this pressure, removing the human element, and allowing the closing of the case. So far it works as long as the computer isn't moved. I'm sure its just a short, or a lack of a short, that is causing this, but as of yet I cannot find the culprit. So it goes. Fortunately I now have a backup machine, plus a non-gate array Model 4 my cousin left with me while he's chasing around the country. Tandy says they can replace the motherboard for $400. HA! I'd be happy if I can get it fixed for less than $75.

SOUNDING OFF

I have been fascinated with sound from my computers for some time. When the little sound amplifiers first came out for the Model I, which could be plugged into the cassette jack from the computer (as even now), I got one. With my Model 4 computers, they had sound built right in, and accessed through port 144 (90H). I quickly changed all my game programs to send sound to this port, rather than port 255 (FFH), the cassette port. Unfortunately the Model 4's speaker is about as big as a peanut, and sounds almost as loud as an ant sneezing. Thus I removed the original speaker and used wire-wrap to connect the two speaker connectors to a 2-inch speaker. For even better sound, I located it facing down on the inside of the base of the computer, and toward the front, so that it emits its sound through a portion of the grating on one of the air vents in the casing. Now I have to make sure no one is sleeping when I use sound software.

For some time I have been experimenting with several different forms of recording and playing back my voice on the TRS computers. I've found that the best sound quality comes from rapid reading of the cassette port and stuffing each reading as an individual byte in memory. Unfortunately, you barely get a phrase out of your mouth before the memory buffer is completely full.

The second method I tried was storing the input state, which is either HIGH (zero), or low (1), by storing eight readings to each byte. This granted me eight times -more- recording time, but was still quite short of what I desired. I figured that if someone wanted to make any practical use of recorded sound on their computers, they would need to store quite a number of phrases in memory.

Thus I came up with my current version, which simply counts high and low states. For example, if a low lasted for 48 readings, I could store this count into a -single-byte rather than in 48 as in the original version, or six bytes in the second version. This current version can store up to 127 counts of a single sound state, before going on to the next byte. In technical terms, since a byte consists of eight bits, I keep the count stored in bits zero through six, and store the state of the

sound (zero or one for high or low) in bit 7 (the eight bit). This method works surprisingly well, even though it is a far cry from the digitally recorded sound that you might get from a compact disk.

Program Listing One should be typed into Model III Disk BASIC and RUN. This will create a program called VOICE/CMD. You use this program with a cassette recorder and the cassette interface plug, which connects it to the back of the computer. You should insert the black cassette plug into the cassette recorder's EAR jack, and the small grey plug into the small MIKE jack (leave the large grey plug hanging). You can turn the cassette recorder on by pushing the record inhibit button in (located inside and to the rear of the cassette storage compartment) and pressing the RECORD and PLAY buttons down. If the recorder you are using does not have a buit-in microphone, then you will have to plug one into the larger MIKE jack.

From the DOS Ready mode, enter VOICE. You will be presented with a menu, where you can select <R> to record data, <P> to play recorded data, <S> to save recorded data to a disk file, <L> to load a recorded disk file into the program buffer, or <Q> to quit and return to DOS.

When selecting RECORD, remember that the more complex the sound (more variations), the shorter the allowed recording time will be. Total silence, for example, can last a long time, since a single sound state is present, so each byte will record 127 counts of silence. Also remember that since VOICE/CMD respects high memory, that if you have a lot of high memory routines present, that this will only shrink the buffer, and consequently the time you have allotted for recording. Regardless, the time is usually most adequate. Also remember that background noise should be kept to a minimum, as not only will this interfere with the recording, but it will also eat up your allotted recording time, since each time there is a sound variation, a new byte is written to.

When speaking into the microphone, remember to speak clearly, distinctly, and to enunciate carefully, and be sure -not- to breath -into- the mike. Following these steps will result in much better recording quality. As a side note, I have found that sound played from a cassette tape seems to provide the best sound quality. Therefore you may wish to record sound using a good recorder and microphone, and then playing it back through the recorder attached to the computer.

If you decide to stop recording early, or even to start over, simply press the BREAK key. This will return you to the main menu, where you can make another selection.

Selecting PLAY allows you to listen to what you had recorded. If you do not have a built-in speaker such as the one on the Model 4, or have not installed a home-grown one into the Model III, you should first connect an external speaker in the the large grey plug (the one we left "hanging"), and turn it on. PLAY will play back all sound recorded from the time that you pressed <R> to the time that the buffer became full, or when you pressed the BREAK key.

Notice that when the play is completed (BREAK will NOT abort during play), that you are given a menu, which you can use to fine-tune the start and time pointers for the recording. You should use the numeric keypad with this menu, as it will also make more sense.

Number "7" controls raising the bottom limit; the pointer that tells the playback mode where to start the play back. You can move it upward in groups of 256 bytes apiece. You can hold the SHIFT key down to raise it in units of single bytes, for "fine-tuning" the start setting.

The number "1" allows you to lower this bottom limit. Notice that you cannot go below the actual beginning of the recording. Like "7", this command moves the pointer in groups of 256 bytes, unless you also use a SHIFT key, which moves the pointer one byte at a time.

The number "3" allows you to lower the upper limit; the end of the recording.

The number "9" allows you to raise the upper limit. Notice you cannot move beyond the end of the actual recording.

Once you have made an adjustment, you can

press <P> to play the new version of the recorded data. You can continue to fine tune the limits as needed. Don't worry about losing data you may have over-stepped during adjustment. it is still in memory, and you can readjust to compensate.

Once you are satisfied, or decide to abort the current work, press BREAK to go back to the main menu.

Selecting SAVE allows you to store recorded sound on a disk file. You will be prompted for a file specification to name the file. When you press enter, the selected file will either be opened or created, and the current sound buffer (with optionally adjusted start and end pointers) will be sent to it. Notice that only the data stored between the current start and end pointers will be sent.

When a file is saved, it is stored as a continuous stream of bytes. All of them will be non-zero, except for the last byte, which is zero to mark the end of the file.

Selecting LOAD will allow you to load a previously saved file back into the memory buffer, where you can play back and edit top and bottom limits, and then perhaps re-save it.

Once you are happy with a recording and have saved it, you can type in Program Listing number two into Disk BASIC to create a program called VPLAY/CMD. Once created, from the DOS Ready mode, enter VPLAY FILESPEC, where FILESPEC is the name of a recording file. This will play back the recorded sound file.

CREATIVE ALTERNATIVES

The really creative assembly language programmer could combine selected recording files together and use this combined file for inclusion in a game program, which could be loaded in a buffer as an overlay, so that perhaps various combined voice files could be used. Since each recording is terminated by a zero byte, a simple mapping routine could be used to point the HL register to the proper phrase. For example, the following assembly routine could be used to find the start of any particular phrase (which were combined using perhaps the DOS's APPEND command):

```
;------------------
;on entry, the B register
;holds the desired phrase #
;Execute via CALL FNDFRS
;
FNDFRS:  LD HL,DATA   ;POINT TO START
         JR FNDREL
FNDLP:   LD A,(HL)    ;GET A BYTE
         INC HL       ;BUMP POINTER
         OR A         ;END OF ONE?
         JR NZ,FNDLP  ;NOT YET
FNDREL:  DJNZ FNDLP   ;DO UNTIL 0
         RET          ;HL ==> PHRASE
;------------------
```

This routine assumes that DATA marks the start of the phrase buffer, and that register B contians the desired phrase number, where 1 indicates the first phrase.

Once the HL register points to the proper phrase, you can play it by using the following routine:

```
;------------------
;on entry, HL point to phrase.
;Execute via CALL PLAY
;
PLAY:    LD A,(4210H) ;get port ECH data
         PUSH AF      ;save
         RES 6,A      ;turn off 4MHz if 4
         CALL PLAYX
         CALL PLAY2 ;play sound
         POP AF       ;get original ECH
PLAYX:   LD (4210H),A
         OUT (0ECH),A
         RET
;-------
PLAY1:   INC HL       ;bump pointer
PLAY2:   LD A,(HL)    ;get a byte
         AND 127      ;get count
         RET Z        ;all done
         LD B,A       ;count to B
         XOR (HL)     ;get sound bit
         RLCA         ;put to bit 0
PLAY3:   OUT (255),A  ;send to cassette
         OUT (90H),A  ;and to 4 speaker
         DEFW 0       ;kill some time
         DEFW 0
         DEFW 0
         DEFW 0
         DJNZ PLAY3 ;do for count
         JR  PLAY1  ;do next byte
;------------------
```

Notice that if you want to write these routines to be used in the Model 4 mode, that first you must change the 4210H address, which stores the port ECH mask, to

0076H, where it is stored in the Model 4 mode on TRSDOS/LS-DOS. However, if you desire to be "legal", you can use the following routine to properly set this address:

```
;------------------
        LD A,101        ;@FLAGS
        RST 28H
        LD DE,'M'-'A'
        ADD IY,DE       ;point to MFLAG$
        LD (PLAY+1),IY
        LD (PLAYX+1),IY
;------------------
```

and now you can use the PLAY routine in complete safety, even on DOSPLUS 4.

You will find the assembly language source code for VOICE/CMD and VPLAY/CMD, as well as a sample recorded file called SAMPLE/VCE.

OTHER SUBJECTS

Previously Stan had mentioned that I was working on a soft font downloader for the Model 4 for use on laser printers. Well, it has been written, and I am now in the process of developing support utilities. The fun part is to write a laser driver for SuperSCRIPSIT and Scripsit PRO that will support proportional spacing of soft fonts.

There are some people who refuse to use LS-DOS 6.3 simply because it lacks a graphics display on boot-up. Personally, I think that this is a pretty lame complaint. For myself, I am more concerned with getting -beyond- the boot-up screen and doing some actual work, rather than spend my time looking at a momentary screen full of space waste. However, be it as it may, recently I came across a public domain patch file written by Doug Mayfield which allowed you to change the TRSDOS 6.2 boot-up graphics screen. Well, I have modified it for LS-DOS 6.3.0 and removed the complicated installation procedure. It now installs as a straight patch, no longer requiring the LDOS CMDFILE program. I've also worked up a version for LS-DOS 6.3.1. What is neat about this jazzy display is that you can include a personalized message, such as your name and address, right within the graphics. So in my next visit I will present this little gem.

Also, starting with my next column, I will be changing my format for a while. During the next few issues, I will be focusing on laser printers, and how to communicate with them. So if you have a laser printer and want to use it with your TRS-80, I will show you how to make it dance, and remove the complicated jargon the laser manuals usually use to explain, or half-explain, how or what a special command does.

So until next time, HAPPY COMPUTING!
-David Goben

HOW TO FIX A FLAT -or- Using the "Patch" command
by David P. Miller

The PATCH command is a useful and handy tool for making minor corrections on programs for the TRS-80. However... it is infrequently used and seldom well understood. Most of us don't bother to include the PATCH/CMD file on our working disks, and load it from the master copy of TRSDOS/LSDOS 6.x only when a patch is supplied by the Shack (very rare these days), or CN 80. Even on these occasions, most of us follow the instructions and apply the patch without fully understanding what is taking place.

Although a certain amount of caution is advised when making changes at the machine-code level to a working program, the PATCH command provides a measure of safety by making sure the changes are what you intended. Let's consider a few possible scenarios: *NOTE* Familiarity with object code and hexidecimal is required to develop patches to machine-language programs. If you are not familiar with these subjects, I suggest you use the information in this article only to modify ASCII text within a file or to learn about the use of "PATCH"!

1. You bought a 16K cassette-based Model 4 when the Shack dealers dumped their demo machines for $300, upgraded with a third-party diskette system, and don't have the sound board.

2. Your original sound board makes you think there's a bean-eating mosquito in the case so you bought the Archer Mini

Amplifier but don't know how to get all the sounds available from DOS and BASIC out the cassette port.

3. You bought the Archer Mini Amplifier in order to hear the sounds from your favorite Model III games and would like to use it in Model 4 mode as well.

If any of the above sounds familiar, I will show you how to re-route all sounds to the cassette port while explaining the PATCH command.

There are two methods of applying a patch: from the DOS command line, or by specifying a patch file that contains the information. The actual PATCH command is the same in both cases, but the second method (from a file) allows you to save the patch for future reference, give it to other users, and return the patched code to its' original condition at a later date. The two commands are:

A. PATCH filespec [patch commands]
B. PATCH filespec1 [USING] filespec2 [parameters]

Items in [brackets] are optional.
Since the actual PATCH commands are equally valid from the command line or from within a file and the use of PATCH files is safer and more useful, I will only discuss PATCHing from files. Just remember that you can make a patch from a command line, just as you can PRINT "something" from BASIC ready as well as from a program line.

The PATCH commands have two forms:

ADDRESS=VALUE to change code by specifying the memory location the byte to be changed will occupy when the program is loaded from disk (load address). This command adds a small 'mini-program' at the end of the file. When you run your program, the 'mini-program' executes first, modifying the bytes on-the-spot in the same way the POKE command does from BASIC. Since the original code is left intact on the disk, you can use the command:

PATCH filename1 [USING] filename2 (YANK)

to remove the 'mini-program' and restore the file to its' original state.

Note that the above method only works with machine-language (/CMD) programs. To change byte(s) in their actual location within the file on disk(ette), use the command:

Drecord,
BYTE=VALUE:Frecord,BYTE=VALUE
(all on one line with no spaces.)

This method works with ALL files, and provides a greater degree of safety, as will be seen.

Drecord,BYTE=VALUE specifies the new byte(s) to be inserted.
Frecord,BYTE=VALUE specifies the existing byte(s) within the record.

Note that VALUE must be the same length in each Drecord/Frecord pair, whether hex or string. The use of Drecord/Frecord is the means by which PATCH verifies that the correct code is changed. You can restore the program to its' original condition later by use of the DOS command:

PATCH filename1 [USING] filename2 (REMOVE)

Note that YANK is used for the ADDRESS patch and REMOVE is used for the Drecord/Frecord patch.

In addition to the above, one final PATCH command is available:
LCODE to indicate a library-mode patch to SYS6, SYS7, or SYS8. The TRSDOS 6 manual states that this command identifies the patch as a "library mode patch" for use by Radio Shack to implement changes to TRSDOS. Upon examination of patches supplied by the Shack, however, it seems that it is not used. Presumably, therefore, you can get along without it.

Now on to the meat and potatoes...

Since I am an old-timer when it comes to TRS-80's, I know better than to "leave well enough alone"; I've looked into my computer from every angle, both literally and from the point of learning about the software. Thus, I know that the Model 4 sound board uses port X'90' (values in hexadecimal form will be expressed in this manner for the remainder of this article) to receive sound-bit data, and the machine code for

writing to this port is most likely X'D3 90' [OUT 90H,A] or X'ED 79' [OUT (C),A]. There was, of course, a possibility that other registers were used to store the sound data and X'ED nn' [OUT (C),r] was used, but register A is the most likely candidate.

Also, I was aware that the sound routine (as with other fundamental DOS calls) would be contained in SYS0/SYS. Browsing through this file, I looked for the machine code values mentioned and found the expected X'D3 90' at load addresses of X'03BC' and X'03C2' (see figure 1) . Carefully examining the code at these locations, I recognized the unmistakable construction of a sound routine. Of course, it was a simple matter to change the X'90' in each case to X'FF'; the cassette port. Testing this modification showed that all sounds at this point came from the Mini Amplifier attached to my cassette port. However, what if I wanted to tell someone else how to make this change? Unclear instructions over the phone on changing SYS0/SYS can be disastrous! Also, what if I got some kind of enhanced sound board installed sometime in the future and needed to return SYS0/SYS to its' original state? I might forget what I had done. Enter PATCH/CMD and the patch file. To make the modification using the ADDRESS=VALUE form of the command, create a patch file as follows. Note that the remarks in the file provide the information to correct the patch at a later date. You can use any word processor that save files in ASCII format (including SCRIPSIT) or from TRSDOS/LSDOS ready, use the BUILD command:

BUILD SOUND/FIX

To create a file called SOUND/FIX. Type in the following lines:

```
. Change output of sound data from port X'90' to port X'FF'
X'03BD'=FF
X'03C3'=FF
```

(The first line starts with a period and is a remark). Press the <BREAK> key at this point to close the file. Now issue the following command from DOS:

PATCH SYS0/SYS.LSIDOS using SOUND

WARNING This patch works on TRSDOS 6.2.1: use of this patch on any other version or on LSDOS may cause irrepairable damage to your DOS and/or files!

The drives will spin, lightning will strike, and sounds will come from your cassette port the next time you boot with the modified diskette. This patch works by adding a 'mini-program' to the end of SYS0/SYS which POKES the hexidecimal value X'FF' (255 decimal) into the two memory locations specified after the file is loaded into memory, but before actual execution begins. Note that you can specify as many hexadecimal or ASCII values as will fit on a line. For example:

X'5300'=01 90 48 3E FF ED 79 3E 00 ED 79 10 F6

would be a valid patch address line. You can remove the patch at a later date by using the DOS command:

PATCH SYS0/SYS.LSIDOS using SOUND (YANK)

However, the better way to make the patch is through the use of the Drecord/Frecord method, as it saves the original information, verifies the correct data, and does not increase the size of the file. To use this method you need to know (A) the record containing the code to be changed, (B) the location of the data within the record, and (C) the existing code at that location. You can use LS-FED or any equivalent to find these values. Bring the data to be changed up on the screen, and LS-FED will display the record number and address.

If you do not have LS-FED or an equivalent, all is not lost. Just LIST the file with the (H)ex option, and use the resulting display/printout to locate the code to be changed. On the left side of the listing you will find line addresses from X'00' to X'F0'. This is the address within the record of the first byte of the line. Count to the right (in hexadecimal) until you arrive at the code to be changed, and write down the record number, address, and existing code. What you're looking for is something like that seen in Patch Lisiting Number One in the Program listing section.

A scan of the patch listing number one shows that the "OUT 90H,A" instructions

(which are represented by X'D3 90' are to be found on line X'40'. Starting at the left side and counting to the right (use the index at the top if needed), the X'90' which specifies the sound port is found under X'02' and again under X'08'. Adding the index to the line number gives us final addresses of X'42' and X'48' within record number X'10'. We now have all the information we need to make a patch file. Use the BUILD command or a word processor to create a file called SOUND/FIX and type in the following statements:

```
.This patch modifies SYS0/SYS of TRSDOS 6.2.1 to route
. all sound commands through the cassette port.
D10,42=FF:F10,42=90
D10,48=FF:F10,48=90
```

Now when you issue the DOS command:

PATCH SYS0/SYS.LSIDOS using SOUND

WARNING This patch is intended for TRSDOS 6.2.1 ONLY!

The PATCH command will check for the existance of X'90' the two locations X'42' and X'48' as specified by the Frecord portion of the two commands, and if found, will change them to X'FF' (because the Drecord portion of the commands say to do so.) This will change the machine-language instructions from "OUT 90H,A" to "OUT 0FFH,A". To return SYS0/SYS to its' original condition, use the command:

PATCH SYS0/SYS.LSIDOS using SOUND (REMOVE)

As with the ADDRESS patch command, you may specify multiple values. Also, you may specify ASCII data in string format. For example:

D10,42="My Dos":F10,42="TRSDOS"

Would work (although some people might not like it...)

"BUT WAIT A MINUTE!" You're probably saying now; "I've installed this patch and re-booted my computer, but my keyboard still 'clicks' from the internal speaker.' (or not at all). This is because the patch we have applied above modified the DOS call to provide sounds from certain programs that use this call, such as the BASIC SOASIC SOUND command. The routines i/FLT do not use these routines because the 'clicks' cannot be generated by the DOS routines. Therefore, we have to PATCH the CLICK/FLT file before this will work. Looking inside CLICK/FLT.FILTER, we find the sound port initialized into the C register at byte X'A5' of record X'00'. Therefore, the patch for CLICK/FLT Version 1.0 is as follows:

D00,A5=FF;F00,A5=90

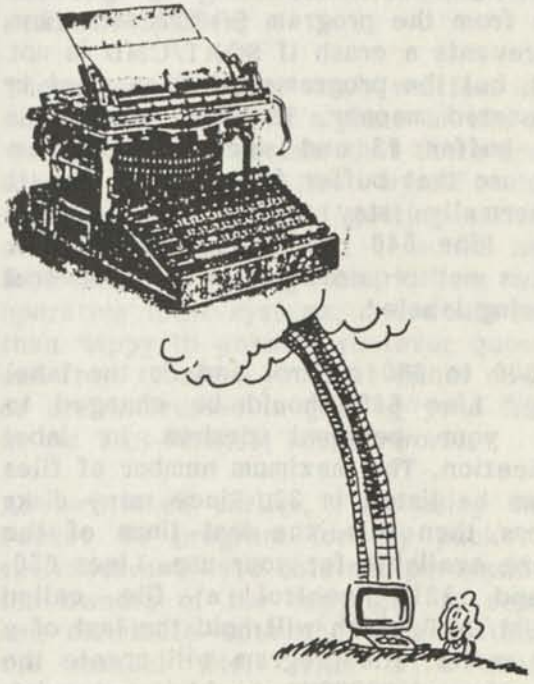
By placing this line in a file called 'CLICK/FIX' you can modify the filter with the command:

PATCH CLICK/FLT.FILTER using CLICK

Install CLICK/FLT according to the instructions in your DOS manual, SYSGEN the system, re-boot, and all sounds should now come from the cassette port.

One last note on using patches: as always, experiment on a backup copy of your diskette, and test it fully before relying on it!

Happy patching.
-David P. Miller



A COMPUTER WISHES
FOR THE OLD DAYS

DISK DIRECTORY LABEL PROGRAM
by Robert B. Franke

LABELDSK/BAS (program listing number three) is a program to print nominal 1x3.5 inch labels for one's disk collection. It is written to run only under LS-DOS 6.3.x, but will read any 6.x.x directory and make the proper label. All other disk formats will require some modification to the program. The screen prompts make the operation self explanatory. Printer commands are for the Tandy DMP 130. Lines 50 thru 70 may need changes for other printers. The variables are BG=start elongation, BQ=end elongation, CD=select microfont, ST=select 10 characters per inch, FQ=select near letter quality. The program functions best with two or more drives available.

Lines 350 thru 390 make use of the SVC interface available in 6.3.x to determine the current free space on the disk being read by calling the @DODIR SVC, condition B=3. Line 340 gets the disk's current operating system. A similar id in DIR/SYS only shows what system was used to format the disk and is not updated when changing from 6.2 to 6.3 for instance. Lines 400 to 480 get type of disk, sides and density information.

Lines 500 to 530 get the filespecs and extensions of the directory. Line 510 can be modified to change the restrictions of which files are included for consideration. Lines 540 to 580 use a machine language sort routine from the program SORT/CMD. Line 1240 prevents a crash if SORT/CMD is not present, but the programs will then print in a non-sorted manner. The sort program is put in buffer #3 and since this program doesn't use that buffer for anything else, it will normally stay there intact while running. Line 540 checks for it so a disk access is not required for each of several disks being labeled.

Lines 600 to 660 control and do the label printing. Line 640 should be changed to reflect your personal desires in label identification. The maximum number of files that can be listed is 32. Since many disks hold less then this, the last lines of the label are available for your use. Lines 650, 700 and 1210 control a file called DISKNUM/DAT which will hold the last of a number series. The program will create the file starting at "00000" should it not exist, but room must be available for it on the same disk with this program.

Lines 900 to 1160 control the screen, scrolling and tagging of files for inclusion on the label. A second label is provided for in case you want to label the jacket as well as the disk.

Line 1220 takes care of the fact there are now different passwords in use for BOOT/SYS. This trap will need changing if you consider modifying this program for other DOS's. Line 1230 prevents a crash if you specify a drive number that has no disk or a drive you don't have!

The first line of the label indicates the disk name and a number you assign at the time of making the label. The second line shows the date the label was made, the current disk operating DOS, DATA or SYST, sides and density, and the current free disk space. The next eight lines show the filenames in quasi-MSDOS form in alphabet order from top to bottom in each of four columns.
-Robert B. Franke

(Editors Note) Our thanks to Mr. Franke for supplying this disk directory program. We have had the opportunity to track down similar programs. One of which is the disk directory label program called EZLabel written by William McMullan of Bastrop, LA. That program was published in the December 1987 issue of 80 Micro. Mr. McMullan sold all rights to 80 Micro and we as yet have not gained permission to publish that program. However Mr. Franke's program is ever bit as good and he has released it to CN80 as public domain.

One feature in the program is that it will support 32 listings on the label. And print your name and address at the bottom. As explained you will have to do some line changes to make it work on your printer, but it is still a great operating program and best of all it is free - thanks to Mr. Franke. Mr. Frank is retired and says he thinks in basic first, then in other program languages. We expect to publish more of his work in coming issues.-Ed.

TIME TO RENEW YOUR SUBSCRIPTION
If your label ends with 90/06 its your last.

```
MD4UTL01  #001
05/21/90 6.1 DATA SSDD   6.0K
M100COPY/BAS   MOVE    /DOC   S14     /CMD   MOVESYS4/JCL
SYSGEN /CMD    DISKNUM /DAT   S15     /CMD   SCRNSV  /CMD
FKEY   /CMD    DMU620  /CMD   FKEY    /DOC   FKEY    /ASM
TSK    /DOC    MEMSYS  /JCL   SCREEN  /CIM   SCRNSV  /SRC
TSK    /CMD    MEMSYS  /DOC   DMU620  /DOC   CLOSE   /CMD
```

Example of the Disk Directory Label

THE TRS80 AND HAM RADIO

by Christen M. Jespersen

Like a number of others I got in on the ground floor of modern computers with the purchase of a Model I back in 1980, and, like many others, I was totally intimidated by the machine to the extent that after setting it up and making several feeble attempts to operate it I repacked the whole thing and left it for eight years. Meanwhile, I pursued my ham radio hobby and completely ignored the possibilites that were available to combine the two interests.

Two years ago this month I finally worked up the nerve to haul out the still-pristine Model I, hook it up, and take the big plunge. Within a month I had acquired enough knowledge to realize that the computer with 48K of memory and one disk drive was just a bare beginning, and at that point started to hit every Radio Shack store in the country from New Jersey to Florida and west to Colorado searching for software, additional drives, and whatever literature I could find.

After six months of these activities I was forced to the conclusion that the inevitable next step was to acquire a Model III or IV , and as luck would have it, a fellow ham had just switched to an IBM compatible and offered his at a very reasonable price. To sweeten the pot he also threw in a TNC for packet radio and an interface for RTTY. Needless to say, I grabbed the offer, drove thirty miles to his house to pick up the items, and by that evening was deeply engrossed in setting up the whole works.

To say that I had made a good move is the understatement of the year. Before the first week was out I had become totally immersed in both packet radio and teletype operation and still am to this day. As a matter of fact, I am now starting to receive QSL cards from various foreign ham radio operators confirming our RTTY contacts.

The point of all this is that those of us who are using and enjoying our TRS-80's still have the capability of doing just about anything that the newer and more expensive IBM compatibles can handle. I do from time to time use my PC compatible but find that the programs which I use for both packet radio and RTTY have features that today's software does not duplicate. Being somewhat familiar with BASIC and machine language I am also able to make necessary or optional changes in the TRS-80 programs if so inclined.

For those readers who are interested I am at the present time using EZ Packet for packet radio in both Model III and IV modes. When operating RTTY I use the now-defunct Macrotronics Terminall program in Model III. The beauty of using these two programs is that they can be installed on the TRS-80 simultaneously with the packet going to the RS232 port and the Terminall going to the I/O bus. All that is necessary to jump from one to the other is to boot up the correct file.

There are other programs in existence, and I would like to correspond with those hams who are using them. Surprisingly enough, these packages can still be found at hamfests in good condition and at very attractive prices.

There has not been much written in CN80 concerning ham radio's place in the TRS-80 world, but I am certain that there are many others out there like myself who are combining the two and getting satisfaction and enjoyment from it. I would be very interested in hearing from others who are operating these systems, and would be more than happy to answer whatever questions I can from those of you that either now have, or are interested in getting your feet wet in the TRS-80/HAM RADIO world.

As mentioned earlier, I am using the E-Z Packet 80 program for my packet radio activities and have obtained permission from the owners of the copyright to reproduce and distribute both the program disk and the manual file. This is a shareware program, and the usual arrangements would

apply to anyone who, after trying the system out, decides to keep and use it. I have put everything that is needed on one disk which includes the operating file and two files to print the manual. The manual is split into two files since one would exceed the memory of the normal word processor.

These files can be obtained from me by sending a disk formatted for TRSDOS 6.X or TRSDOS 1.3 and a stamped self-addressed mailer to:

Christen M. Jespersen, P.O. Box 471, Bridgeton, NJ 08302

For you hams out there that have been promising yourself that you would get into packet radio here is the opportunity to put your Model III or IV to work in the latest, if not greatest, communication mode.
-Christen M. Jespersen

The programs mentioned will also be available from CN80 File Cabinet library.

HAMMING WITH THE TRS 80 COMPUTER
by Charlie Formaker KA0SZK

I understand there are several Hams that would like to use the TRS 80 Mod III or the Mod 4 with ham radio. I hear a lot of people call the TRS 80 the trash 80. I would like to get one thing straight at this point, the only ones that do that really don't know the capabilities of the TRS 80 Machines. You can run PACKET, RTTY, CW, and AMTOR with the TRS 80, and they really work fine.
There are a few things you need such as:

1. A TNC (Terminal Node Controller)
2. An outstanding computer such as the TRS 80.
3. A program to interface the computer and the TNC.
4. Of course you need either an HF or a VHF radio or both.

There are several very good TNCs on the market. To name a few, and by all means there are more, but for a start:

1. AEA's Pakratt 232 all mode.
2. Kantronics Kam all mode.
3. MFJ's 1278 all mode.

That is just a few, and there are several more. When I say all mode, that means they can run PACKET, BAUDOT, MORSE, ASCII, and AMTOR plus more. When you get a TNC, the manual tells you how to hook up the TNC to the radio. To hook the TNC to the computer you need an RS 232 cable. The next thing you need is a terminal program so your computer can talk to the TNC. One of the finest program that I have found is called EZ Packet 80. I bought my programs from the Martin Co. 4 years ago. I don't believe they are in business anymore, as the gentleman that wrote the programs passed away. Stan at Computer News 80 was going to call and see if he could get the programs in his catalog. If he can, that would be great.

The Model III and Model 4 require a separate program due to the language in the machines, but the program is identical for both. The only difference is the Model III program has 3 lines below the separation line, and 15 above where the Model 4 has 5 below and 18 above. Other than that they are identical. When you get hooked up, and turn everything on, you will discover that you have to set the baud routine. This sets the baud rate of the computer and the TNC to the same rate.

When you get to the above point, baud routine set, you are all ready to go. You must then read the manual for your TNC, and follow the directions in it, and you will be off and running. All the commands are in the manual to tell you how to get into the various modes of operation. If you have a 2 meter rig, you can get on 2 meter packet. If you have a HF rig you can run HF PACKET, CW, RTTY etc. It takes a little practice to get the hang of it, but you will find a whole new world of ham radio. If you can't find the EZ Packet 80 program, any communication program for your computer will work. Have fun, put the old TRS 80 Model III or Model 4 to work.

If you have any questions, my address is as follows: Charlie Formaker, 900 Cataract Ave., Waterloo, IA 50702

With that I will say 73's good hamming.
-Charles F. Formaker KA0SZK

MORE ABOUT COMPUTERS
by David Dalager

A letter was received by CN80 and forwarded to me, and forms the basis of this article. Seems there is still some confusion regarding memory chips. I would like to thank JG for providing the "meat" of this article. I have no desire to embarrass anyone and hope that this article doesn't. Instead, I hope the following information will clarify and not add to any already existing confusion. I will however use his letter as the basis of this article by either quoting or paraphrasing his questions or postulates.

IS DAVID WRONG?

Q: "I think you guys are wrong in saying that the speed of the memory chips doesn't make any difference i.e. 100, 120, 150, or 200 nanosecond access, as long as they are 128 cycle refresh chips." JG then cites that there is a particular speed required for a particular microprocessor clock speed.

Answer: 1) You are wrong only on your viewpoint: As the model 4 comes with a microprocessor speed of 4 MHZ, the chips that come already installed in the model 4 are of the 200 nanosecond access time specification (of course they are the 128 cycle refresh variety!).

2) You are right in that if you increase the microprocessor clock speed that a faster than 200 nanosecond access time chip is needed!

LET'S SEE WHY

The approach JG used is a very good one: The access time required for a memory chip that uses a 4 MHZ clock, using a "rule of thumb" approach, would be the reciprocal of 4,000,000, which is equal to 250 nanoseconds. Continuing to use that "rule of thumb", a microprocessor clock speed of 5 MHZ (5,000,000), the reciprocal of which is 200 nanoseconds, the access time required would be a 200 nanosecond memory chip. As JG points out in his letter: a microprocessor clock speed of 6.3 MHZ (6,300,000) would require a 158 to a 159 nanosecond chip, while a microprocessor clock speed of 8 MHZ (8,000,000) the required time would be 125 nanoseconds.

RULE OF THUMB

Now a "rule of thumb" approach is one that is almost always a workable method. If you happened to have read the article I wrote in TRSLINK # 13, you will find that I showed how to speed up your Model 4 for as little as 89 cents, plus the price of a faster Z80 microprocessor. However I did point out that unless you may be experimental of mind that the better way was to obtain the speedup kit from Anitek! Frank Gottschalk in California tried this "cheap" method as have many others and have reported good results. I no longer offer the oscillator package for sale as I could not find any reliable ones available, only the faster microprocessor. Anitek gives you everything you need in one package. In the TRSLINK 13 article I show you how to speed up your computer to 5.0688 MHZ or 5,068,800 cycles per second. According to the "rule of thumb" illustrated in the preceding paragraph, the reciprocal of 5,068,800 is approximately 197 nanoseconds. YET, in many cases we can still use the 200 nanosecond memory chips already installed in the computer! I think that Frank Gottschalk tried using the 200 nanosecond chips already installed in his computer and had good results!

WHY???

Well, success is possible only because of how the memory chips are specified: There are to my knowledge of dynamic RAMs like those used in the model 4s come in several categories of specifications. There are 80, 100, 120, 150, 200, and 300 nanosecond chips being specified as being manufactured.

Those chips that don't meet the 80 nanosecond specification are obviously slower! The question is: How much slower? Now that we have all the chips that are a little (who knows how little) bit faster than 80 nanosecond are sorted out, we now have to sort out the next category: 100 nanosecond or faster than 100 but slower than 80 nanoseconds; the next category would be the 120 nanosecond chips which will be slower than 100 nanosecond but as fast or faster than 120 nanoseconds. Next we have to sort out the slower than 120 nanosecond chips that are not slower than 150 nanoseconds, and then sort out the slower than 150 nanoseconds, but as fast or faster than 200 nanoseconds. Then we sort out the chips that are slower than 200

nanoseconds, but as fast or faster than 300 nanoseconds.

WHEW!
What a mouthful! This should illustrate the idea of how the memory chips are graded by access times. Now one can see why the possibility of using the 200 nanosecond chips that come in the computer *might* work successfully!

MICROPROCESSORS?
JG in his questions and postulates did happen to leave out one very important idea though: The microprocessors (Z80s) do come in different speeds. The speeds are: Plain vanilla Z80 is a 2 MHZ, the Z80A is a 4 MHZ, and the Z80B is a 6 MHZ while the so called Z80H is an 8 MHZ version. Merely replacing the Z80 with a faster microprocessor chip *does not* speed up your computer! You also have to change the microprocessor clock speed. The x MHZ specification is the supposed maximum at which that chip can work.

Just in case you didn't know it, many of the video games you see in the video game arcades use a Z80H that are tested to work at 12 MHZ or faster! Unfortunately, the fastest that the model 4 boards can work at without gross modification by choosing special (read that as faster) chips are approximately: non-gate array 4 is about 5.5 MHZ; the gate array 4 is about 7.2 MHZ.

I have no desire to fight each (customized except for myself) computer. No one that I know of wishes to fight that battle either, much less pay for the labor time that would require! I have tested the Seatronics speedup kit (8 MHZ) for simplicity of installation and found it to be not for the average computer user. Further, although I was promised the appropriate (Americanized) software, which was never received. Incidentally, the Seatronics speedup kit are no longer available. There is though, a rumor that Anitek is working on a 7 MHZ speedup for the gate array models 4/4P.

BOUQUETS FOR CN80 AND STAFF!
JG did quote Eric Maloney (UGH!): "In this God-forsaken industry, an "expert" will tell you *this* to get your money, another "expert" will tell you *that* to get your money!" Some more from JG: There is so much un-adulterated greed and irresponsibility in this business that it is pitiful! And it's amazing how people will gossip and repeat what they have heard (without checking up on the information), simply because they happen to LIKE the guy they heard it from! JG says: "I believe you guys are different. You are really trying to help people!

Thanks JG! Such beautiful thoughts are appreciated!!

JG brings up a point, "repeat what they have heard ---etc" that I covered, according to some, in a rather (sadly) amusing manner in TRSLINKS # 29 and # 30. Some said I should put it in CN80 also. I think that CN80 subscribers should also get TRSLINKS from The File Cabinet. You would never know how much you'd miss unless you have them too! The price is quite nominal! In TRSLINK #29 I bring up a similar point and even add a new method of troubleshooting: By popular vote or consensus! Get TRSLINKS from The File Cabinet. -David Dalager

(Editors Note) To clarify a point beyond what David Dalager has written; if you are not concerned with your computers speed, and are just adding memory chips to take your computer to 128K instead of the 64K memory which was installed by Radio Shack, then you do not have to be concerned with the speed of the memory chips. 200ns, 150ns, etc. work for the primary purpose of upgrading your existing memory, just as long as they are 128 cycle refresh chips. CN80 now has six Model 4 work stations, which are used on a daily basis. We have expanded the memory in all except one so far. Leaving in each computer the original 200ns that were installed by Radio Shack for the 64K memory, and installing 200 or 150ns chips, which ever were handy at the time, for the upgrade, with no problems. Many users have done the same with no problems reported.

Not being tinkerers, we have no need or desire to play with the speed of the computers. There are certainly fast enough for us. And seeing the volume of work that they produce, we don't think that it is anything to worry about. However we don't disagree with those hackers who, if they had a car, couldn't resist seeing how they

could turn that car into a "hotrod", just to see how fast they could make it go.

One other point to consider, if you have a very large data base (maybe 150K and over) that you had to search for data, then the speed of the processing time for the search becomes significant. But for word processing, label making, and all around spreedsheet applications the speed of the computers -just the way they are- is just fine for us. "If it ain't broke, why fix it." Plus the average user spends an average of maybe 2 hours a day on the computer. Even if he would like to spend more time than that, a 3% speed up would save 108 seconds per day or 1.8 minutes. Our favorite programmers who have tested some of the methods of speed up have reported that it didn't make that much difference.

Having spent many years as an electrical consultant who specialized in "cost of installation" for the construction field, we are very aware of time and labor units (man hours per unit installed, carried out to the forth decimal) and the costs of getting the job done. But some productivity speed ups do not necessarily improve the quality of installation, or keep the cost of the job down. Where one less coffee break, or taking the coffee break while the machine is doing its job, would do it.

Can't help it but - we just put a time bomb in our mail bag, because we expect to hear from all the speedup boys, as to why we are wrong. We will look at all your letters and consider all your points - but "If ain't broke, we still won't try to fix it". -Ed.

Offical definition:

Hacker- "The word hacker means at least three things in relation to computer programming: (1) exceptionally skilled computer programmer; (2) a person who programs computers for recreation or as a hobby; (3) a person who 'breaks into' computers with out authorization, either for malicious reasons or just to prove it can be done." - Barrons Dictionary of Computer Terms.

HA HA definition:

Hacker- One who can not resist tinkering with his program (or yours), or his computers innards. Never satisfied and never finished. Known as "super computer hobbiest or guru".

HOW TO TALK TO YOUR PRINTER Part 1
by CN80

A ROUGH OUTLINE of PRINTER TALK
To be able to talk to your printer from your computer keyboard your computer and your printer need to be married. They also, must talk the same language. To do this you need to combine the instructions in your printer manual and the instructions in either your computer manual, basic program manual or application manual. But the most important is the printer manual. That is where you will find the information on what the printer understands. Each word (ASCII Character Code)) and each sentence (Escape, followed by the Control Code) sent to the printer has to be words and sentences written in an language that the printer can understand.

In basic the character string CHR$ is like saying - hey pay attention, I am going to tell you something. The escape code (27) is like saying - drop everything, and do this now. Then you add the code, in the case of this article we will use only the decimal codes. But in the ASCII Character and Control code tables in your printer manual you will find a column for decimal and hexidecimal code numbers for each character (letter A B C etc.) and each control code (turn on italics, turn off italics etc.) You will also find tables for block graphics that operate in a similar manner, except the printer has to be put in the graphics mode. For this time lets just stick to the standard letter character mode.

You will also find these tables in your computer owners manual, check them out against the tables in your printer manual, in most cases you will find them to be the same. Since all printer are produced in Japan, RS Model 130 series made by

Seikosha, DWP 410 by Ricoh etc., the newer model printers all have a standardized set of ASCII control and character codes. And all speak the same language in their standard or Epson mode. Newer Tandy printers and other brand name printers have dual emulations, which are referred to as IBM and standard. In each case their standard setting is the Epson FX80, MX80 with the exception of Diablo, which is the American made Xerox brain child. Not having any experience with the Diablo printers, you will have to do your own research on those printers if you own one.

Some printer manuals will have their tables listed in a three column layout. With Decimal Code, Hexidecimal Code and Character/Function reading left to right. Other printer manuals have a funny looking chart that will have a row of numbers and letters running across the top, and the same letters and numbers in the left hand column, with the characters in graph paper like setting. Stick with the three column layout, it is much easier to use. If your printer manual gives you some basic examples to demonstrate its abilities take time to try them out. You will get a better understanding of the interaction between computer and printer.

Some printer manuals are very good in that they give plenty of examples, others just assume that you know all there is to know and just give you the instructions on how to install the paper, connect the cables, and throw a bunch of tables at you. But there are several good books on the subject, the ones we would recommend are the Radio Shack Cat. No. 26-1242 "How To Use Your Radio Shack Printer", by William Barden, Jr. This book is no longer in print, but if you are lucky enough to find one it should be added to your library, even if you have to pay the $14.95 original RS price. The other is currently in print and available from McGraw-Hill book company and should be available on your local book store shelf, it is "Getting The Most Out of Your Epson Printer" buy David A. Kater and Richard L. Kater $17.95. This is a excellent reference manual even though you may not own an Epson printer. Because your newer brand name printers from Japan, and even Tandy printers will have the Epson emulation as their standard. Except Tandy may have a slightly modified Epson emulation called the Tandy mode. Their older printers used what was called The Tandy Character Set or Modified ASCII, but that only changed some of the characters printed like brackets and back slash to print up and down arrows, leaving the ABC characters and control codes using the standard ASCII codes.

GIVING ORDERS

To give special orders to do certain things to your printer, first make sure that your DIP switches are set in the "Standard Mode" and not the IBM mode. Refer to your printer manual for these dip switch settings. Chances are that if you have been printing text for sometime you have the printer correctly set. We'll leave block graphics settings for a later article and concentrate now on text printing.

If your printer is not a TANDY printer, and it has the Epson FX80 or other Epson print mode. Set it to that mode. The Epson is not the only mode that will work from a Model III, 4/4D/4P, but it is the most common emulation that you can get print drivers that are already written for your system and your application programs.

PRINT DRIVERS

Now what is a "print driver", I thought you said I was the driver when I told the printer what to do.

Well you are the driver, but when you write a basic code to tell the printer you want it to print in 12 pitch and have saved it to a disk file, that file is commonly known as a print driver. It can be a machine language program and still be referred to as the print driver.

If you write a set of instructions for your printer, and don't save the instructions, then you are the driver. If you save the instructions, then you have a "print driver".

Most application programs like word processing programs have a print driver already written and installed in the program. The print driver then becomes the interpreter of your key strokes and tells the printer what you want it to do. For example you may hit one or two keys like CLEAR 2, and embed that in your line of text. The print driver sees that command and says "Oh yeah, he wants the printer to back up three micro spaces and type a slash

over that zero it just finished printing. Your print driver acting as your job foreman, then tells the printer what to do step by step, one thing at a time in a string of commands codes.

Which might look like this if you sent it directly to the printer from basic.

LPRINT CHR$ (27);CHR$(8,3)CHR$(47)

Which the printer reads as:
CHR$ = Got a message coming.
27 = Cancel previous instructions
(8 = Backup
,3) = Three spaces
(47) = Type a slash.

once the printer has performed these tasks it will advance to the next space and continue with the default commands that it has stored in it.

You need to check out your application program and install the print driver for your printer, if it is available in their set up instructions. Some experimentation is due here, because the print drivers are so similar, it may not have the exact name of your printer listed, yet one of the print drivers listed may run your printer. So try them all and see which one does the most complete control job for your printer.

CUSTOMIZING YOUR WORD PROCESSOR
Some word processing programs have the a separate little set up where you can install your own customized commands, others may have most of those things you want to have the printer do already set up in is internal print driver. Programs like SuperScripsit have such a program, and the way you can customize it is to go to the System Set Up Utility <S> from the main menu. Then go to the "enter printer <C> codes" of that menu.

You will see Code Units, Sequence and Comments listed across the top of the screen followed by the list of character lines you can use.

For the slash zero example on a daisy wheel printer you would leave the Units at 0 (for that determines the width of a character when printed by a dot matrix printer or when using proportional spaced wheels.

On the Code sequence line, which can take up to 11 codes, type:

48 8 10 47 127

and ad your comments to the comment line, like SLASH 0 or what ever you want to identify what instructions you have placed on that line.

Go back into your document and type CLEAR 0 for every 0 you type in the document. Or use the global replace command and type CLEAR 0 to replace 0's. This will change every zero in the document to a slashed zero. And is easier to do after the document is finished, than to have to remember to type CLEAR with each zero.

What that line of codes means is:

48 = print a zero
8 = backspace
10 = ten micro spaces (you will have to experiment with your printer to know how many micro spaces to back up to get your / centered in the 0.
47 = print the /
127 = print blank space.

On dot matrix printers, you can do a lot more that you can with daisy wheel printers, which will usually have Bold or Double Strike, superscript and subscript, and underline codes available from the print driver that has been programmed into your application program.

Using SuperSCRIPIT's user customizing Set Up Utility for example, you could use the "(code line" and type the control sequence

27 52 Comments Start Italics

and on the ") code line" type

27 53 Comments End Italics

then when you embed your code in your document like this

The sea contains a vast number of CLEAR(endangeredCLEAR) whales.

The word endangered would be printed in italics. Using a daisy wheel printer you would have to change wheels, print the one word, and then change back to your original

wheel.

The codes for enlongated, doublewide, bold characters all work the same way. Supposing you want to print the copyright symbol after a title. That would be ASCII code 128, if installed on code line 2 for example every time you typed CLEAR2, the printer would print the copyright sign ©. But 128 happens to be the code for the DWP410 Radio Shack printer. But the Epson FX80 does not have a code for the symbol so you would be stuck with the standard typed (C).

But suppose you wanted to change your dot matrix printer from 10 pitch to 12 pitch without wanting to reset the front buttons on the printer. In SuperScripsit you would type 27 77 for draft Elite Pitch (12 pitch) and 27 111 for NLQ Elite Pitch (12 pitch) on another line. Lets say you put 12 pitch draft on line 6, and near letter quality 12 pitch on line 7. Then when you placed CLEAR 6 on the first line of your document it would be printed out at 12 pitch, in draft mode. For the final copy you could change CLEAR 6 to CLEAR 7 and your last copy would be printed in the 12 pitch near letter quality of your printer.

It takes some time and work to set up these command and character codes for your particular printer. Most ASCII codes are the same from printer to printer, but you have to use your printer manual to be sure that you are using the code that it understands. Once you have installed your codes, it is common to forget all about the codes and remember just what the CLEAR Number Code does. Don't worry about that because once you have your print drivers set up they will work just fine, doing the same job over and over. But do keep a list of what your codes are somewhere, so if you have to install them to a new disk you won't have to go back and figure just what they were, or test them all over again.

SETTING THE PRINTER FROM BASIC

In past issues we told you about some simple programs written in BASIC that would send a printer command to the printer without setting the front buttons on the printer.
(See Vol 1 No. 4 pg 10, Vol 1 No. 5 page 20.)

Here are a couple of examples of short BASIC programs to set the pitch.
Remember to have your printer set in the command mode, that is usually the mode it defaults to when you first turn it on. Otherwise the printer will not listen to your commands. These examples are for the Panasonic printers in the Epson FX80 mode.

```
5 REM 10 PITCH FOR PANASONIC
10 LPRINT CHR$(27)+"w"+CHR$(0)
20 SYSTEM
```

```
5 REM 12 PITCH FOR PANASONIC
10 LPRINT CHR$(27)+"w"+CHR$(1)
20 SYSTEM
```

```
5 REM PANASONIC 15 PITCH
10 LPRINT CHR$(27)+"w"+CHR$(2)
20 SYSTEM
```

```
5 REM PANASONIC 17 PITCH
10 LPRINT CHR$(27)+"w"+CHR$(3);
20 SYSTEM
```

In each of the examples above line 20 returns you to DOS ready, so be sure to save the program before you run it or you will have to type it all over again. Or use David Goben's utility that recovers a basic program after you have exited the program without saving it.

In part two of this series on using your printer codes, we will go into greater depth on the use of the command codes. It would help a great deal if our readers would let us know what they would like the direction of this series to take. It also does not exclude you from writing your own suggestions so we can include them in this series. -CN80

PROGRAMMER AT A GOLF OUTING

ADVENTURES WITH HARD DRIVES Part 6

by Roy T. Beck

AN OLD PROBLEM REVISITED

In the last episode of this series, I described the apparent failure of the Hard Disk Controller (HDC) in my VR DATA "Hard Disk III". I also described my method of working around it, which involved replacing two 5 Meg bubbles with one 8 Meg unit. I also stated I wasn't going to pursue the apparent failure of the HDC to select the second bubble of two connected to it. Well, I didn't and I did.

To reconstruct the crime, I took my Hard Disk III to a meeting to demo the installation of three different DOS' on it. This entailed carrying the hard drive home from my office and then to the meeting. I also needed a computer, but rather than also carry home the 4P the hard drive normally ran with, I simply grabbed the spare 4P I keep at home.

DOUBLE-SIDED DRIVES

The spare 4P was originally equipped with SS drives, but when I acquired it, I immediately bought DS drives for it. When I went to install these, I found the internal cable was rather ratty, and I replaced it with a new piece. I reused the old connectors, noting as I did so that these were Radio Shack "pulled pin" type. I paid only enough attention to this to place the :0 and :1 connectors in the correct place. Upon completion, I used the J&M test disk to verify the new drives were OK and working correctly. J&M said all was OK. Since the machine was really a "spare", I did not use it extensively.

THE WELL-LAID PLANS OF MICE AND MEN...

The demo I planned involved booting up the Hard Disk III with three different boot disks, one for TRSDOS, one for LDOS, and one for CP/M. Of course, this all worked correctly on the 4P in my office, but when I got to the meeting with the spare 4P, the CP/M would not boot up. Neither would LDOS. TRSDOS booted correctly. Knowing I had located LDOS and CP/M on the second of the two bubbles, and since now only TRSDOS on the first bubble would boot, I assumed the HDC select function was at fault, and was only selecting the first bubble.

ANALYSIS

Later, when I began checking into the hard drive, I continued using the same 4P to research the problem. As I described in the previous episode, I ended up replacing the two 5 Meg bubbles with one larger one on the theory that this would avoid the need for the HDC to select the second drive. After some fussing around, creation of new boot disks, etc, all appeared to be well again, and I forgot the problem.

MORE TROUBLE

Somewhat later, I again attempted to use the spare 4P for some purpose, and became aware it was refusing to read the second sides of BOTH its drives! Now what? I dissected it, and the first thing I did was to verify the side select signal (line 32) was active. To my surprise, it was OK. But why would two nearly brand-new drives both suffer failure to side select? I then swapped in another drive I had handy, and things began to get even more mysterious. Finally, I took a good look at the two connectors with the pulled pins. Not only were the select lines for the "other" drives missing, so also were the side select pins (# 32)! Dawned the light! The side select function had NEVER worked. But wait just a damn' minute. How come J&M told me the rear sides of the drives were working when I tested them after their original installation? I can only conclude that the J&M disks have identically the same info recorded on the corresponding front and rear tracks, and its control program did not catch the fact that the drives were reading the front tracks even when commanded to read the rear tracks! I admit I have not bothered to confirm this, but it is the only thing that makes sense.

THE SOLUTION

I solved the problem by reinstalling the two connectors on the ribbon cable with a 180 degree reversal, which effectively restored the missing pins. This of course is an old TRS trick which works because all the odd numbered pins are grounded. Reversing the connectors puts all the odd-numbered pins where the even ones should be, and vice versa. Since Radio Shack only pulls certain even-numbered pins, this effectively puts a full set of pins on the even numbered side, with some missing ones on the odd-numbered side, which are all grounded anyway, and therefore don't hurt anything. Next I

verified double sided operation by generating and operating with a double-sided DOS. All now seemed well.

IN CONCLUSION

In retrospect, my errors were twofold. First, I neglected to note the missing #32 pins and the significance thereof when I installed the new DS drives. Secondly, I assumed, (without justification), that the DS J&M test disk, (for which I paid a premium), reliably tested the backside of a drive when told to do so. It correctly issues the side select signal, alright, but it apparently has no capability of telling whether the data is from a front track or a rear track! Shame on J&M!

FUTURE PLANS

I intend to reinstall the two 5 Meg bubbles into the Hard Disk III box, thus restoring it to its previous capacity. I will then build up another Western Digital type hard drive, using an available WD 1000-TB1 HDC from Dave Dalager, and a new bubble which I bought at a closeout sale. When I have that unit finished and working, I will take it to work and replace the Hard Disk III unit. My objective in all of this is to have both my machine at work and my machine at home use the same drivers, autoboot from the hard disk, have large capacity, and generally work as nearly identically as possible.

I may keep the Hard Disk III as a "portable" unit for club demos, etc, or I may peddle it to someone if the price is right. Wait and see on that. Since I have both TRSDOS, LDOS, DOSPLUS and CP/M drivers for the Xebec HDC in it, it is quite versatile, and someone may find it very usable.

I also need manuals for an ADDS Viewpoint/60 terminal, or at least enough information to set baud rates, etc. If any of you have any information along these lines I will pay reasonable copy charges.

-Roy T. Beck
2153 Cedarhurst Dr.
Los Angeles, CA 90027
213-664-5059

PROGRAMS TO FIND BASIC MODULES

by Merlin P. Walters

In CN80,Vol 3, No. 3, page 12, Christopher Fara states that a BASIC program must "know" the sequence in which the modules sit in the high memory. This is so only if the BASIC program does not have a routine for finding each module that it needs. I have written such a routine. It will find all the modules needed by a BASIC program regardless of the sequence in which they were loaded if all of the needed modules have been loaded, otherwise it will stop at the first missing module.

The demonstration program is called "GETMOD/BAS". (see program listing five and six.)

-Merlin P. Walters

OPEN FORUM

LTR: I wish to comment on a program I purchase from one of your advertisers, BDCS of Clearwater, Florida. Several months ago I purchased a data base called ULTIMA to replace my Profile 4 I had been using for four years. I am terribly impressed with the ease of using this program because of the similarity it has to Profile. The author took, what I feel is a good product, and enhanced and improved it by adding many features that were lacking in Profile. For instance the screen outline and more sort/select capabilities made it worth the purchase price. But in addition I received a forms feature and archive feature (extra programs for Profile) the ability to underline, bold print, condense print, expand print in the report format. Plus being able to duplicate a screen format with just a simple key stroke, graphics ability for screen formats, create and run menu on same screen and many more features too numerous to mention.

I would recommend ULTIMA for anyone presently using Profile 4. I am thrilled with it's simplicity and capabilities. It does everything I could want in a data base.

-Beale Hayhurst, Worthington, Ohio

We appreciate it very much when someone takes the time to report their success or lack of success with a product. -CN80

Q: In response to the request by S.B.W. of Blythe, California (Vol 3 No. 5) for TRS plotter programs I can offer the following.

I have written a general purpose BASIC plotting program for the FP 215 flat bed plotter and have been expanding it over the last several years as my needs changed. If S.B.W. would like to have a copy I'd be glad to provide it. A long time ago I also wrote a program for the older Radio Shack plotter (the one with the tractor that used a ball point pen). If S.B.W. happens to own a plotter of that type then I can provide him with a copy of that program but it has been several years since I owned one of those plotters so I probably couldn't provide much support for it.

Please feel free to provide my address so that S.B.W. can contact me if he wishes.
I. R. Glendale, CA

(Editors Note) This information was forwarded to S.B.W as soon as it was received, and in keeping with our policy, we forwarded S.B.W's address to I.R. If anyone would be interested in the programs I.R. has offered drop us a line and we will forward it to him also. It's readers like I.R who are willing to help other users that will keep the TRS-80s alive and kicking for a long, long time. Our thanks to I.R for his thoughtfulness.

LTR: I have recently received all back issues of CN80 and am in 'puter heaven. My CN80 collection is now complete. What a great publication you guys put out.

My software is SCRIPSIT PRO, PROFILE 4 PLUS, VisiCalc, Rembrandt, and Misosys' new 6.3.1 DOS system. (I have converted all my programs over to it.) My hardware is an 'old! trash-80 model 4 w/128K and an Okidata Microline 192 printer. (I'm extremely impressed with my Oki. Great Graphics. Enclosed is a joke showing off the near letter quality and the graphics ability it holds.) If you would like a product review of this printer, I would be glad to supply one.

I'm a locksmith and horologist (clocksmith) and this equipment is handling all the bookkeeping, data processing, and everything else I could ever ask for in a computer system. This is my first system and I am impressed with it all. I see no reason to ever update a thing as long as you guys stay around and parts are available for repair.

I am now into BASIC programing and have written a few programs for special use but the graphics are what fascinate me. I would like to learn more on how to manipulate these little 'critters'. Is there any book(s) available on graphics? If so, I want it/them.

I would also like to recommend a cribbage game I just received from the FILE CABINET called CRIBBAGE/BAS. If you are into cribbage, this is one hell of a challenge. It's not for beginners for you MUST already know how to play. K. Mohr, I commend you on this one, (you stinker. Score stands at 12 to 9....you're ahead!). David Goben, you're a genius, (watch the big head). Your OTHELLO/BAS game is good, too, but there is a bug in it. The computer's score holds two digits all the time. ie. When the score stands at 6 to 5, it's displayed as 6 to 50. If the 'puter's score has risen to 13 and I take 5 back, then the score stands at 11 to 83. Can you tell me how to fix it? Note, this does not effect the actual scoring, though. The 'puter seems to understand the 6 to 5 and 11 to 8 score. It's just the display that is incorrect.

All in all, I'd like to thank everyone who contributes to CN80. For it's all of you who have taught me what I know today...besides the many sleepless nights I've spent 'hackin' away on my own.
-R.H. Monticello, AR

A: Maybe we should have given David Goben a chance to answer the game questions before we started typing this letter in, but we didn't so watch for his answer in the FILE CABINET Update next month. The opinions and punctuation expressed in this 'puter letter is the sole responsibility of the 'puter writer. Glad to see we have a 'puter fan in 'Arkansaw'. Our stock of "how to do it using graphics books have been wiped out, but if any user would like to offer this reader a chance at any he may no longer need. Let us know and we will pass on the information. -CN80

LTR: I would like to take a few minutes and thank all involved in the publication of CN80, an absolutely wonderful job is being done by all. The information available through this publication is great. I can't imagine the hours that are used in gathering this information, but is well worth the bargain subscription rate. For those of you which received a sample issue this month, don't hesitate, subscribe now, you are wasting time. I live in a rural area and literally starve for new information and this is the place to get it.

I have searched as many of the R/S's as possible here in south central Kentucky for any item dealing with Model I's or Model III's. Software, hardware, whatever I could find. Looking in one store in Somerset, Ky., which by the way is going out of business, I happened upon a Visicalc disk. The gentleman was selling all demo disc's for a half dollar each. So for fifty cents I couldn't go wrong. Anyway, I have the program with no documentation. If someone has an old manual for sale I will gladly purchase it for a reasonable price. Also, the disk can not be backed up anymore and if anyone knows how to get around the third times the charm routine, I would appreciate that very much. I may have something to trade, and will send a list to anyone interested. In closing, I wish to thank you again on a job well done.
-L. C. J. Crab Orchard, KY

A: We just happen to have one used VisiCalc manual and program disk for the Model III, if that is what you are looking for, priced at $20 plus $4 S&H. As for the backup of copy protected disks, there are several copy programs that will over ride the protection. Check out the File Cabinet.

LTR: I have noticed several questions on the more technical side that I would like to address. When the Model 4 arrived, some nice items were missing in the new system that were present in Model 3.

1. To find if the printer is ready (example in BASIC), use:
IF INP(&HF8) AND 240 = 48 then printer READY
IF INP(&HF8) AND 240 = 32 then printer NOT READY
(the NOT READY is sometimes contingent on your type of printer and if you have a printer controller).

2. In Vol 3 No. 5 Page 20, someone asked about finishing FOR/NEXT loops. It is necessary in most cases for long running or continuous programs. If the loop is exited improperly, the stack entry for this loop is kept until the program ends. This takes up memory. If this happens many times, you get "OUT OF MEMORY" error. The example in that volume eliminates the problem.

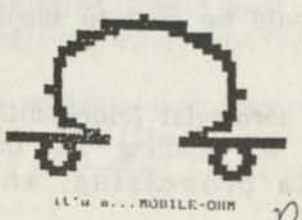
3. On Model 4 BASIC, you may not include more than one NEXT statement for each FOR statement; there must always be a matching SINGLE pair. Model 3 allows multiple NEXT statements for one FOR. Use a GOTO to access the single NEXT statement instead of several NEXTs.

----------WRONG----------
```
10 FOR I = 1 TO 10
20 IF S$(I) = "X" THEN NEXT I
30 PRINT@500,"ON ITEM"I;
40 NEXT I
```

----------RIGHT----------
```
10 FOR I = 1 TO 10
20 IF S$(I) ="X" THEN 40
30 PRINT@500, "ON ITEM"I;
40 NEXT I
```

QUESTION:
Has anyone had a large number of problems with the "C Compiler" RS# 26-2230. I have written a number of programs, but had to "program around" many errors that should not be. The TIME function works once, not twice. The $MEMORY function (heap) usually returns zero. OPENRAND does not accept over 57 for the record length. RUNTIME ERROR 18: NOT ENOUGH PARAMETERS. These are a few. Tandy isn't much help.

I would like to say that CN80 does a wonderful job keeping up with new and old programs and hardware. It's nice not to be forgotten.
-P. L. Clearwater, FL



Rick Hargrave

VOICE/BAS -- PROGRAM LISTING NUMBER ONE by David Goben

```
10 CLS:PRINT"BUILDING 'VOICE/CMD'":RESTORE
20 OPEN"O",1,"VOICE/CMD":L=80:HX$="0123456789ABCDEF"
30 CS=0:L=L+10
40 READ A$:IF A$="END"THEN CLOSE:END
50 IF LEFT$(A$,1)="-"THEN GOTO 70 ELSE A=INSTR(HX$,LEFT$(A$,1))-1
60 A=A*16+INSTR(HX$,RIGHT$(A$,1))-1:PRINT#1,CHR$(A);:CS=CS+A:GOTO 40
70 IF VAL(MID$(A$,2))=CS THEN 30 ELSE PRINT"CHECKSUM ERROR IN LINE"L:END
80 ''' DATA AREA '''
90 DATA 05,06,56,4F,49,43,45,20,1F,2D,56,4F,49,43,45,20,2D,2D,20,43,-1088
100 DATA 4F,50,59,52,49,47,48,54,20,31,39,38,39,2C,20,31,39,39,30,20,-1200
110 DATA 42,59,20,44,41,56,49,44,20,47,4F,42,45,4E,2E,1F,20,52,45,4C,-1278
120 DATA 45,41,53,45,44,20,49,4E,54,4F,20,54,48,45,20,50,55,42,4C,49,-1369
130 DATA 43,20,44,4F,4D,41,49,4E,2E,01,FE,00,52,ED,73,46,52,3A,40,38,-1604
140 DATA E6,04,28,0B,CD,2B,00,B7,20,FA,21,FF,FF,18,2F,3A,12,44,32,83,-1937
150 DATA 52,32,E8,53,CD,2B,00,B7,20,FA,21,6D,54,CD,1B,02,01,1F,52,C5,-1931
160 DATA 21,27,57,06,01,CD,40,00,D8,7E,E6,DF,FE,51,20,0A,CD,C9,01,21,-2047
170 DATA 00,00,31,00,00,C9,FE,50,CA,3E,53,FE,53,CA,D4,52,FE,4C,CA,B2,-2474
180 DATA 52,FE,52,C0,CD,4E,54,3A,10,42,E6,FD,32,AB,52,E6,BF,F6,02,32,-2622
190 DATA 10,42,D3,EC,DD,21,40,38,21,58,58,F3,DD,CB,00,56,20,29,06,7E,-2070
200 DATA 23,08,7C,FE,00,28,1E,08,36,01,30,02,CB,FE,DB,FF,E6,01,FE,01,-2021
210 DATA CB,7E,20,04,38,DE,18,02,30,DA,08,34,08,10,EB,18,D3,2B,2B,23,-1610
220 DATA 22,F0,52,3E,00,32,10,42,D3,EC,C9,CD,4E,54,CD,28,53,D8,CD,1F,-2345
230 DATA 53,CD,24,44,20,4B,21,59,58,CD,13,00,20,43,77,23,B7,20,F6,77,-1766
240 DATA 22,F0,52,18,34,CD,28,53,D8,CD,1F,53,CD,20,44,20,2C,D5,FD,E1,-2367
250 DATA FD,36,08,00,FD,36,0A,00,FD,36,0B,00,21,00,00,01,00,00,ED,42,-1287
260 DATA C5,E3,C1,7E,23,01,FE,FC,52,CD,1B,00,0B,78,B1,20,F6,AF,CD,1B,-2592
270 DATA 00,CD,28,44,C8,F6,C0,CD,09,44,21,1B,56,CD,1B,02,3A,40,38,E6,-2021
280 DATA 05,28,F9,C9,21,27,57,06,00,11,27,58,C9,21,00,56,CD,1B,02,21,-1391
290 DATA 27,58,E5,06,16,CD,40,00,D1,D8,CD,1C,44,C9,E1,21,E5,56,CD,1B,-2385
300 DATA 02,CD,13,54,2A,F0,52,ED,5B,F3,52,A7,ED,52,7C,B5,C8,EB,3A,10,-2627
310 DATA 42,32,82,53,E6,80,32,10,42,D3,EC,F3,7E,E6,7F,47,7E,E6,80,07,-2554
320 DATA D3,90,D3,FF,00,00,00,00,00,00,00,00,00,00,10,EC,23,1B,7A,B3,-1436
330 DATA 20,E2,3E,00,32,10,42,D3,EC,21,40,3D,22,20,40,21,33,56,CD,1B,-1589
340 DATA 02,CD,49,00,FE,01,C8,21,94,53,E5,FE,37,28,64,FE,27,28,5A,FE,-2354
350 DATA 31,28,4B,FE,21,28,41,FE,39,28,30,FE,29,28,26,FE,33,28,15,FE,-1948
360 DATA 23,28,0B,FE,50,CA,3D,53,FE,70,CA,3D,53,C9,2A,F0,52,2B,18,04,-2114
370 DATA 2A,F0,52,25,ED,5B,F3,52,DF,D8,C8,18,0E,2A,F0,52,23,18,04,2A,-2200
380 DATA F0,52,24,7C,FE,00,C8,22,F0,52,18,24,2A,F3,52,2B,18,04,2A,F3,-2075
390 DATA 52,01,FE,F8,53,25,11,59,58,DF,D8,18,10,2A,F3,52,23,18,04,2A,-1850
400 DATA F3,52,24,ED,5B,F0,52,DF,D0,22,F3,52,21,00,3C,22,20,40,2A,F0,-2306
410 DATA 52,E5,2B,CD,32,54,CD,62,54,2A,F3,52,CD,32,54,CD,62,54,D1,EB,-2617
420 DATA A7,ED,52,7C,CD,37,54,7D,F5,07,07,07,07,CD,40,54,F1,E6,0F,FE,-2445
430 DATA 0A,38,02,C6,07,C6,30,CD,33,00,C9,2A,11,44,22,F0,52,7C,21,59,-1705
440 DATA 58,22,F3,52,36,00,23,BC,20,FA,C9,3E,1D,CD,33,00,3E,1A,CD,33,-1898
450 DATA 00,C9,1C,1F,56,4F,49,43,45,20,2D,20,31,2E,30,20,2D,20,52,65,-1178
460 DATA 63,6F,72,64,20,61,6E,64,20,50,6C,61,79,20,73,6F,75,6E,64,20,-1818
470 DATA 70,72,6F,67,72,61,6D,0A,43,6F,70,79,72,69,67,68,74,20,28,63,-1894
480 DATA 29,20,31,39,38,39,2C,20,31,39,39,30,20,62,79,20,44,61,76,69,-1250
490 DATA 64,20,47,6F,62,65,6E,2E,20,50,44,0A,2D,2D,2D,2D,2D,2D,2D,2D,-1219
500 DATA 2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,-900
510 DATA 2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,2D,0A,0A,01,FE,F4,-1194
520 DATA 54,41,74,74,61,63,68,20,62,6C,61,63,6B,20,70,6C,75,67,20,74,-1842
530 DATA 6F,20,45,41,52,20,63,61,73,73,65,74,74,65,20,73,6F,63,6B,65,-1816
540 DATA 74,0A,41,74,74,61,63,68,20,73,6D,61,6C,6C,20,70,6C,75,67,20,-1796
```

con't on next page

```
550 DATA 74,6F,20,73,6D,61,6C,6C,20,6D,69,6B,65,20,73,6F,63,6B,65,74,-1931
560 DATA 0A,50,72,65,73,73,20,42,52,45,41,4B,20,6B,65,79,20,74,6F,20,-1576
570 DATA 73,74,6F,70,20,72,65,63,6F,72,64,69,6E,67,2E,0A,0A,52,20,2D,-1668
580 DATA 20,52,65,63,6F,72,64,20,66,72,6F,6D,20,63,61,73,73,65,74,74,-1898
590 DATA 65,0A,50,20,2D,20,50,6C,61,79,20,72,65,63,6F,72,64,65,64,20,-1610
600 DATA 64,61,74,61,0A,53,20,2D,20,53,61,76,65,20,72,65,63,6F,72,64,-1682
610 DATA 65,64,20,64,61,74,61,20,74,6F,20,64,69,73,6B,0A,4C,20,2D,20,-1556
620 DATA 4C,6F,61,64,20,72,65,63,6F,72,64,65,64,20,64,61,74,61,20,66,-1832
630 DATA 72,6F,6D,20,64,69,73,6B,0A,51,20,2D,20,51,75,69,74,20,74,6F,-1671
640 DATA 20,44,4F,53,0A,0A,45,6E,74,65,72,20,79,01,FE,F0,55,6F,75,72,-1867
650 DATA 20,73,65,6C,65,63,74,69,6F,6E,3A,20,03,45,6E,74,65,72,20,46,-1703
660 DATA 69,6C,65,20,73,70,65,63,69,66,69,63,61,74,69,6F,6E,3A,20,03,-1816
670 DATA 50,72,65,73,73,20,45,4E,54,45,52,20,74,6F,20,63,6F,6E,74,69,-1771
680 DATA 6E,75,65,0D,43,6F,6E,74,72,6F,6C,20,6B,65,79,73,3A,20,28,53,-1767
690 DATA 48,49,46,54,20,3D,20,6D,69,63,72,6F,20,61,64,6A,75,73,74,29,-1686
700 DATA 0A,37,20,2D,20,52,61,69,73,65,20,42,4F,54,54,4F,4D,20,6C,69,-1420
710 DATA 6D,69,74,0A,31,20,2D,20,4C,6F,77,65,72,20,42,4F,54,54,4F,4D,-1520
720 DATA 20,6C,69,6D,69,74,0A,39,20,2D,20,52,61,69,73,65,20,55,50,50,-1528
730 DATA 45,52,20,6C,69,6D,69,74,0A,33,20,2D,20,4C,6F,77,65,72,20,55,-1534
740 DATA 50,50,45,52,20,6C,69,6D,69,74,0A,50,20,2D,20,52,65,70,6C,61,-1585
750 DATA 79,20,72,65,63,6F,72,64,65,64,20,64,61,74,61,0A,42,52,45,41,-1727
760 DATA 4B,20,2D,20,45,78,69,74,20,74,6F,20,6D,61,69,6E,20,6D,65,6E,-1658
770 DATA 75,0D,1C,1F,78,78,78,78,48,01,3D,EC,56,20,3D,20,55,50,50,45,-1564
780 DATA 52,20,6C,69,6D,69,74,0A,78,78,78,78,48,20,3D,20,42,4F,54,54,-1657
790 DATA 4F,4D,20,6C,69,6D,69,74,0A,78,78,78,78,48,20,3D,20,4C,45,4E,-1641
800 DATA 47,54,48,20,6F,66,20,64,61,74,61,0D,02,02,00,52,-1013,END
```

VPLAY/BAS -- PROGRAM LISTING NUMBER TWO by David Goben

```
10 CLS:PRINT"BUILDING 'VPLAY/CMD'":RESTORE
20 OPEN"O",1,"VPLAY/CMD":L=80:HX$="0123456789ABCDEF"
30 CS=0:L=L+10
40 READ A$:IF A$="END"THEN CLOSE:END
50 IF LEFT$(A$,1)="-"THEN GOTO 70 ELSE A=INSTR(HX$,LEFT$(A$,1))-1
60 A=A*16+INSTR(HX$,RIGHT$(A$,1))-1:PRINT#1,CHR$(A);:CS=CS+A:GOTO 40
70 IF VAL(MID$(A$,2))=CS THEN 30 ELSE PRINT"CHECKSUM ERROR IN LINE"L:END
80 ''' DATA AREA '''
90 DATA 05,06,56,50,4C,41,59,20,1F,27,56,50,4C,41,59,20,2D,2D,20,43,-1126
100 DATA 4F,50,59,52,49,47,48,54,20,31,39,39,30,20,42,59,20,44,41,56,-1311
110 DATA 49,44,20,47,4F,42,45,4E,2E,1F,20,52,45,4C,45,41,53,45,44,20,-1258
120 DATA 49,4E,54,4F,20,54,48,45,20,50,55,42,4C,49,43,20,44,4F,4D,41,-1371
130 DATA 49,4E,2E,01,FE,00,52,ED,73,3E,52,3A,40,38,E6,04,28,0B,CD,2B,-1741
140 DATA 00,B7,20,FA,21,FF,FF,18,27,CD,2B,00,B7,20,FA,E5,21,AB,52,CD,-2504
150 DATA 1B,02,E1,11,10,54,CD,1C,44,21,10,53,06,00,CD,24,44,20,2B,CD,-1399
160 DATA 41,52,CD,67,52,21,00,00,31,00,00,C9,21,F8,52,CD,1B,02,21,42,-1516
170 DATA 54,11,10,54,CD,13,00,20,0D,77,23,B7,20,F6,77,22,6E,52,CD,28,-1675
180 DATA 44,C8,F6,C0,CD,09,44,C3,11,52,21,0C,53,CD,1B,02,21,00,00,11,-1694
190 DATA 42,54,A7,ED,52,EB,3A,10,42,32,A4,52,E6,80,32,10,42,D3,EC,F3,-2487
200 DATA 7E,E6,7F,47,7E,E6,80,07,D3,90,D3,FF,00,00,00,00,00,00,00,00,-1866
210 DATA 00,00,10,EC,23,1B,7A,B3,20,E2,3E,00,32,10,42,D3,EC,C9,56,50,-1881
220 DATA 4C,41,59,20,2D,20,31,2E,30,20,2D,20,50,6C,61,79,20,64,69,67,-1337
230 DATA 69,74,61,6C,20,72,65,63,6F,72,64,69,6E,67,73,0A,43,6F,70,79,-1951
240 DATA 72,69,67,68,74,20,28,63,29,20,31,39,39,30,20,62,79,20,44,61,-1445
250 DATA 76,69,64,20,47,6F,62,65,6E,2E,20,50,44,0A,0D,4C,6F,61,64,01,-1480
260 DATA 16,FC,52,69,6E,67,20,64,61,74,61,66,69,6C,65,2E,2E,2E,0D,1D,-1712
270 DATA 1B,1E,0D,02,02,00,52,-156,END
```

PATCH LISTING NUMBER ONE by David Miller

```
============================================================
                  HEXIDECIMAL LISTING
============================================================
BYTE   ØØ Ø1 Ø2 Ø3 Ø4 Ø5 Ø6 Ø7 Ø8 Ø9 ØA ØB ØC ØD ØE ØF
..... ....................................................
<ØØ>  . ØØ Ø1 82 8Ø Ø3 ØØ ØØ C5 3A 7C ØØ CB 5F C4 8C Ø3 .
<1Ø>  . C1 ØB 78 B1 2Ø FB C9 C5 E5 78 E6 Ø7 Ø7 21 D1 Ø3 .
<2Ø>  . 4F 78 Ø6 ØØ Ø9 4E 23 6E ØF ØF ØF E6 1F 3C 67 3A .
<3Ø>  . 7C ØØ E6 Ø8 28 Ø6 CB 24 CB 25 CB 21 F3 E5 41 3E .
<4Ø>  . Ø1 D3 9Ø 1Ø FE 41 3C D3 9Ø 1Ø FE 2D 2Ø FØ E1 25 .
<5Ø>  . 2Ø EB FB E1 C1 C9 5Ø 4C 56 48 5C 44 62 4Ø 6B 3C .
<6Ø>  . 72 38 79 34 8Ø 3Ø Ø1 ØØ ØØ 7E D6 3Ø D8 FE ØA DØ .
<7Ø>  . C5 E3 29 29 Ø9 29 Ø6 ØØ 4F Ø9 44 4D E1 23 18 E9 .
<8Ø>  . F3 AF D3 84 C7 Ø1 26 57 F9 82 AF BF BF BF BF BF .
<9Ø>  . BF BF BF BF BF BF BF BF BF BF BF BF BF BF BF BF .
<AØ>  . BF BF BF BF BF BF 9F A1 84 9Ø 8Ø 74 6D Ø1 23 A9 .
<BØ>  . F9 8B BF BF BF BF BF BF BF 8F 8F 8F 8F 8F 8F 8F .
<CØ>  . 8F 8F 8F 8F AF BF BF BF BF BF BF 87 98 A1 86 98 .
<DØ>  . A1 84 Ø1 21 FA F9 82 AF BF BF BF BF BF BC BC BC .
<EØ>  . BC BC 8Ø A8 BC BC BC BC BE BF BF BF BF 9F A1 86 .
<FØ>  . 98 A1 86 98 81 Ø1 1D 4C FA 8B BF BF BF BF BF BF .
    ....................................................

Record X'ØØ1Ø'      Byte X'ØØ' => X'ØØ' = ØØØØ ØØØØ = Ø
============================================================
```

LABELDSK/BAS PROGRAM LISTING NUMBER THREE by Robert B. Franke

```
1Ø GOTO 3Ø
2Ø SAVE"LABELDSK/BAS":STOP ' Last mod Ø5/Ø8/9Ø
3Ø DEFINT I-P,T-Z:DEFSTR A-F,Q-S:ON ERROR GOTO 12ØØ
4Ø DIM J(5):AA=STRING$(2Ø,"*")
5Ø BG=CHR$(27)+CHR$(14):BQ=CHR$(27)+CHR$(15)
6Ø CD=CHR$(27)+CHR$(77)
7Ø ST=CHR$(27)+CHR$(19):FQ=CHR$(27)+CHR$(18)
8Ø DR="1":DIM F(255),E(255),T(255),Q(9),DA(255),P(1):NL=7:NR=32:CLS
1ØØ PRINT@(1Ø,25),"SET UP PRINTER (Y)/<N> "C;'****** SET UP PRINTER ******
11Ø DMY="":WHILE DMY="":DMY=INKEY$:WEND
12Ø IF NOT (DMY="Y" OR DMY="y")THEN 2ØØ
13Ø LPRINT BG;STRING$(17,"X"):LPRINT CD;STRING$(29,"X");BQ:FOR X=Ø TO NL:LPRINT
 STRING$(58,"X"):NEXT X:LPRINT:LPRINT ST;
14Ø GOTO 1ØØ
2ØØ CLS:PRINT@(9,19),"PRESS NUMBER OF DRIVE TO CHANGE DRIVE";'***** INTRO *****
21Ø PRINT@(1Ø,18),"PLACE DISK IN DRIVE :";DR;", PRESS SPACE
BAR";:PRINT@(15,29),"Press
 'Q' TO QUIT";:IF K>Ø THEN PRINT@(12,16),"PRESS <F1> FOR ANOTHER LABEL FROM SAME
DISK";
22Ø IF KF THEN PRINT@(13,22),"RETRY - DRIVE ERROR ENCOUNTERED";:KF=Ø
23Ø DMY="":WHILE DMY="":DMY=INKEY$:WEND:IF DMY=CHR$(129)AND K>Ø THEN 91Ø
24Ø IF DMY="Q" OR DMY="q" THEN CLOSE:CLS:END
25Ø IF DMY<"Ø" OR DMY>"7" THEN 26ØELSE DR=DMY
26Ø IF DMY<>" "THEN 21Ø
```

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```
27Ø K=Ø:FOR X=Ø TO T:T(X)=Ø:DA(X)=" ":F(X)="":E(X)="":NEXT
 X:DN="":J=Ø:MAX=Ø:TT=Ø:T=Ø:TJ=Ø:FOR X=Ø TO NL:Q(X)="":NEXT X
3ØØ DOS="BOOT/SYS.LSIDOS:"
31Ø DOS=DOS+DR:OPEN"R",1,DOS,32
32Ø FIELD 1,1 AS A,4 AS DB,8 AS F,3 AS E,16 AS DC
33Ø GET 1,17:ID=ASC(A):CLOSE 1
34Ø J(Ø)=34:G=(PEEK(VARPTR(AA)+1))+(PEEK(VARPTR(AA)+2)*256)'Get FREE disk space
35Ø IF G>32767 THEN G=G-65536!
36Ø J(1)=G:J(3)=&H4ØØ+VAL(DR)
37Ø IA=USR11(VARPTR(J(Ø)))
38Ø G=CVI(RIGHT$(AA,2)):G=G+(((G MOD 3)<>Ø)*.5)
39Ø DIR="DIR/SYS:"+DR:OPEN"R",2,DIR,32:FIELD 2,11 AS AX,1 AS DD,1 AS CT,1 AS SS,2
 AS BX,8 AS DNAM,8 AS CX
4ØØ CLS:PRINT@(12,25),"READING DISK - "LEFT$(AA,8);:GET 2,7:IF 128 AND ASC(SS)
 THEN DISK="DATA"ELSE DISK="SYST"
41Ø CLOSE 2:IF 64 AND ASC(SS) THEN DENSITY="DD"ELSE DENSITY="SD"
42Ø IF 32 AND ASC(SS) THEN SI="DS"ELSE SI="SS"
43Ø DOS=" XXX":IF ID=99 THEN DOS=" 6.3"
44Ø IF ID=98 THEN DOS=" 6.2"
45Ø IF ID=97 THEN DOS=" 6.1"
46Ø IF ID=96 THEN DOS=" 6.Ø"
47Ø DOS=DATE$+DOS
48Ø TR=35+ASC(CT):SD=SI+DENSITY:IF TR>43 THEN SD="QUAD"
5ØØ GOSUB 7ØØ:CLS:PRINT@(12,3Ø),"READING DISK";:OPEN"R",1,DIR,32:FOR X=16 TO
 144:GET 1,X
51Ø IF A<>CHR$(16)THEN 53Ø 'Skip S,I,P or closed files
52Ø F(T)=F+"/"+E:T=T+1
53Ø NEXT:T=T-1:CLOSE
54Ø Z=Ø:IF PEEK(VARPTR(#3)+8)=126 THEN 56Ø 'Is ML sort in memory buffer?
55Ø OPEN"D",3,"SORT/CMD":FIELD 3, 255 AS SORT:GET 3,1:CLOSE 3
56Ø P(Ø)=VARPTR(F(Ø))
57Ø P(1)=T:Z=VARPTR(P(Ø))
58Ø DEF USRØ=VARPTR(#3)+8:Z=USRØ(Z):GOTO 91Ø
6ØØ FOR X=Ø TO NL:Q(X)="":NEXT X:FOR X=Ø TO NR:E(X)="":NEXT X 'PRINTING setup
61Ø J=Ø:FOR X=Ø TO T:IF T(X)THEN E(J)=F(X):J=J+1
62Ø NEXT X:L=(J+3)\4:FOR J=Ø TO L-1:I=J:FOR K=1 TO 4
63Ø Q(J)=Q(J)+E(I)+"    ":I=I+L:NEXT K,J
64Ø IF Q(5)=""THEN Q(5)="Robert B. Franke":Q(6)="3ØØ Girard Ave":Q(7)="Reading, PA
 19605"ELSE IF Q(7)=""THEN Q(7)="Robert B. Franke, 3ØØ Girard Ave, Reading, PA
 19605"
65Ø LPRINT FQ;BG;DNAM;" #"DN:LPRINT CD;DOS;" ";DISK;"";SD;USING"####.#K";G;
:LPRINT  BQ:FOR X=Ø TO NL:LPRINT Q(X):NEXT X:LPRINT:LPRINT ST;:IF IDV THEN
 OPEN"O",1,"DISKNUM/DAT":PRINT#1,RIGHT$("ØØØØØ"+DN,5):CLOSE
66Ø GOTO 2ØØ
7ØØ OPEN"I",1,"DISKNUM/DAT":INPUT#1,DN:DN=MID$(STR$(VAL(DN)+1),2):CLOSE 1
71Ø IDV=1:DN!=VAL(DN):IF IDV THEN PRINT@96Ø,CHR$(3Ø)TAB(31)"DISK NO.  <"DN!">";
72Ø IF IDV THEN PRINT@(13,13),"DO YOU WANT TO CONTINUE SERIES (Y)/(N).....<
 >";:GOTO 74Ø
73Ø PRINT@(12,25),"ENTER DISK NO.  < ..... >";:PRINT@(13,13),"DO YOU WANT A SERIES
 OF NUMBERS (Y)/(N)... < >";
74Ø PRINT@(12,43),"";:P=43:IF IDV THEN 81Ø
75Ø DN=""
76Ø DMY="":WHILE DMY="":DMY=INKEY$:WEND:IF DMY=CHR$(8)THEN IF LEN(DN)=Ø THEN 76ØELSE
P=POS(X)-2:PRINT@(12,P),".";:PRINT@(12,P),"";:DN=LEFT$(DN,LEN(DN)-1):GOTO 76Ø:REM
BACKSPACE
77Ø IF DMY=CHR$(13)THEN 8ØØELSE PRINT DMY;
```

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```
78Ø DN=DN+DMY:IF LEN(DN)=5 THEN 8ØØ
79Ø GOTO 76Ø
8ØØ DN!=VAL(DN)
81Ø PRINT@(13,57),"";
82Ø DMY="":WHILE DMY="":DMY=INKEY$:WEND
83Ø ON 1+INSTR(" YyNnQq",DMY)\2 GOTO 82Ø,84Ø,85Ø
84Ø IDV=1:PRINT DMY;:RETURN
85Ø IF IDV=Ø THEN PRINT DMY;:RETURN
86Ø IDV=Ø:GOTO 73Ø
9ØØ '***** MENU and routines to TAG files *****
91Ø CLS:PRINT@(3,26),"<DOWN ARROW> = Next Filename";:PRINT@(4,26),"< UP ARROW > =
 Previous Filename";:PRINT@(5,26),"<T> = Tag File";:PRINT@(6,26),"<U> = Untag
 File";:PRINT@(7,26),"<P> = Print Label";
92Ø PRINT@(8,26),"<Q> = Quit";:PRINT@(9,8),STRING$(62,"=");:PRINT@(1Ø,8),DNAM;:
PRINT@(1Ø,27),"Tag";:PRINT@(1Ø,33),"Filename";:PRINT@(1Ø,42),"Ext.";:PRINT@(11,8),
"#";DN;:PRINT@(11,27),"___" ;:PR INT@(1 1,33),"________";:PRINT@(11,42),"___"
93Ø IF TJ>T THEN TJ=Ø
94Ø IF TJ<Ø THEN TJ=T
95Ø IF T(TJ) THEN DA(TJ)="T  "ELSE DA(TJ)="  "
96Ø GOSUB 1Ø5Ø:PRINT@(21,1Ø),"TAG"T+1;"FILES (";NR;"MAX)";:PRINT@(21,5Ø),"FILES
 TAGGED ";TT
97Ø QU="":WHILE QU="":QU=INKEY$:WEND:IF TT=NR THEN MAX=1ELSE MAX=Ø
98Ø IF QU=CHR$(1Ø) THEN 1Ø4Ø
99Ø IF QU=CHR$(11) THEN 1Ø3Ø
1ØØØ ON 1+INSTR(" TtUuPpQq",QU)\2 GOTO 97Ø,1Ø1Ø,1Ø2Ø,6ØØ,2ØØ
1Ø1Ø IF MAX=Ø THEN IF T(TJ)THEN 1Ø4ØELSE T(TJ)=1:TT=TT+1:DA(TJ)="T  ":GOTO 1Ø4Ø
1Ø2Ø IF T(TJ)THEN T(TJ)=Ø:TT=TT-1:DA(TJ)="   "
1Ø3Ø TJ=TJ-1:GOTO 94Ø
1Ø4Ø QU="":TJ=TJ+1:GOTO 93Ø
1Ø5Ø TE=TJ-4:IF TE<Ø THEN TE=(T+1)-ABS(TE):IF TE<Ø THEN TE=Ø 'SCROLL setup ****
1Ø6Ø TD=TJ-3:IF TD<Ø THEN TD=(T+1)-ABS(TD):IF TD<Ø THEN TD=Ø
1Ø7Ø TC=TJ-2:IF TC<Ø THEN TC=(T+1)-ABS(TC):IF TC<Ø THEN TC=Ø
1Ø8Ø TB=TJ-1:IF TB<Ø THEN TB=(T+1)-ABS(TB):IF TB<Ø THEN TB=Ø
1Ø9Ø TA=TJ:TF=TJ+1:IF TF>T THEN TF=TF-(T+1)
11ØØ TG=TJ+2:IF TG>T THEN TG=TG-(T+1)
111Ø TH=TJ+3:IF TH>T THEN TH=TH-(T+1)
112Ø TI=TJ+4:IF TI>T THEN TI=TI-(T+1)
113Ø PRINT@(12,28),DA(TE);:PRINT@(12,33),F(TE);:PRINT@(13,28),DA(TD);:PRINT@(13,
33),F(T D);: PRINT@(14,28),DA(TC);:PRINT@(14,33),F(TC); 'Screen SCROLLing *******
114Ø PRINT@(15,28),DA(TB);:PRINT@(15,33),F(TB);:PRINT@(16,25),">>";:PRINT@(16,28),
DA(TA );:P RINT@(16,33),F(TA);:PRINT@(16,46),"<<";
115Ø PRINT@(17,28),DA(TF);:PRINT@(17,33),F(TF);:PRINT@(18,28),DA(TG);:PRINT@(18,
33),F(T G);: PRINT@(19,28),DA(TH);:PRINT@(19,33),F(TH);
116Ø PRINT@(2Ø,28),DA(TI);:PRINT@(2Ø,33),F(TI);:RETURN
12ØØ '***** ERROR recovery routines *****
121Ø IF ERR=53 THEN OPEN"O",1,"DISKNUM/DAT":PRINT#1,"ØØØØØ":CLOSE:RESUME
122Ø IF ERR=69 THEN DOS="BOOT/SYS.VZA:":CLOSE:RESUME 31Ø
123Ø IF ERL=39Ø THEN DR="1":KF=1:RESUME 21Ø
124Ø IF ERL=55Ø THEN RESUME 91Ø
125Ø ON ERROR GOTO Ø
```

(Editors Note) Change line 640 for your own name and address. When there is a wrap-around line on the page. There is a space in the next line between the last character of the line above -only if the line is set in one space- if there is no space then the line will start flush with the line above. Please read the authors documentation text carefully. The above program is written for a Radio Shack DMP 130 printer, you may have to change it for your printer.

GETMOD3/BAS DEMONSTRATION PROGRAM LISTING NUMBER FOUR by Merlin P. Walters

```
100 '   MODEL III DEMONSTRATION PROGRAM FOR FINDING MACHINE LANGUAGE MODULES HAVING
NEADERS
110 GOTO 130
120 ZZ%=LX%+256*HX%+(LX%+256*HX%>32767) *65536:RETURN
130 B%=2:CLS  'B% IS THE NUMBER OF MODULES USED BY THE BASIC PROGRAM
140 DIM A$(B%),AD%(B%),V%(512)
150 A$(1)="VIDEX3"
160 A$(2)="WHITE OUT"
170 LX%=PEEK(17425)
180 HX%=PEEK(17426)
190 GOSUB 120  :AD%(0)=ZZ%+1
200 FOR C% = 1 TO B%
210   HD% = AD%(0)   'HD% IS THE ADDRESS OF HEAD
220   LT% = HD% + 2  'LT% IS THE ADDRESS OF LAST
230   NL% = LT% + 2  'NL% IS THE ADDRESS OF LENGTH
240   IF PEEK(HD%) <> 24 THEN PRINT A$(C%);" NOT FOUND": STOP
250   L% = LEN(A$(C%))
260   IF L% <> PEEK(NL%) THEN LX%=PEEK(LT%):HX%=PEEK(LT%+1):GOSUB 120  :HD%=ZZ%
+1:GOTO 220
270   NM% = NL%    'NM% WILL POINT TO EACH CHAR OF NAME
280   FOR E% = 1 TO L%
290     NM% = NM% + 1
300     IF ASC(MID$(A$(C%),E%,1)) <> PEEK(NM%) THEN E%=L%+3
310   NEXT E%
320   IF E% > L% + 1 THEN LX%=PEEK(LT%):HX%=PEEK(LT%+1):GOSUB 120 :HD%=ZZ%+1:
GOTO 220
330   AD%(C%) = HD%
350 NEXT C%
360 DEFUSR1 = AD%(1)
370 DEFUSR2 = AD%(2)
380 PRINT@192,"THIS IS THE SCREEN TO BE SAVED AND"
390 PRINT@331,"REDISPLAYED"
400 FOR W = 0 TO 500:NEXT W
410 V%(0) = 6
420 Z1% = USR1 (VARPTR(V%(0)))
430 Z2% = USR2 (0)
440 FOR W = 0 TO 500:NEXT W
450 V%(0) = 5
460 Z1% = USR1(VARPTR(V%(0)))
```

GETMOD4/BAS DEMOSTRATION PROGRAM LISTING NUMBER FIVE by Merlin P. Walters

```
100 '   MODEL 4 DEMONSTRATION PROGRAM FOR FINDING MACHINE LANGUAGE MODULES HAVING
 HEADERS
110 GOTO 130
120 ZZ%=LX%+256*HX%+(LX%+256*HX%>32767)*65536!:RETURN
130 B%=2:CLS  'B% IS THE NUMBER OF MODULES USED BY THE BASIC PROGRAM
140 DIM A$(B%),AD%(B%),V%(960)
150 A$(1)="VIDEX4"
160 A$(2)="WHITE OUT"
170 LX%=PEEK(1038)
180 HX%=PEEK(1039)
```

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```
190 GOSUB 120  :AD%(0)=ZZ%+1
200 FOR C% = 1 TO B%
210   HD% = AD%(0)   'HD% IS THE ADDRESS OF HEAD
220   LT% = HD% + 2  'LT% IS THE ADDRESS OF LAST
230   NL% = LT% + 2  'NL% IS THE ADDRESS OF LENGTH
240   IF PEEK(HD%) <> 24 THEN PRINT A$(C%);" NOT FOUND": STOP
250   L% = LEN(A$(C%))
260   IF L% <> PEEK(NL%) THEN LX%=PEEK(LT%):HX%=PEEK(LT%+1):GOSUB 120 :HD%=ZZ%
+1:GOTO 220
270   NM% = NL%    'NM% WILL POINT TO EACH CHAR OF NAME
280   FOR E% = 1 TO L%
290     NM% = NM% + 1
300     IF ASC(MID$(A$(C%),E%,1)) <> PEEK(NM%) THEN E%=L%+3
310   NEXT E%
320   IF E% > L% + 1 THEN LX%=PEEK(LT%):HX%=PEEK(LT%+1):GOSUB 120 :HD%=ZZ%+1:GO
TO 220
330   AD%(C%) = HD%
350 NEXT C%
360 DEFUSR1 = AD%(1)
370 DEFUSR2 = AD%(2)
380 PRINT@(4,10),"THIS IS THE SCREEN TO BE SAVED AND"
390 PRINT@(5,22),"REDISPLAYED"
400 FOR W = 0 TO 1000:NEXT W
410 V%(0) = 6
420 Z1% = USR1 (VARPTR(V%(0)))
430 Z2% = USR2 (0)
440 FOR W = 0 TO 1000:NEXT W
450 V%(0) = 5
460 Z1% = USR1(VARPTR(V%(0)))
```

WHITEOUT SOURCE CODE PROGRAM LISTING SIX by Merlin P. Walters
An exercise for the reader using GETMOD3/BAS or GETMOD4/BAS

```
00100                   ORG     32000
00110       RUN:        LD      HL,(17425)      ;GET HIGH$
00120                   LD      (LAST),HL       ;PUT IN HEADER
00130                   LD      DE,DONE         ;PRESENT END
00140                   EX      DE,HL           ;SWAP END & HIGH$
00150                   LD      BC,DONE-HEAD+1  ;LENGTH
00160                   LDDR                    ;LOAD IT
00170                   EX      DE,HL           ;HL = NEW HIGH$
00180                   LD      (17425),HL      ;STORE IT
00190                   RET                     ;EXIT TO DOS
00200       HEAD:       JR      EXEC            ;TO ROUTINE
00210       LAST:       DEFW    $-$             ;END ADDRESS
00220       NICK:       DEFB    HOOK-NAME       ;NAME LENGTH
00230       NAME:       DEFM    'WHITEOUT'      ;MODULE NAME
00240       HOOK:       DEFW    $-$             ;NOT USED
00250       DOSS:       DEFW    $-$             ;RESERVED
00260       EXEC:       LD      HL,3200H        ;START OF VIDEO
00270                   LD      (HL),191        ;WRITE CHARACTER
00280                   LD      DE,3201H        ;DESTINATION
00290                   LD      BC,1023         ;COUNTER
00300                   LDIR                    ;FILL SCREEN
00310       DONE:       RET
00320                   END     RUN
```

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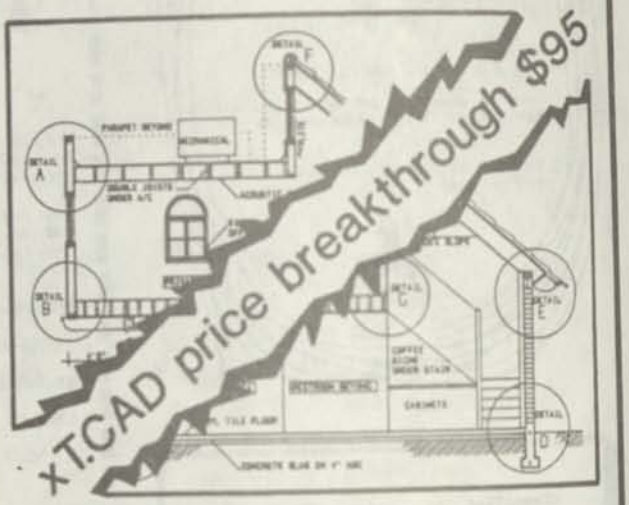

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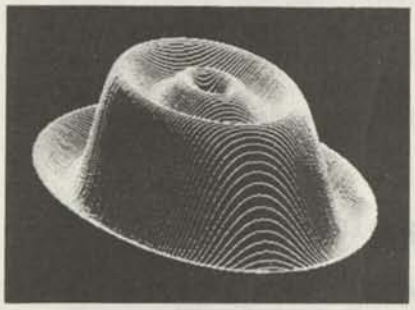

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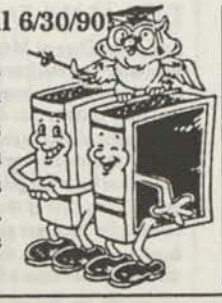

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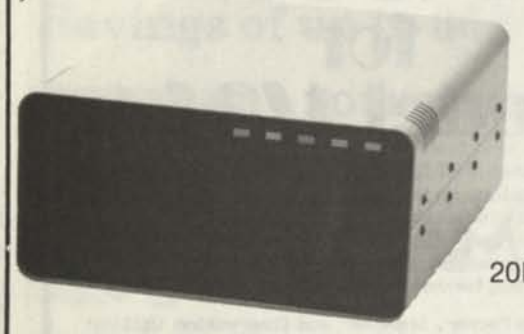

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MODEL 4P FOR SALE: Internal Modem, LSDOS 6.3, Service & Tech Manuals, Price $300 COD. Contact: KE6DJ, 3804 Cheryl, Redding, CA 96002.

MAKE AN OFFER - Send for copy of Mail Sale. Determine your own price for books, software, hardware. Send LSASE to: Richard A. Yehle, 8952 Autumnwood Dr, Sacramento, CA 95826-4055 before July 31, 1990.

COMPLETE SYSTEM: Model III, w/2 drives & DMP 200. Includes SuperSCRIPSIT, Profile III +, Visicalc, Much other software. $500
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Troy, AL 36081

FOR SALE - Orchestra 90 for TRS80 Models III & IV. Complete original unit includes cassette software & instruction book. $50 + $5 S&H. Also buying Orchestra 90's complete or in parts, SASE for list.
D.F. Emery, PO Box 86, Phillipsburg, NJ 08865.

FOR SALE: Model 4, 2-360k drives installed, 2-180k drives uninstalled. 128k memory installed, Anitek upgrade kit to 640k. Graphyx Solution Card installed. LSDOS 6.3 with 6.2 Source, Tandy "C", Pascal, Assembler, Visicalc. Tech Manual, build your own Z80, Hardware Interfacing the TRS80, TRS80 Assembly language programming.

FOR SALE: Model 3, 48k, 2-180k Disk drives. Tandy Videotex, COBOL, Scripsit, Assembler. DMP-106 printer, 12 CN80 Newsletters. BEST OFFER.

Richard Lucas, PO Box 271493, Oklahoma City, OK 73137 or (405)947-1865, 8-5.

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INDEX

EDITORIAL COMMENT

Just look at that lineup of programs and authors, our Index almost didn't fit in the column. Where is your article and name?

None of these authors are professional writers, just users trying to pass on their experience to other users, and CN80 is the best vehicle to do that. Contributions to CN80 are welcome from everyone. We really like to run a variety of articles, from those directed at the very first time owner of a TRS-80 computer, all the way to the type of article that would interest even the most experienced user. Articles and Program submissions must be on a disk, saved in ASCII, with printouts and disk labels. We just don't have the time to key in programs. If letters to be published are very long and not submitted on disks they are set aside in lieu of letters that are on a disk until we have time to type them in. Generally we are more interested in how your program works and runs, rather than how you developed it. Hopefully programs published should be a learning experience for all.

A big hello to Al Boland of Wentzville, Missouri who stopped by for a visit while he and his wife were touring Yellowstone National Park and the Grand Tetons. Al is a Mod 4P user and a ham radio operator. Great to have someone drop by. If it had been any other day than Friday, that's the day we get our weekly construction news report out, we could have sat around all afternoon chewing the TRS-80 fat. Hope your return trip was safe and pleasant.

Coming Next Month
Special Feature Article
Using a mouse on your TRS-80
Without an interface.

FILE CABINET UPDATE
A CN80 Staff Report

TRSLINK BACK ISSUES
There are now 32 issues of TRS-80 Link© electronic magazine available. (Issue 32 -June 1990.)

We have had several requests for the complete collection, and realizing that $48.00 dollars might be a little more that most people would like to spend for the whole set of back issues to date, we are making the whole collection available on flippy disks, (one single sided disk issue on a side) for 75 cents per issue. Orders must be for four or more issues to qualify for the 75 cents per issue. Single issues on standard single sided disks will remain at $1.50 each.

SUMMARY
One issue $1.50 on SS/DD disks.
Four or More issues .75 per issue $1.50 per flippy disk. Postage included.

REASON
It is a great advantage to be able to receive this fine electronic magazine thru the mail when you only have single sided drives. You can also use them on double sided drives as well.

These disk can be used on Model I/III/4 or 4P and 4D, Model III requires LDOS 5.1 or higher, Model 4 requires LS-DOS 6.x or higher.

TRS-80 Link is also available for downloading from several Bulletin Boards. Check your local BBs, or downloaded directly from TRSLINK (215) 848-5728

NEW PROGRAMS AND CATALOGS
The new restructured File Cabinet Model 4 Catalog is not expected to be completed until September of this year. Starting with the next issue of CN80 we will provide a listing of new programs that have been added to the collection. You will be able to order the new program disks then without having to wait for the new Model 4 catalog in September.

Further plans for upgrading the Model 1/3 and other catalogs will be announced as they are completed. Look for the new program listings in the next CN80.

CN80 DISK SERIES NUMBER NINE

Some of you who have already received your disk number nine may have been surprised to see that the mailing contained two disks. That's right we had so much to place on the disks that it would not fit on one single sided 180K disk. So the second disk was added to hold Henry Leno's Car Maintenance program.

Then a late arrival came in from Danny Mullen which contained a program for printing our Product and Software Order Form. This we added to the second disk too. It will be available also in the File Cabinet Collection. Unfortunately the first set of disks that were mailed did not have this program on it. We do have several standing orders for the CN80 disk series. So those orders were filled as soon as we had the disks made.

(Note: If you would like to enter a standing order, just send $5 per disk for as many of the future issues you would like to receive automatically as soon as they are assembled. There is one disk for each three issues and are issued quarterly. With the exception of disk #1, which contains the programs from the first six months of 1988.)

Danny Mullen's CNORDER/CMD prints out our order blank as shown in the display ad section, but as you enter the program you are asked for your name, address and etc. Then you can type in the quantity, product description, prices and other information, then send it to your dot matrix printer set at 80 columns. His reason for creating this program - well he just didn't want to remove pages from his CN80.

We have had that complaint from some of you before, and in the last issue we published a full page of the open order form. It was our hope that you who wanted to use that would just simply have copies made of the page. But not everyone has easy access to a copier, so Danny's program may be the solution. Right now it doesn't work too well on our daisy wheel printer (DWP410) as it wants to print the full 15 inch size of paper. But maybe that can be corrected. And since the program is written for TRSDOS 6.3.1 on the Model 4 it does not run on the Model III, but Danny has included the Basic Program, that

creates the /CMD program, the Assembly Language Source Code, and a document file explaining how the program works.

Because the assembly language source code is seven pages long, and the basic program is three and a half pages with many repetitive code lines we will not print them here. But the documentation file is printed in this issue. (see page 10)

(We wish to thank Mr. Mullen, who appears to be a very accomplished programmer both in BASIC and Assembly Language for all his work, there surely is a lot of time represented here.)

HINTS AND TIPS

FINGER POINTING
by Dick Houston

Elton Wood's CHEKRITR/BAS program in the April, 1990 issue contained a little BASIC programming jewel that many may not have noticed. I have been intrigued by an occasional pointing hand in a menu but never got around to looking into how they were done. There it is in line 280 of Elton's program!

I'm ashamed to admit how many times I've looked separately at the figures produced by CHR$(244), CHR$(245), and CHR$(246) and wondered what all those lines were supposed to represent! It was a reverse situation of being too close to the trees to see the forest! I'd never seen the three figures as one, but it is now SO obvious that the three, along with CHR$(191) to fill in the wrist, make up a pointing hand!

Have other BASIC programmers been as dense as I have? I don't remember ever before seeing a program with that combination - or have I just been "looking in all the wrong places"?

So thanks, Elton, for pointing in the right direction, and may others find as much use as I plan to for:
CHR$(191)+CHR$(244)+CHR$(245)
+CHR$(246)!

MORE TIPS
by Danny C. Mullen.

TIP #1
After recent correspondence with Roy Soltoff of MISOSYS he indicated the following information about LS-DOS 6.3.1 with the ALPHA TECH patches he developed to recognize its extended ram:

— The new Bank Available Ram (BAR) locations are located at 414H to 417H.
"..low order bit of low order byte is associated with bank 0 whereas
the 2nd high order bit of high order byte is asscociated with bank 30."

Though not mentioned in his letter, I found the following:

— The Bank Used Ram (BUR) locations are 410H to 413H.

NOTE: I don't know if Roy would mind this info being put out yet since he may be just beta testing it now... He didn't say not to.

— Though I don't know his plans, Roy has reworked DOUBLE DUTY to function with the AT patches (previously it didn't) and it now has a parameter to allow it to be in any bank recognized by DOS. You're no longer limited to banks 0-2. DDUTY (Bank=x) where x = any available bank from (1-29)

TIP #2
SUPERDRIVE, the ramdisk emulator supplied with ANITEK's SUPERMEM BOARD, has two undocumented parameters: /A and /H. These make SUPERDRIVE load all files from the source disk to the SUPERDRIVE ramdisk instead of just the /SYS files when making it a SYSTEM drive: (/A parameter)

Force its driver to reside in high memory versus low memory: (/H parameter).

ex: SUPERDRV 0,12/A/H

— SUPERDRV uses a similar BAR/BUR scheme as the AT patches mentioned above.

— In high memory, you'll find the words SUPERMEM ALLOCATION followed by some bytes (for my 512K version - 3 bytes): I don't know what the first one means, but the next two are the BUR bytes.

— In its low memory driver area, another SUPERMEM ALLOCATION is found: appears to be its BAR bit scheme in similar fashion.

TIP #3
-- When doing the Drecord,byte:Frecord,byte patches under TRS-DOS/LS-DOS, you can eliminate the verify part (Frecord,byte) by using the (O=N) parameter.
BEWARE - make sure your data is CORRECT before using this parameter!

TIP ON USING HARD DRIVES
by Henry A. Blumenthal

Unlike MS-DOS machines, most Model IIIs and 4s with hard drives have to be booted with a floppy, after which the floppy can be put away. But this is really a plus, not a minus. Because a floppy disk is required, this means that you can configure your hard drive system in a variety of ways, depending on your work session requirements. When you have things the way you want them, just do a sysgen on the floppy; it remembers everything.

In my case, I have my 20-meg hard drive for my Model 4 divided into four partitions, with three enabled in Model 4 mode and the fourth enabled only when the machine is booted via LDOS as a Model III. In Model 4 mode, I can further refine what I want and don't want on line: a choice of KSM files or no KSM at all; a choice of subdirectories that will be ready and waiting without having to call them up; and/or a variety of auto commands or no auto commands at all.

So if my wife, as a high school English teacher, has some work to do, she knows which boot disk to reach for. If one of my kids is in a games mood, he knows which disk to reach for. Etc., etc. One's entire software library may be on a hard drive, but the user doesn't have to look for a thing; the appropriate boot diskette puts whatever is needed instantly on line.
-Henry A. Blumenthal

TIP FROM CN80 - All hard drives are convenient, easy to use, fast, and give a false sense of security. All hard drives will crash sooner or later losing your files. FREQUENT BACKUPS ARE REQUIRED.

ASSEMBLY LANGUAGE TUTOR Part 18
by Christopher Fara (Microdex Corporation)

Menu tables

Back in 1989 we developed a FONTS program with a simple menu (CN80 6/89:12, Z80 Tutor I:15). The routine went through a series of CP instructions, and if a key pressed by the user matched one of the valid comparisons, a jump was made to an appropriate segment of the program. That scheme is ok when a menu has few choices, but it's not practical in complex situations with many choices. The series of CP instructions would be too long and slow. To delete, add or change choices we must do a lot of confusing editing and re-arranging. A more flexible "universal" procedure can be designed, using a real darling Z-80 instruction.

''

CPIR
ComPare, Increment, Repeat. Scan a block of bytes anywhere in memory, and compare the contents of each memory location with the contents of register A. Before writing this instruction we set up registers as follows:

HL=> start of block to scan
BC= length of block
A = byte to find

If a match is found then the scan ends, Z-flag is set, HL points to the byte right after the found one, and BC contains the number of bytes still remaining to be scanned in the block (if the match is the last character in the block then BC=0). If there is no match, then Z-flag is reset NZ, HL points to the byte right after the end of block, and BC=0. Whenever BC=0 then the Parity flag is reset PO (Parity Odd) otherwise it remains set PE (Parity Even).

''

Alert readers will notice that the idea here looks similar to the LDIR instruction (CN80 2/90:4), and in fact both belong to the same "block transfer and search group" of Z-80 instructions. So we can guess that there must be another instruction similar to LDDR.

''

CPDR
ComPare, Decrement, Repeat. Scan a block of bytes "backwards". Before writing this

instruction we set up registers as follows:

HL=> end of block to scan
BC= length of block
A = byte to find

Like in CPIR, a match sets the Z-flag, BC contains the number of remaining bytes (BC=0 if the match is the first byte in the block), but HL points to the byte right below the found one. Similarly if there is no match then Z-flag is reset NZ, BC=0, but HL points to the byte right below the start of block. As in CPIR, the Parity flag indicates when BC has been decremented to zero.

Both instructions do the scan non-stop, just like LDIR and LDDR make an instant copy. If for some reason we want to scan a block one byte at a time and do something at each "stop" , then we can use two other instructions which parallel the LDI and LDD principles.

CPI

ComPare, Increment. Before writing this instruction, we set up the registers the same way as for CPIR. After each comparison HL is incremented (points to next byte in the block) and BC is decremented. Z-flag is set if a match is found, reset NZ if not. Parity flag is set PE as long as BC has not been decremented to 0 (the scan has not reached the top of block yet), and reset PO if BC=0.

CPD

ComPare, Decrement. Same as CPI, except "backwards". Before CPD the pair HL must point to the end of the block, after each comparison HL is decremented, and the parity flag tells us whether the bottom of the block has been reached yet or not.

But let's go back to our menu problem and see how CPIR can streamline it. Suppose we have a program which incorporates three different procedures selectable from a menu. The listing is for Mod-III. As usual, in Mod-4 replace CALL 539 by SVC 10 (CN80 8/89:8, Z80 Tutor I:7) and CALL 73 by SVC 1 (CN80 8/89:9, Z80 Tutor I:17).

```
;-------------------------------------------------
MENU:   LD      HL,ASK      ;address menu
        CALL    539         ;display it
        CALL    73          ;wait for key
        LD      HL,KEYS     ;table of keys
        LD      BC,TASKS-KEYS;how many
        CPIR                ;scan
        JR      NZ,MENU     ;no match
        LD      HL,TASKS    ;addresses
        ADD     HL,BC       ;double
        ADD     HL,BC       ;offset
        LD      E,(HL)      ;get low byte
        INC     HL          ;then hi byte
        LD      D,(HL)      ;DE=address
        EX      DE,HL       ;HL=address
        JP      (HL)        ;go for it
;-------------------------------------------------
TASK1:  ... routines go here
TASK2:  ...
TASK3:  ...
;-------------------------------------------------
ASK:    DEFM    'PRESS 1, 2 OR 3'
        DEFB    13          ;terminator
KEYS:   DEFM    '123'       ;valid keys
TASKS:  DEFW    TASK3       ;addresses
        DEFW    TASK2       ;of
        DEFW    TASK1       ;procedures
;-------------------------------------------------
```

Below ASK there are two tables: KEYS is a string of valid choices, and TASKS are 2-byte "word" addresses of the corresponding routines. But notice and remember that the tables must be arranged in reverse order to each other (the last item in KEYS, the key '3' corresponds to the address of TASK3 which is the first item in the TASKS table, etc). The reason for that will become obvious in a minute.

The key pressed by the user is returned in register A, we set up HL and BC, and CPIR scans the KEYS table. If the flag is reset NZ after CPIR then there was no match and the menu is redisplayed for another try. Otherwise we point HL to the beginning of the TASKS table, and add BC twice to point to the address of the procedure. For example, suppose '1' has been pressed. Therefore after CPIR the register pair BC has been decremented from 3 (the initial length of the KEYS table) to 2 (remaining bytes not compared yet). Adding 2 twice is like adding 4, so this addition will cause HL to skip the first 4 bytes in the TASKS table. Since each address in TASKS is a 2-byte "word", HL will now point to the third "word" TASK1. The next four instructions are our typical sequence which

transfers that "word" to HL. Then we JP (HL) directly to the desired procedure ("jump to the address contained in HL", see CN80 4/90:8).

Now suppose '3' has been pressed. It's the last item in the KEYS table, so after CPIR the pair BC=0 (no more bytes remain to compare). Adding zero twice won't change HL which will remain pointing to the beginning of the TASKS table where the address of TASK3 is stored. Similarly after pressing '2' the pair BC is decremented to 1 and added twice makes HL point to TASK2. No matter how many choices are listed in KEYS and how many corresponding addresses are in the TASKS table, this procedure instantly matches the correct address for the selected key. There is no upper limit (except memory, of course) to the number of choices that can be arranged this way. Keys and addresses can be easily added, removed and re-arranged in the tables without touching the main body of the program. The MENU routine can be re-used without change in any program.

Actually the tables don't have to be arranged in the order opposite to each other, as we did here. We could use CPDR instruction to scan the KEYS "backwards".

```
;-------------------------------------------
        LD      HL,TASKS-1 ;end of KEYS
        LD      BC,TASKS-KEYS
        CPDR
;-------------------------------------------
```

The order of KEYS and matching TASKS must be now the same and this may feel more "natural" in the source listing.

```
;-------------------------------------------
KEYS:   DEFM '123'      ;valid keys
TASKS:  DEFW TASK1      ;addresses
        DEFW TASK2      ;of
        DEFW TASK3      ;procedures
;-------------------------------------------
```

In this case when '1' is pressed then BC gets decremented to 0 and so TASK1 can be at the beginning of the TASKS table, etc.

For the three choices in our example this routine (including tables) is 12 bytes longer than an equivalent CP-scheme (like in FONTS). If tight memory (rather than the convenience of a standard procedure) is the primary consideration then we might prefer to use the CP-method. Each additional choice shrinks the difference by 2 bytes, so already with 9 choices both methods will have the same length, and with more choices the CPIR scheme will be shorter. Complex programs such as xT.CAD use similar schemes for instantaneous routing of the program flow to various procedures in response to dozens of different single-keystroke commands.

INC and DEC revisited

In the second version of the expanded "loader" last month we have used a new instruction DEC and did not provide the standard "box" definition. Hopefully not a big deal, since the context should have made its meaning apparent enough. But to keep things straight, here is the box.

""

DEC target

Decrement. Subtract "one" from a value in 'target' memory location which can be a single register, register pair, or memory location addressed by the register pair (HL).

```
DEC B
DEC DE
DEC (HL)
```

""

There is a curious thing about both INC and DEC instructions. Incrementing or decrementing a single byte such as INC A or DEC (HL) sets or resets Sign, Zero and Parity flags depending on the result (Carry is not affected). But INC and DEC applied to a register pair (eg. INC DE or DEC HL) do not affect any flags at all. Sometimes this is convenient, because we can increment or decrement register pairs and after that still can check the status of flags triggered by some previous operation. We've been silently taking advantage of this in previous essays, for example in the MOGET routine (CN80 4/90:7). On the other hand without the flags we don't have a convenient way of checking if the incremented or decremented register pair has reached some threshold value. So we must do the checking some other way.

Testing if a register pair has reached zero value is usually done by ORing the two "halfs" of the pair. The result of OR is Not Zero as long as at least one of the bytes is not zero. If both are zero then obviously the pair is also zero. For example:

```
;-----------------------------------------
MORE:  ... here some processing
       DEC   DE
       LD    A,D          ;high byte
       OR    E            ;both zero?
       JR    NZ,MORE      ;not yet
;-----------------------------------------
```

To test for a "threshold" other than zero we could use the SBC instruction (Subtract with Carry) with the threshold value in another register pair. One of the pairs must be HL, however, because SBC can only subtract from HL. For example:

```
;-----------------------------------------
MORE:  ... here some processing
       INC   DE
       LD    HL,10000     ;threshold
       OR    A            ;reset carry
       SBC   HL,DE        ;test
        JR   NZ,MORE      ;not yet
;-----------------------------------------
```

These fragments would loop until DE reached the threshold value, in which case Z-flag would be set, JR NZ,MORE would be skipped, and the program would "fall through" to some following instructions.

MY ADVENTURES WITH HARD DISKS
Part 7
by Roy T. Beck

UPDATING THE DOS ON YOUR HARD DISK or CAN YOU CHANGE DOSES IN MIDSTREAM?

PROLOG
The other night (while reclining in my hot tub and admiring the stars; my wife was in the house reading and I was alone in the hot tub), I received a call from a man in Wyoming who was having trouble installing TRSDOS 6.3.1 on his newly acquired Model 4. Questioning revealed he had received the machine with TRSDOS 6.2.X installed on it and operating from a 15 Meg hard disk. He had purchased TRSDOS 6.3.1 to improve his operation, but as we know, the documentation accompanying 6.3.1 is sparse, to say the least.

While the machine would boot and run happily with the 6.3.1, it gave no hint of recognizing the 15 Meg HD attached to its backside. What to do?

THE SOLUTION
I had never performed this specific update of a DOS on a working machine before, and could not remember all the details of the information which accompanies TRSDOS 6.3.0. Since the man assured me he had full backups of everything on the HD, I outlined what he had to do to reformat from scratch. Thinking about the matter later, I decided I had missed the easy solution to his problem. I will now try to outline the steps to be performed in this situation, in case someone else faces the same task. I will not go into the why's and wherefore's; your original DOS manual plus the documentation you received when you purchased your DOS 6.3.0 update is adequate for that.

First, I will assume the machine is able to run properly from the hard drive, and is booted up from a floppy on which is SYSGENed the necessary CONFIG/SYS file. I also assume the configuration has drives :0 through :3 on the hard drive, and drives :4 and :5 are floppies.

BY THE NUMBERS
The steps are as follows:

1. Boot the machine under the existing DOS, 6.2.X or 6.3.0.

2. Make several fresh backups of your original 6.3.1 disk.

3. Place a new copy of LSDOS 6.3.1 in drive :4.

4. Issue the command BACKUP :4 :0(SYS,INV) to move the new system files onto the system partition of the hard drive.

5. If the previous DOS was 6.2.X, then issue the command DATECONV :n ENTER for each partition of the hard drive. If the system objects to this command, then repeat it with (CS) appended, as DATECONV :0(CS) ENTER. This step may be ignored if 6.3.0 was previously properly installed. If not sure, do it anyway, it won't hurt anything.

6. Now replace your previous hard drive boot disk into floppy :4 and issue the following commands:

BACKUP :0 :4 (I,S,OLD) ENTER
DATECONV :4 ENTER
MEMORY (A=X'3B',B=0) ENTER
MEMORY (A=X'85',B=99) ENTER
MEMORY (A="Y",B=255) ENTER
SYSGEN (D=4) ENTER

For interpretation of the commands, see your DOS and Tech Ref Manuals.

SOME GOTCHA'S
If you ever have to reformat a hard drive using the TRSFORM6/CMD program supplied with TRSDOS 6.2, use the DATECONV :n program on each partition afterwards so the partitions are valid for 6.3.X. Roy Soltoff supplied a patch in your 6.3.0 update doc's to avoid the need for this step.

If you plan to use DS floppy drives, be sure you get at least Level 1B of 6.3.1. Level 1A has a small bug in the FORMAT command which causes it to write DS disks with a defect in the directory. You can send your disk to MISOSYS for correction, or you can patch it yourself, using the patch information in Roy Soltoff's "The Misosys Quarterly", Winter 1989/90. If you are only using single sided drives, don't worry about it. Hold off until some more pressing reason comes up for updating. Actually, the change level is now up to Level 1D, per an article in TRSLink #31. You can either make the changes yourself, or send the disk to Misosys for updating.

OTHER DOCUMENTATION
Mod 4 by Chris (Fara), sold through Computer News 80 is a good general source of information about TRSDOS 6.3.0.

IN CONCLUSION
The answer to my original question is Yes, you can switch DOSes in midstream. The DOS was designed to let us do this, and I believe most of the smarts for this purpose are in BACKUP/CMD. Whatever, the mechanism, it can be done.

It is important to realize that much of the DOS has been revised to some extent in issuing 6.3.1, and all of the system files have to be substituted by new versions. The BACKUP command with its various parameters is the only possible way to do this without totally replacing the DOS partitions and starting all over, which was my original mistaken approach. While I am reasonably certain the man in Wyoming has had workable results, my advice was not the best, due to ignorance on my part and not having the documentation to hand when needed. Even after replacing the DOS files "on the fly", you must still create a new CONFIG/SYS file with the SYSGEN command so the updated boot disk will have a valid copy of the system configuration from which to set up the system at boot time.
- Roy T. Beck

MODEL I MODIFICATIONS
by Arthur N. McANINCH

64K RAM IN THE MODEL I KEYBOARD
Those mysterious re-boots and dropping dead syndromes of the venerable Model I with the Expansion Interface can be completely cured by installing 8 64k RAM chips in the keyboard in place of the standard 16k RAM chips. In addition, the RAM in the E/I is totally disabled. This solves many problems inherent in the design of the expansion interface.

The following modifications have been successfully accomplished on a "D" series board and on a "G" series board.

It is necessary to remove the keyboard and the main CPU board from the keyboard case. Twelve traces on the CPU board must be cut, and 14 jumpers must be added, so do not attempt this modification unless you are familiar with printed circuit board soldering practices. Extreme caution must be observed throughout the entire procedure.

Remove the old 16k RAM chips from their sockets, Z13 to Z20. Use a sharp X-Acto knife with a small blade to make the trace cuts, and inspect them with a magnifying glass. Small wire-wrap wire is used for the jumpers. The entire modification will take about two hours, including testing.

TRACES TO BE CUT

(a) Remove +5v from pin 9 of Z13 to Z20
cut #1-#8 figs 1 & 2

(b) Remove +12v from pin 8 of Z19
cut #9 fig 1

(c) O/C *RAS from A73 pin 5
cut #10 fig 3

(d) O/C Z73 pin 6 from Z21 pins 2 & 14
cut #11 fig 3

(e) O/C A14 from Z21 pins 1 & 15
cut #12 fig 1

(note that cut #8 is on the component side of the board.)

Jumpers to be added:

(a) +5v to Z19 pin 8
jumper #8 fig 1 (see diagrams in the program listing section.)

(b) Z13 - Z20 pin 9 to Z51 pin 12
jumpers #1-#7

(c) *RAS to pins 2 & 14 at Z73
jumper #9 fig 3

(d) Z73 pin 6 to Z21 pins 1 & 15
jumper #11

(e) Z38 pin 11 to Z73 pin 5 & Z51 pin 14
jumpers #11 & #12

(f) Z38 pin 9 to Z51 pin 13
jumper #14

Now, install 8 128 cycle refresh 64k RAM chips in the sockets Z13 to Z20. Make certain that you don't try to use the 256 cycle refresh chips currently being produced. The chips you need are no longer produced; however, Computer News 80 as well as MISOSYS, Inc. currently have some available.

If you have an Expansion Interface, then the traces to Z40 pins 6 & 7 must be cut (cuts #13 & #14) and then joined together and pulled up to +5v by a 4700 ohm resistor (jumper #15) as in Figure 4. Then remove all the RAM chips from the E/I to save the power drain and resultant heat.

Use a black permanent marker to annotate on the front of the E/I that the RAM chips are disabled, and a marking should be made on the keyboard case that there are 64k RAM chips installed. I installed a 64K RAM button from a Model 4 that had been upgraded to 128K on the keyboard for a professional appearance.

Now, the next project is to speed up the CPU. The nicest thing here is you no longer have to worry about the MRAS, MMUX, and MCAS circuits in the E/I anymore!

HIGH SPEED MODEL I

By today's standards, the 1.77 mhz clock speed of the Model I is almost creeping. Really, for the first popular microcomputer on the market, it has done well and continues to perform for many users. It is still the most gratifying computer for a hardware hacker to get it do things its producer never intended. Actually, provision was made in the original design for 2.66 mhz as well as 3.55 mhz, although 1.77 mhz was chosen for the production version since the chips available back then were not considered reliable at the higher speeds.

There are several things to be aware of before you attempt this modification. First, the Level II boards with the two-chip ROMS will not work with this speed-up. Also, the later units with the XRX III board (a 500 baud wave-shaper for cassette input) must have the XRX board deactivated in order to function with this mod. Third, Expansion Interfaces manufactured after January 1980, must also be modified to function with these speed-ups. And, fourth, if your Model I is extremely early, you may need to replace the old 16k RAMS with newer ones. If you have installed 64k RAM chips in your keyboard and deactivated the E/I RAM prior to this modification, you won't need to worry about these last two concerns.

HARDWARE MODIFICATIONS

You will need a 74LS02, a 74LS74, and a 74LS367, some wire-wrapping wire, a small soldering iron along with small diameter rosin-core solder, and a sharp, small bladed X-Acto knife for this modification. Standard printed circuit board wiring practices must be followed. Watch out for solder bridges and excessive heat, and watch for cold solder joints as well.

Locate Z56 on the circuit board, and cut the trace from pin 8 to the plated thru hole. Mark this hole, for you will run a wire to it later. Now, piggyback a 74LS02 on top of Z53. Carefully bend all the leads except pins #7 and #14 parallel with the top of the chip, and seat it on top of Z53 so that the dot or the notch is oriented in the same direction with Z53. Then, carefully solder pins #7 and #14 to the corresponding pins of Z53. This new circuit is PORT 254 and we will call it Z53P.

Find Z52, and solder a wire from pin #6 of Z52 to both pins #2 and #3 of Z53P. Then connect pins #1 and #12 of Z53P together. Next connect a wire from pin #3 of Z22 to pin #5 of Z53P. Now, solder together pins #8, #9, and #13 of Z53P. A BASIC command OUT 254,X will activate Z53P at pin #4.

Identify Z26, and piggyback a 74LS74 on top of it. Again bend all pins parallel with the body except #7 and #14. Be certain to orient it in the same direction as Z26, and then solder pins #7 and #14 to the corresponding pins of Z26. This new circuit is called Z26P.

Connect a wire from pin #3 of Z26P to pin #4 of Z53P. Run a wire from pin #4 of Z59 to pin #2 of Z26P. Now, connect together pins #1, #4, and #14 of Z26P. The BASIC command OUT 254,0 will flip the circuit, and the command OUT 254,1 will flop it. Thus, it will be possible to software select your clock speed after the rest of the modification are complete.

The 74LS367 must be piggybacked on top of Z44. In a similar manner to the two previous piggyback installations, bend all pins except pins # 8 and #16 parallel to the body. Install it in the same orientation with the other chips on the board, and solder pins # 8 and # 16 to the corresponding pins of Z44. Call this circuit Z44P.

Connect a wire from pin #8 of Z56 (from where you cut the trace as you began) to pin #2 of Z44P. Run a wire from pin #3 of Z44P to the plated thru hole beside Z56 (the other end of the trace you cut from pin #8 of 256).

Run a wire from pin #5 of Z26P to pin #1 of Z44P. Now, when OUT 254,@ is given, NORMAL speed will flip in place. Connect pins #3 and #13 of Z44P together. Run a wire from pin #15 of Z44p to pin #6 of Z26P. This enables the command OUT 254.1 to flop the CPU to the faster speed.

At this point, you have a choice which speed to wire up as your faster speed: either 2.66 mhz or 3.54 mhz. You may desire to try each one, one at a time before you permanently button everything up.

For the 2.66 mhz as the faster speed, locate 243. Connect a wire from pin #2 of Z43 to pin # 14 of Z56. Now, run a wire from pin #12 of Z56 to pin #14 of Z44P. The modifications are complete for 2.55 mhz.

If you want 3.54 mhz, instead of the instructions in the previous paragraph, run a wire from pin #11 of Z56 to pin #14 of Z44P. For reliability, it is also necessary to tweek the memory select circuits, so locate Z69, and cut the trace between pins #5 and #12 of Z69. The modifications are now complete for 3.54 mhz.

Now if you have an Expansion Interface manufactured after January 1980, you will need to either install 64K ram chips in the keyboard and disable the ram within the E/I, or you need to do the following. Since Radio Shack modified the newer E/I's by using only the RAS line and then artificially generating a simulated CAS and MUX circuit within the E/I, the MRAS, MMUX, and MCAS signals totally ignore the speed of the CPU (keyboard). These newer E/I's can be speeded up by not delaying the RAS to produce MRAS, and creating MMUX and MCAS in the old MRAS and MMUX positions. You may need to replace the ream chips with chips rated a 200ns, at least. This modification to the E/I applies only to the newest boxes that do -not- need the buffered cable.

First, locate Z37 and Z38 on the E/I circuit board. Cut the trace that comes from Z38, pin 9, and call the trace farthest from Z38 Trace A. Then cut the trace from pin 8 of Z38, and call the trace farthest from Z38 Trace B. Now, cut the trace from Z37, pin 4, and call the trace farthest from Z37 Trace C. Prepare a small piece of wire-wrap wire and connect it as a jumper between Trace A and Z38, pin 11. Also,

connect a jumper from Trace B to Z37, pin 4. Finally, connect a jumper from Trace C to Z38, pin 9. The modification to E/I is now complete if you intend to continue using the ram within it.

Reassemble your TRS-80, and try out the different speeds by alternating the BASIC commands OUT 254.0 and OUT 254.1. Your Model I can now keep up with an early Model 4 and even out perform a Model 3! If there is trouble, turn your system off and recheck all your work. If everything looks correct, they you probably need to replace your memory chips with faster ones.

As mentioned at the beginning, if you haven't installed 64K ram within your keyboard unit and totally disabled the ram within the E/I, that would be the next modification for you to undertake.
Happy Computing.
-Art McAninch

CN 80 ORDER BLANK DOCUMENTATION
by Danny C.Mullen

CN80 COMPUTERIZED ORDER FORM

Welcome to the 'on-line' order form for COMPUTER NEWS 80 products. This program will present a facsimile of the order form found in your issue of the magazine right on your computer; with one advantage - you won't have to photocopy the page or destroy your magazine anymore!

To use it, just enter just enter CN80 at the DOS READY prompt. You will be asked to enter your name, phone number, street address, city, state, and ZIP code. This information will be placed on the form in the correct place. Alternatively, you could just press the <ENTER> key to skip this part and fill in the form with this information later.

After entering the last item (press <ENTER> after each entry) the top 24 lines of the form will appear on the screen. You can move around by using the arrow keys, move the page up/down by using the shifted up/down arrow keys, or pressing <ENTER> will scroll the form if at the bottom line. At any time the cursor is at the bottom of the screen, and there is more form to be shown, just use these same keys. <ENTER> will also jump to the next line when finished entering data on a line.

You won't be allowed to type in the header area even though you can move the cursor there. You won't be able type on any of the double lines or on any of the colon column separators. Use the arrow keys to advance past the colon characters. You can, if not careful, overtype in the bottom area where the shipping/handling information is. You could make any correction to your address if needed, however.

By the way, just overtype any errors you may make when filling in the form, no need to erase them first.

All totalling of quantities/costs/shipping and tax info must be done by you - just put them in the appropriate locations.

If you don't desire to use the order form 'on-line', you could just skip the entering of name, etc. at the beginning (by pressing <ENTER>) and just use this program to print a blank form on your printer.

==========

WHAT! NO PRINTER ??? Well, I suppose you could just use the DUMP command to dump the form to disk and good old Stan and company might just load it into their computer and print it there! You'd have to send a disk, though.

To do this, after exiting the program, enter the following command at DOS READY:

DUMP CNORD/TXT(S=X'8000',E=X'912F',ASCII)

(note, all on one line no spaces except where shown between DUMP and CNORD/TXT)

This would also give you a copy, on disk, of what you ordered if you desire.

To print this saved copy, enter the following at DOS READY:

LIST CNORD/TXT (PRT)

==========

Oh yes, to print the form, filled in or not, just press <CONTROL><P>. Make sure the printer is in 80 character per line mode or it won't look so good. If the printer is off line, you'll get a visual and audio warning and a chance to get it on line.

Finally, pressing <BREAK> will exit when finished.

SUMMARY OF COMMANDS

ENTER Moves to next line on form. Skips through information at beginning of program. Will scroll the form if at bottom screen line & more form exists.

ARROWS Move around the form. Move past colon column separators when entering data. Will scroll the form if at bottom screen line & more form exists.

SHIFT ARROWS Scroll the form up/down.

CONTROL P Prints the form on printer.

BREAK Exits the program.

I hope you can find this utility helpful - I can remember how frustrated I was when I couldn't find any of the order forms and refused to destroy my CN80!
-Danny C. Mullen

(This program will also be available from the File Cabinet. With some adaptation of the code we are sure that many readers could find several applications for their own form use. -CN80)

MORE ABOUT COMPUTERS
by David Dalager

MACHINE LANGUAGE
There are a lot of people that would like to "break into" learning machine language programming. Why? Because it runs much, much faster than programs written using Basic. There are many good books out in the world that have been written with the "novice" in mind. Guess I never got that far.

BOOKS
Don Ady has a good book on machine language programming. So does William Barden, and Rodney Zaks, and then we have Chris Fara's articles, and the booklet available from CN80 that Chris wrote — very good. Now when I go into doing something or think I might a little later, I go whole hog. I now own 5 different machine language books with some tutorials. I've enjoyed Chris Fara's very much. Chris uses a different approach — he does not assume that I already know how a microprocessor works. Refreshing. Chris also has some exercises that one can immediately try also. So do some of the others, like Don Ady's. But woe is me. I don't have enough time to astutely apply myself to the subject, and when I do get a little time, I've already forgotten what was learned before. Oh, how I envy some people. Maybe some day, soon I hope, maybe I can become a novice at machine language programming.

MACHINE LANGUAGE TEACHING AID
In casting about in the waters of machine language programming, I ran across an interesting group of programs written by Mel Patrick. Mel gave me some historical background that I'd like to share with you. Although these can be considered to be "simple", they do exemplify a number of approaches that one can take and run with. You get an opportunity to "see" how one programmer accomplished his goals by being able to examine his "source code" (/ASM). One gets to see how the video was handled, error checking or testing was done. Simply loads of goodies. Over the past couple of years, time has been spent, you could read that as blown since not enough time was spent in order to retain the information for later usage. But if the time could have been spent, machine language programming could be another of my accomplishments. I really do envy those with the time and feel sorry for those that have the time and don't use it. Why, there's a whole new purpose to Life.

JUST LOAFING
Appearances would indicate that some people are actually trying to learn machine language on the Model 4. At least judging from the number of requests Mel Patrick was getting for source code of his

programs. With that in mind, Mel was sitting around one day (very unusual for Mel), he decided to code up a simple program that would do something. While digging and scratching around for an idea, Mel came up with an idea to write a simple program that would display a message to the video screen and work with it's presentation.

WHY

The reason for using the video was two fold: 1) It's much easier to debug your programs when you are working with a visual feedback environment and 2) you can keep the code fairly simple.

ANOTHER GAME

The idea of using a game approach kept creeping into his mind. Games teach a number of things, and Mel decided that for the first time since 1981 he would write a game. The last one written was a SLOTS game for the Model 1 which was given away. Mel says "I didn't know what else to do with it." Obviously someone did and "borrowed" about 80% of Mel's program, added a couple of things to it, and sold it. The guy probably made some money off it. Which incidentally is why Mel has never written a game since. "However that's all in the past and this is now." says Mel. Most everyone with a computer of sorts can recollect having played the old HI-LOW number guessing game (yes, even the guys with the Hewlett Packard pocket programmables did it). Effectively what happened was that the computer was told generate a number in a fixed range, you spent the next 20 seconds guessing it. If it took you longer than that, better you should have used a coin and played heads/tails instead. Be that as it may, the computer told you if you were too high or too low and whether or not you were right. Well, that was the point of the game, wasn't it? Many people wrote what must be a truck load of these programs in BASIC (Mel included) and they had what we refer to as bells and whistles. Meaning they got "fancy". Multi-player, disk saving of high scores, playing against an opponent and even more were added to a rather mundane program idea in the first place. Of course all this just added to the growth of computers anyway, so not all was in vain.

/CMD AND /ASM FILES

In this group of files that Mel wrote, there are both /CMD and /ASM (/ASM in this sense will mean source) files. If you are learning machine language, it is always a good place to start by using a code written by someone else and making little changes and seeing what effect your changes have. Some words of advice: Write protect your drive 0 unless you know "exactly" what your code will do. It is totally possible to re-create (read that as: discombobulate) a DOS which doesn't boot or work anymore. If you have trouble tracing the program put in little @DSP (displays - see The Technical Reference Manual for the model 4/4P)) to the video so you can see where and what you've written is doing. Watch that you don't foul up a register when doing this. If you want to trace program logic flow use a machine language monitor like OverVue (which Mel also wrote; is Public Domain and should be in The File Cabinet). Oh, it's also a good idea to make a backup....just in case of Murphy's law.

GAME #1

GUESS/CMD and GUESS/ASM. These are the first examples Mel created. You'll notice a complete lack of "polished" look about them when you type in the /CMD file. That is because they are what programmers call a SHELL. Basically they do all they ever will in checking, error trapping and displaying. They are really the core to which you hang a much more pleasing display. Mel said it took him about 2-3 hours to get this to where he liked it. Naturally Mel couldn't leave well enough alone, and then wrote Game #2.

GAME #2

GUESS1/CMD and GUESS1/ASM. These are Mel's "enhanced" versions of the same basic game as game #1. But with many modifications to polish the game up. It's still not great by any stretch of the imagination but maybe the kids will like it. Mel added sound and a graphic display. Because of the additional coding Mel had it do more extensive error testing.

LEARNING TOOLS/TOYS.

Both games can serve as learning tools. Routines are there to check limits of input, screen positioning, writing to the screen, memory mapping the video, cursor addressing, pseudo random number

generation, displaying and more. All it takes is for you to examine the routines to see what they do. Mel generally uses the K.I.S.S. method of programming (read Keep It Simple Stupid) but Mel claims he started to get carried away with this one. Once the initial Game #1 was completed it only took about 2 hours to code up Game #2. "If you left it for a week, wonder what I would come up with...."

These are Mel's contributions to anyone wanting to learn something about machine language. Mel says "If you want to "borrow" my work or these programs, be my guest, but PLEASE at least give credit to where you got them. These are not shareware but if you like what you see and it does help you, I'll consider my task completed. If you need info on exactly how a routine works, better to write me a letter and include $0.50 for return postage." Send to: Mel Patrick, 8056 164A St.; Surrey, B.C., Canada, V3S 7S7. Mel's BBS is: FastPlus II BBS, (604) 574-2072, 300/1200/2400 24hrs

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(Note: GUESS/ASM, GUESS/CMD, GUESS1/ASM and GUESS1/CMD, are available on the File Cabinet's Model 4 Education Disk Number MD4EDU22. OVERVIEW/CMD and OVERVIEW/TXT are on the Model 4 Utility Disk MD4UTL35, and are listed as shareware. If you use these shareware programs, please support the author by sending the shareware fee requested. Do not send shareware fees to CN80, all shareware fees go directly to the author. The File Cabinet Disk fees are for the copying and distribution service only.-CN80)

TIME TO RENEW ?

If the last number on your mailing label is 90/07 - this is your last copy of your current subscription - and it is time to send in your renewal.

REPLACING EXTERNAL FLOPPY DRIVES - ALL MODELS
by Donald W. Ady

External drives are interchangeable with internal drives. Both need a connection to a 34 line flat cable and to a three line power plug. External drives are mounted inside a case with power supply. You can buy them used or new as a unit or as separate items. The single sided one I installed for Model 1 was removed from inside a Model 4 that got new double sided drives.

Be sure to power off before changing the drives.

Remove four screws that hold the case cover in place. Slide the case off. Unplug the floppy cable and power cord. Turn the case over and remove two screws from the bottom that hold the drive in place. To reassemble, reverse the process. That's all there is to it. Sometimes. Complicating details can crop up in the drive number selection. If the drive does not respond as the drive number wanted, then read on.

Tandy drives with Tandy cables interrupt unwanted select lines by pulling contacts out of the cable plug. To change selection, you change the plug on the drive to another plug on the cable. That works except on some older single sided drive cables that will not support a double sided drive.

Non Tandy drives interrupt select lines on the drive PCB board. The number wanted gets passed through by what is usually a jumper: often labelled DS0 for drive :0 and DS1 for :1 etc. Move it to change the assignment if needed. On this style you can easily plug the floppy cable backwards. That's harmless but useless. Drives while on run all of the time. Power off then change the plug direction at the drive, or at the computer.

Mixing of incompatible cable and drive is often an easy thing to jury rig. Read on:

Select lines on 34 pin cable:
Wire #10 Drive :0 All models
Wire #10 Drive :2 M3/M4
Wire #12 Drive :1 all models
Wire #12 Drive :3 M3/M4
Wire #14 Drive :2 Model 1 only
Wire #32 Double sided, all

Wire #32 activates the read write head on the back of the diskette for double sided drives. On single sided Model 1 setups, #32 can otherwise select drive :3. The external drives on M3 and M4 get their signals shunted to lines that in other cases serve drives :0 and :1. If all four lines come through to the innards of the drive PCB, then selection is ambiguous. I tried this out for laughs on my Model 1, with only the one drive connected. DIR :0 and DIR :1 and DIR :2 and DIR :3 all showed the same listing! In this case all lines and the contacts in the non Tandy cable were intact. The Tandy style drive shorted all four select lines together on its PCB. This could be easily seen by examining the board on the drive. The lines ran together onto a perpendicular trace less than an inch from the plug.

In an earlier misadventure, I'd butchered a Tandy cable by trying to pull unwanted contacts. Isn't there an easier way? Yes, indeed. A small drill turned by hand with a pin vise works like a charm in cutting PCB traces. Leaving #14 intact to select :2 single sided for the M1, I cut the other select traces before they ran together on the drive PCB. Now it selects just fine as :2. Would it be easy to cut the wrong trace? Sure, but it's easy to fix with some solder.

A Tandy cable with some needed contact missing can be replaced by a new cable. But try this trick first: inplug the cable at the computer end, then flip it 180 degrees, and replug it. Ditto at the floppy drive end. If there is a web in the plug and a notch on the PCB, you need to cut a matching notch on the flip side of the PCB. This swaps ground lines, all intact, with signal lines, partly missing at the Tandy contacts. PCB traces short out 17 ground lines that come all on one side of the plug. Those are all odd numbered lines 0-33. If you do this for a Tandy drive to activate line #32, then you'll need to cut some traces on the drive PCB as I did for the Model 1 example.

Most floppy cases fit one full height drive. So far as I know the same case can take two half height drives. You need new mounting holes and Y branch fittings for floppy cable and for the power supply plugs.
-Donald W. Ady

TUNE DEVELOPMENT PROGRAM
by Dick Houston

The Model 4 contains a tone generator circuit and a small speaker. By accessing the port assigned to the generator a machine-language programmer can play any desired tones and thus create music. Some of the File Cabinet disks provide programs that do just that.

For simpler use fixed tones can be called from BASIC with the SOUND command. The available tones can play simple tunes, but are most frequently used for alert signals, warning signals, fanfares for correct answers, etc. Such signals can add punch to a program.

The SOUND syntax is SOUND A,B where A is a number representing the pitch of the tone and B is a number for the desired tone duration. A can be 0 through 7, with 0 being the lowest pitch. B can be 0 through 31, with 0 being the shortest sound, approximately 1.5 second, and 31 giving the longest, about 12 seconds. An article in 80micro once said that the actual tones corresponding to the number A are: 0 C, 1 C#, 2 D, 3 D#, 4 F, 5 F#, 6 G, and 7 G#. I haven't had my computer close enough to my piano, my organ, or my frequency counter to check the accuracy of that information, but it certainly is OK for RELATIVE pitches of the tones.

If you aren't a musician, don't let the notes bother you - you can just do it "by ear" with my program. (See Program Listing One)

Two useful musical combinations, using the do-re-mi system, and not worrying about what key the notes are played in, are:

do - mi - sol: 1 - 4 - 7

do - re - mi - fa - sol: 1 - 3 - 4 - 5 - 7

Also you might try 4 - 1 - 4 - 1 - 4 - 1 ..... for a European ambulance sound effect!

But enough musical theory! TUNEDEV/BAS gives you a way to try any combinations of pitch and duration for a "tune" of up to 10 tones. It also lets you play tones "piano style" on the number keys so you can pick out the ones you probably need. When you have found your tones, you record their

numbers then enter a pitch number and a length number for each note of your "tune". When you are finished, you hit any key to hear your composition.

Then you are given a menu from which you can choose to listen again, make some changes, try a new combination, sample the available tones ("piano style"), or end the session. Once you have found the right tune or sound effect, you can incorporate the required SOUND statements into your program or insert them into other programs. One thing you need to be aware of - if you attempt to play the same tone two or more times in succession, all you will get is a single tone with a short click where each new tone begins (BASIC CAN be fast!). You will need to insert a very short FOR-NEXT delay loop between tones. Something like FOR X=1 TO 5:NEXT X will do it nicely. TUNEDEV/BAS merely inserts the delay after every tone, and it sounds OK.

A disclaimer: TUNEDEV/BAS won't earn you a GRAMMY award, but you can have fun with it and add some nice touches to your programs or others.
-Dick Houston

SCREENS/BAS A Model 4 Utility
by Donald W. Ady

This article is a brief review of the SCREENS/BAS, referred to here as simply SCREENS for short. It is simple and useful tool to help display text or graphics or both in your BASIC programs. Level for general use: novice. Additional features also for more advanced programmers. Complicated screens with text and/or graphics become a cinch to design quickly. And, they tend to use less program memory than ones created conventionally.

SCREENS has been available from me for $10. CN80 will carry it, via The File Cabinet (78K of disk space required for the files). The program itself has adequate HELP screens for casual use. The distribution disk adds a lot more to that on a variety of document files.

Text typing provides functions to position the cursor, type, overtype, and erase. The Model 4 screen, 80 columns, and 24 lines, is used. The full screen is used, WYSIWYG, what you see is what you get. The usual and simplest application will instantly compile the screen into PRINT statement(s) on an ASCII BASIC format disk file. To add the screen to your own program, use MERGE. When compiling you are prompted for the line number to fit your application program.

The screen can also be saved temporarily without compiling to one of four memory "pages". It can be saved permanently for later compiling or rework on a disk file. Conventional BASIC methods to produce graphics are one terrible chore that is little but drudgery. SCREENS makes graphics quick and easy for even a novice. Drawing uses a single pixel cursor that can draw, skip, or erase. With less than 15 minutes of practice, you can should get the hang of it well. There is a simple method to trace line drawings - for non artist. Drawing motions are guided by the arrows and (better) the numeric keypad keys. Speed is widely adjustable. At any speed selected, the SHIFT key gives a useful speedup on long straight runs.

For intermediate programmers: documentation on disk tells how Z80 routines of SCREENS can be used in your own programs. Most useful of these perhaps is storing screens on disk and using direct I/O. SCREENS gives an example of that for its HELP. Only the size of the disk will limit the possible variety of display with hardly any program memory load at all. Of course you could also do drawing, typing, program direction menu functions, etc.

To barely mention a few technical details: Space compression codes require the normal (startup) state of the PRINT format toggle PRINT CHR$(21). If this is in the wrong state, then the compiled PRINT will look weird, until you reboot or again use PRINT CHR$(21). Codes 194 to 255 are used to represent from two to 63 blanks.

Video and keyboard memory on Model 4 mode are inaccessible to PEEK. They reside in special memory banks, which can be temporarily switched in at address &HB400 and higher. Many of the SCREENS routines,

if used in other programs, will require HIMEM set below &HB400, at least.

PRINT @ will usually not work as expected to change an indent on the compiled PRINT, unless WIDTH 255 is in effect. Model 4 BASIC PRINT contrarily insists on starting a context on a new line if not all of it fits at the indent on the one line. The PRINT compiler gets around this problem for indentless PRINT by allocating statement starts to the left margin. The WIDTH parameter and indent problem does not exist in Model 3 BASIC.

If you have questions on SCREENS, call me at (908) 277-3365. The phone co. is changing the old area code (201) to (908). Both numbers work for a year. A few readers might still have interest from earlier CN80 reviews of my packages for M1, M3, or M4 in M3 mode: LVE low vision editor, Stylus word processor, or Elixir. SCREENS is a small reworked subset of Elixir, for M4.

-Donald W. Ady
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A VISIT WITH DAVID GOBEN
by David Goben

Before I get right into the heart of talking to your laser printer (by the way, owners of other printers such as dot matrix and daisy wheels may find this month's information useful as well), I'd like to clear a few other things up.

40 x 100 SPREADSHEET MATRIX FOR BUSY-CALC

If you have been lucky enough to have obtained Busy-Calc for your Model 4/4P/4D from CN-80, but at the same time you need a LONGER vertical spreadsheet other than the 64 x 64 matrix that comes standard with Busy-Calc, PATCH LISTING ONE contains the -OFFICIAL- optional patches to BC/OVL so that it will afterward have a 40 x 100 (columns A-AN, rows 0-99) matrix. Apply the patch (-only- if you want this change, -and- on a BACKUP copy of Busy-Calc) using the command PATCH BC/OVL BC40X. If you have obtained the inexpensive enhancement upgrade to Busy-Calc; Busy-Calc64, use PATCH LISTING TWO, and apply it to BC64/OVL using PATCH BC64/OVL BC6440X. Feel free to give copies of these two patches away, or put them on your favorite BBS, so that the many people who are choosing Busy-Calc as their spreadsheet of choice can take advantage of these patches if they choose to.

MAIL BAG

Next off, for WNM of Detroit: MI, I believe that the the reason RAMDRIVE will not work with LS-DOS 6.3.1 is that, if you are using double-sided drives, the directory is 34 sectors long, and RAMDRIVE is expecting it to be 36 (as it was for LS-DOS 6.3.0 and previous). Thus the Record Out of Range Error will crop up when it looks for the non-existing 35th and 36th sectors. For JPJ of Fairmont, WV: you're right, Model 4 VisiCalc is slow as molasses in winter compared to Model III VisiCalc. A lot of it has to do with the III-version being able to access the screen directly, the SMALLER screen size, and the fact that the Model 4 version has to access extended memory (in a awful manner, to boot). Why not try Busy-Calc (plug, plug), which is much faster on the Model 4? I don't understand the reason for incompatability between the 2 VC versions on a particular file, unless of course you recently upgraded your DOS and copied the Model 4 to Model III with the date extension changes. Try using a program like UNDATE, found on DAVID'S SYSTEM UTILITIES DISK, available from CN-80. It can remove the date extension of just a single file (as well as a whole disk). Other than that, I don't know. The VC file formats between the two versions is identical.

ANOTHER UNDOCUMENTED 1.3 FEATURE

For those of you complaining that PROTECT/CMD, a scroll protect program I presented a few issues back to accompany VIDX/CMD, will not work on TRSDOS 1.3 for the Model III are wrong. It -does- work, it's just that I have found -another- undocumented feature of TRSDOS 1.3 — it will turn off scroll protect when it comes back to the TRSDOS Ready mode. Thus

PROTECT does in fact poke the scroll protect value into the system, but as soon as DOS level control is returned to, the DOS turns it back off. Of course, if you applied the optional patches to VIDX to make it use the Model I scroll protect address, and VIDX is resident in high memory, then it -will- work. Geez, I understand the reasoning behind some of these (many) undocumented features, but hey, why not let us know about them so we won't be ripping our hair out?

LS-DOS 6.3 BOOT-UP GRAPHICS

Last time I promised you 6.3 (and potential 6.3) users that I would provide you with patches so that you could boot up with a graphics logo (I still don't understand why people feel this is so important, but I guess I have my own personal little likes about some things as well). Well, here it is. I had said that I would also provide patches for 6.3.1 to boot. I will, however, hold off on the 6.3.1 patches until I am sure that the few recent patches issued by MISOSYS for 6.3.1 will not interfere with them. Those MISOSYS patches are minor, and will in fact not matter to most users, and I'm sure that they will not interfere with these screen patches, but I would like to hold off for a month or 2 to check to see if they will still work trouble-free (worse things have clobbered me over the head).

The patches for 6.3.0 are in the program listing section labeled as PATCH LISTING THREE and PATCH LISTING FOUR. Use a text editor, such as TED, to create the ASCII files, and save listing three as BOOT63A/FIX, and listing four as BOOT63B/FIX. Of course you may wish to modify the lines in BOOT63B/FIX to reflect your own personal message or address, just -don't- change the line lengths. It is -very- important that they contain 27 characters between the quotation marks! Next apply the patches to a system disk (a backup copy of your work disk, if you please) by entering PATCH SYS0/SYS.LSIDOS:d BOOT63A/FIX (O=N), where "d" is the drive number. Apply the second patch using PATCH SYS0/SYS.LSIDOS:d BOOT63B/FIX. Once these patches are applied (successfully), try booting the disk. You may be very surprised.

These graphics screens were developed by Doug Mayfield of Middleburg Heights, Ohio for TRSDOS 6.2, and placed in the public domain. I changed them (I don't always do this because I don't always know better) so that you do not need to use a complicated transfer procedure using CMDFILE/CMD from the LDOS 5.3 mode to apply them. I felt that this procedure was tricky enough to turn most non-hackers away from the process. The direct approach, using the (O=N) parameter (that's OH, not zero) is -much- friendlier to those who prefer to stay away from hacker territory.

Now I take off my hacker's hat, and put on my print shop hat.

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DOING IT ON A LASER PRINTER

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Communicating with a Laser printer, or any printer for that matter, is a fairly easy thing to do, -if- you understand its language. Using a Printer Control Language (PCL) is not a complicated procedure, and is -much- easier to learn than BASIC. The nice thing about a PCL is that if you are a BASIC programmer, you can "talk" to your printer using the BASIC LPRINT command, and you machine language programmers can use the SVC @PRT command.

More times that I -ever- care to mention, people have asked me (and CN-80 has been asked as well) how to do those "tricks" on the printer, such as double wide, compressed, underlining, etc. But when I ask them if they have ever read the manual that came with their printer, 9 times out of 10 I hear, "Oh, that. I threw it away. I don't use those things." (There went some more hair).

Therefore, before we start drawing boxes and selecting different fonts and such, I think that it is important to first understand the various control codes that your printer understands, as well as have a working knowledge of things called Escape Sequences. It is also -strongly- suggested that you "crack the books" on your printer and familiarize yourself with what it tells you about communicating with it. It is actually pretty simple once you get the feel for it. Most manuals also include examples, usually for BASIC, which demonstrate the

various features. TRY THEM!!! Did I yell? The next thing you know you'll be creating "wow-em 'til their eyes pop out" documents.

UNDERSTANDING CONTROL CODES

The most complicated thing standing in your way is to run into a statement that says something like "Use ESC SO to select blah-blah-blah." So what is is ESC and what in heaven's name is SO? If you ever tried entering LPRINT"ESC SO", did the printer start doing the feature, or did it simply print ESC SO? So what's the deal, Neil? You have just ran into control codes, and in this particular example, a thing called an ESCAPE Sequence. You have also ran into control code icons; the symbols people use to reference control codes.

Let's take a look at them. If you are curious about what the symbols represent, they were developed back in the early days of data communications, when talking to teletype devices and such were all done by modems. Those of you familiar with BBS systems will usually be familiar with some of these. In the following paragraph, I have listed the symbol (icon), followed by the decimal code that represents it in parentheses:

NUL (0), SOH(1), STX(2), ETX(3), EOT(4), ENQ(5), ACK(6), BEL(7), BS(8), HT(9), LF(10), VT(11), FF(12), CR(13), SO(14), SI(15), DLE(16), DC1(17), DC2(18), DC3(19), DC4(20), NAK(21), SYN(22), ETB(23), CAN(24), EM(25), SUB(26), ESC(27), FS(28), GS(29), RS(30),US(31), SP(32), and DEL(127).

You may notice that SP near the end of the listing to be simply the space bar code.

Those of you who have played around with your video screen control codes may recognize a few of these, and most people are familiar with several others, such as BS (backspace), LF (linefeed), FF (formfeed), CR (carriage return), and ESC (escape).

Using the above table (in case your printer manual does not contain a similar, and hopefully -better- one), you now know that if the manual states, "SO Enlarged mode ON," you know that you must send the code that represents SO to the printer (14, in this case), and not the text "SO".

ESCAPE SEQUENCES, VERSION 1

The next step is to understand these (stupid) things called Escape Sequences. The way they are listed in most manuals is in the example forms "ESC SI", or maybe "ESC 4" or even "ESC 3 n" or "ESC 3 (n)". (Once you understand this, you'll be a pro).

The key to untangling this mess is to understand the difference between the control code icons as straight text characters to type in, because most printers, such as dot matrix and laser printers, use a combination of BOTH icons and 'keyboard printable' characters, but 99% of the time the manual does not explain this difference, and this is what has made most of those people I mentioned before throw their manuals away. The thing is, the key to unlocking these differences is amazingly simple.

If the code for performing some task is not represented as a numeric code, but is pre-presented by MORE THAN ONE (here's the key) character (and begins with an alphabetic character), then the code is an icon, for which you can refer to the previous table to derive its decimal value. Thus If you look at a sequence that states "Use DC1 for such-and-such), you know that you send the code representing DC1 to the printer (17 in this case), instead of the text DC1. From BASIC you would send this character to the printer as LPRINT CHR$(17);. Please note the semi-colon at the end -- this prevents BASIC from sending a carriage return (CR — 13) to the printer afterward, and moving the printer head to the start of the next line.

If you then run into an escape sequence, such as "ESC SI", you now know that you send the codes for ESC (27) and SI (15) to the printer, such as LPRINT CHR$(27);CHR$(15);. Aren't you feeling like an expert already?

Next comes what most people consider a can of worms. But, considering the previously presented material, it will actually be a "piece of cake" to understand. If a symbol, be it alphabetic, numeric, or a special character, as long as it is 1 (ONE) character long, this means that this code is actually a -keyboard typeable- code. Thus if you see "ESC 7", this means that you will send the code for the ESC (27), and then

the -character- "7" to the printer. Thus you could use LPRINT CHR$(27);"7"; (technically, when mixing characters and control codes in BASIC, you could get by without including the first semi-colon, but I'll leave that for you to figure out in you BASIC manual).

Finally, if you see a command stated as, for example "ESC - (n)" or "ESC - nn", or any combination of variable information, where (n) or nn represents a numeric value — usually a CHR$(nn) value, unless otherwise stated, this means that you would send the CHR$ code for ESC, the keyboard character "-", and then a CHR$ value of variable definition. For example, on my Epson Apex 80, and the FX-80 mode on my Laser printer, the command to turn underlining on is "ESC - (n)", where (n) can be either the code 1 (for on) or 0 (for off). Thus to turn it on, I would use LPRINT CHR$(27);"-";CHR$(1);. My manual tells me that I may optionally use the -printable- codes 1 and 0. Thus I could also turn underlining on by using LPRINT CHR$(27)"-1";.

ESCAPE SEQUENCES, VERSION 2

When Hewlett-Packard came out with their LaserJet printers, they decided that to take full advantage of the printers, that they must write a totally new PCL for it. The bad news is, it does not always follow the rules outlined above, but the good news is that it is a whole lot simpler to use. The reason is that -each- command to the laser printer begins with the ESC code (27), but that is basically the -only- control code you really have to remember, as just about everything else is keyboard typeable data, -even- the variable values. The only control codes that The Lasers accept are ESC (27), which tells the printer that it is about to receive a command, LF (10), the linefeed code, CR (13), the carriage return command, FF (12) the formfeed command, SO (14), which selects the secondary font, and SI (15), which selects the primary font. All the rest are typeable text, even if you are entering a value of, say, 100.45 as an argument for a command.

One handy "first" printer command to learn is to set the printer to automatically send a linefeed after a carriage return. This is a handy command as most Tandy printers do this automatically, and this also means that you will not have to add a filter to your computer to do it for you. This command string, from BASIC, is LPRINT CHR$(27)"&k1G";. Notice that letter case is very important here.

After a couple more visits with me, you will understand all these strange special control symbols such as "&", "*", and "(". And being familiar with them, you will not longer be intimidated by them.

Now that you know just as much about control codes and escape sequences as I do, try going through your printer manual with this fresh perspective and tackle those once-hard commands. You will find yourself saying "This is child's play!"

So, this introduction to the "hard" part of printer interfacing being over and done with, the next time we will be looking at how to take advantage of the laser printer's features. Although I will be covering the Hewelett-Packard LaserJet PCL, you will notice that (virtually) all laser printers are compatible with its Printer Control Language. Before you know it, we will be drawing boxes, shading with gray-scales, and using various typefaces with ease. Looks like potential desktop publishing to me.

Until next time, happy computing!
-David Goben

SEIKOSHA SP-2000 PRINTER

We were asked if we would publish a review or some additional information on the printer we advertised. So much as this tight space will allow, here are a few more of the details.

It is a nine pin print head.
Near letter quality is quite good. With 10, 12, 17, and 20 characters per inch pitches.

It will use either fabric ribbon or Multistrike Film Ribbon. And has Epson and IBM resident emulations. Epson is used for TRS-80 computers. Two print styles, 178 characters and 50 graphic characters in the standard mode.

Standard centronics cable connections, with the cables well out of the paper path.

TRSDOS 1.3 PATCH UPDATE
by Henry H. Herrdegen

I have just recently come across TRSDOS 1.3 disks with a Mon Feb 20, 1984 date and no serial number, have never received any notice about this "new" release, and R.S. naturally was no help with an "obsolete" system. Can anyone out there enlighten me? Tandy, in their great wisdom, never put the updated version number on the disk, so it is still 1.3, not 01.03.03 as the bulletin 0312-14 proclaims.

Interesting enough, the spelling error in the HELP menu, "avaLIable", corrected with bulletin 15 (the last one Tandy sent me), is still there. Running this disk thru the patches of my PUP1.3, starting with PATCH1, seems to prove that all changes up to and including bulletin 14 are on it.

The only outward difference from the Jul 1 1981 version is the inclusion of the MODELA/III file, and the length reduction of the HERZ50/BLD file from 2 records to one. This file really contains only one single patch line, but the original had some copyright message attached, and a record 2 with a strange (funny?) message. Does anyone know who Joe the "Rummy Buzzard" is?

Running it thru the PATCHSC program, with <G>roup, 1 to 19, caused no problem whatsoever. The first 5 lines from PATCH6 will not find the string, and the Mon Feb 20 date remains, as does the 1.3 version number. It is not necessary to start at PATCH1, as the only "made" patch in 1 to 5 is the last line in PATCH4, the spelling error in file *8, at 4F9B, which can be applied in command mode, if you so desire, or by running PATCH4 as <S>ingle. Starting at PATCH6 will save about 5 minutes, but still it takes more then 15 min's to run PATCH6 thru 19.

If you want the 01.03.03 version number, then add the following lines 6 and 7 into the PATCH6/BLD file, it will then handle both the Jul 1 and the Feb 20 dates:

PATCH
*0:1(ADD=5036,FIND=312E3320,CHG=30312E30)

PATCH
*0:1(ADD=503A,FIND=4D6F6E20,CHG=332E3033)

Change the last 33 if you want to put your own version number on, 34 for 04, etc.

Another interesting wrinkle is the fact that one of Andy Levinson's' unpublished patch lines, correcting a double "to" in the error messages, will not take. They must have that one corrected somehow, not with that patch, and on the sly too. This line is the last one in PATCH8 (before the number update) in file *4, at 4F3E.

Go ahead and use PUP1.3 on this version TRSDOS disks, as on the old Jul 1 version. PATCH18 and 19 mentioned above are new ones, not included in the disk issue, and you probably have added them to the PUP library from the listings in issue 3.? . If not, do it now, they are another big step to make our good old 1.3 even better and friendlier.

A discussion arose in TRSTimes, when a reader claimed that his TRSDOS (as well as mine!) need an other string at *9 54E9 (PATCH18) then the one Gary wrote and the editor verified. I took care of that possibility by including both versions. One or the other will take.

TIDBIT
Ref.: Model III BASIC

If you generally load BASIC with the default 3 files, run some programs, and then want to run one which needs almost all memory, you are familiar with the message: "Out of Memory". Easy to correct, back to TRSDOS, load BASIC again, maybe this time with only 1 file, and everything is fine.

But annoying. I have such a program, which I mostly run after some others, and got fed up of re-loading BASIC. Put my thinking cap on, and came up with a line which checks for available memory, and, if not sufficient, reloads BASIC with 1 file and re-runs the program. It also forgives you if you run from DOS with BASIC FILENAME, and forgot to specify -F:1. Stuck at the very beginning, as the first working line of the program, it looks like this:

5 IF MEM<xxxxx then CMD"I","BASIC FILENAME -F:1"

The number of free bytes depends on what you need. I found 35000 sufficient for my program, which is about 3000 bytes long and clears 30000 for string handling. You may want to find your minimum needs, so as not to go thru the motions unnecessary. I am going to put that line now in other programs, just in case. Isn't it great that the Model III BASIC permits us such a short and easy fix?

NEW PATCHES
"PATCH18" & "PATCH19", new additions to PUP1.3.

Gary Campbell just published an interesting set of patches for the TRSDOS 1.3, which make the "COPY" function much faster. So much so, that I want to give you the chance to add them to the patch library for PUP1.3. Let me tell you how easy it is:

Use your work copy of PUP (you use a backup, not the original, don't you?) in drive 0 (already booted up with another TRSDOS disk, or override the AUTO command on the PUP), and type the following patch lines with the included Scripsit, calling the file PATCH18, exactly as shown (no margin, no tabs):

(See patch listing number 18.)

Another interesting patch group comes from Northern Bytes, replacing the slash at the date input with the more convenient period. I have added a line in order to show the periods in the prompt also:

(See patch listing number 19.)

(Read thru the patch listings before reading further, then return to the text.)

Do not be alarmed when you see that one "String not found" shows up either at the 8th or 9th patch line, at ADDress 54E9, that is normal. Explanation? In the TRStimes following the publication of Gary's patches, a reader reported that the original byte string was not found when he attempted to patch his disks, and gave the 3 bytes needed for his disks. The Editor then warned that his disks patched ok with the original bytes. Tandy screwed up somewhere? Anyway, I checked all my TRSDOS'es, and all 8, with dates of May 1, May 2, July 1 and Feb 20 needed the new bytes. So, I put both possibilities into the file, and one or the other will show "Patch made". For you who want to know: the original Gary bytes are C22352, the new ones supplied by Arthur McAnich are C3955F.

And if that little instruction prompts you to add other patches to the files, wherever you may find them and think you may like them, more power to you. If you do, please let me know, I am very much interested to make this package as complete as possible, and our TRSDOS 01.03.03 even friendlier in the process, sharing it with all our readers.

Adding to file "PATCHES":-

The list PATCHES was written with my ALPHALST program, published in CN80 1.12 and on disk 3 of the CN80 disk series. If you have it, you can easily add the 14 patch lines. 14, because the 15th, *0 5098 37-38, is already in the list. If you wondered why I ended the 8 byte patch strings after 6 bytes with two periods, maybe an explanation is due now: it is simply to allow 2 column printing. This list being meant only as a quick reference, to easy locate the patched files and addresses, the PATCH, ADD, FIND & CHG had been dropped and not all bytes listed. Just to identify the patch, not to type it.

If you have not got it, maybe now is a good time to add it to your library. I don't know of any other program that can write ASCII lists, name, rename, sort, add, delete, merge and print in 1 to 4 columns, paginated. (If you type it in from the listing, add "REM" or the " ' " in the first two lines and push the block identifiers, like 'MENU', 'SORT', etc. to the right margin, the type setter goofed.)

In the distributed documentation, this list was printed in single column (probably with the LIST function), so these shortcuts appear a bit odd. The full, functional patch line might as well have been printed in single column. But 2 column printing saves 1/2 the paper, space in your folder, and the abbreviated lines are fully adequate for the intended purpose.

If you had not noticed it yet, there is a duplication of line *0 5098 36-37. Please delete one of them. There also is a typo,

which could be misleading: the scripsit patch line: SCR 7004 000000-FEEDC9 should have address 7D04, not 7004! Sorry, I did not write a correction facility into ALPHALST (would somebody want to do it?), you have to delete the line and re-enter it correctly. And type the added lines in exactly using the same format, same spaces, period's, etc.

Have fun, and keep the "80" alive!
-Henry H. Herrdegen

SHEETING WITH BUSY-CALC

BUSY-CALC REVIEW
by Ray Stanley

I am sure that you have better computer people working on a review of Busy-Calc than me, but here is my review of David Goben's BUSY-CALC program. (Busy-Calc for the Model 4/4p/4D. $79.85, plus $4 S&H.)

First I should fill in a little background. For almost 20 years BC, that's "before computers" I have been a avid detail taker. I keep details on everything, how much gas we buy for the family car, how much gas for the tractor, how much dog feed goes to our four dogs, etc. Some day I am going to figure out how to hitch those dogs to the plow and get rid of the tractor. My wife is no good at keeping records, she writes three checks and maybe, just maybe writes two of them in the check book. She claims that "how come she has to add and subtract the checks, we pay the bank to do that for us, don't we." That means I have to keep a checking account balance that would support the Titanic, just in case. Lucky most of the merchants around here know us, so when I get a call saying "Mary did it again". They are always nice about it though.

Well since I got my computer a couple years ago, I still had to keep all those records in those little individual record books that you can get at K-mart. The only problem was that I never could get the time to add up the totals till once a year, if then. Which means I got all the details on a lot of things, but really don't know how they relate to our farm and family life.

My good friend Ted, who lives about 30 miles away on his spud farm. That's potatoes, not horses. Always told me that the easiest way to get those records together, and have them total themselves, was to get a spreedsheet program. Ted (that in our computer group stands for "The Experienced Dude"), advised me that VisiCalc was a simple spreedsheet and easy to use for almost anything. Well I had been looking for one and just could not come up with an original version. Ted let me borrow his disk, but I didn't want to spring for $40 bucks to get the manual copied. Besides I figured if I ever had the IRS men in and they wanted my computer stuff, I would get nailed for breaking the copyright law. Besides I like to have everything on the up and up, and Ted just couldn't have supplied me with the support I would need if I didn't r e m e m b e r a l l t h o s e / "t h a t's slash-something" commands. So I thanked him for his good thoughts and never did get past the first look-see at Visicalc.

Then over the hill came a ray of light, via CN80 about David Goben's new spreedsheet program. Which I bought and I am now filling page after page from my little record books into it.

I can even point the blank spot out to Mary in the Busy-Calc check book record, and tell her I just got to have something to go in there, or I can't turn the computer off and go to bed.

The first thing I noticed upon receiving Busy-Calc was unlike some manuals that stress reading the manual cover to cover before using the program, was that before I was barely into the Busy-Calc manual it was urging me to boot up a backup copy of the program and go through the examples as I read them. Of course I did.

The screen display is very clean and crisp, and if you are familiar with VisiCalc, the display formats are very similar. The first big difference I noticed was the menus. Rather than using the cryptic prompts that VisiCalc used, Busy-Calc presented clear, "plain english" pop-up windows. These I found to be the clincher that "sold" me.

I called my friend Ted, and said "you just got to come over for dinner Sunday and take a look at this thing."

Ted, after playing with it for 10 minutes or so told me that "even though it was not as full-featured as Multiplan (but then, neither is VisiCalc), he found it to operate much faster.

He reached into my disk files and pulled out his loaner copy of VisiCalc, blew the dust off it and showed me a few examples of what he was talking about. For example, after creating a fairly large spreadsheet, he experimented with inserting columns and rows. On VisiCalc the time it takes to insert a column sometimes is enough time to mow the lawn. And that is if the programs don't crash (He said he had learned early to forget about column inserts in large spreadsheets made with VC and MP because of this.) But not only did Busy-Calc do this without a problem, but it did it in only a matter of 2 or 3 seconds! I was definitely impressed, and so was Ted.

He also found the time for recalculation was significantly faster with Busy-Calc than with VisiCalc.

One thing that made Ted hesitate in using Busy-Calc was the fact that Busy-Calc supports only a 64 by 64 spreadsheet. After all, Visicalc supports a 63 by 254 sheet, and even Deskmate's WORKSHEET program supported a 99 by 99 spreadsheet. But then he figured because I only have 64K of memory that I couldn't make one that big anyway without running out of memory. I am about to get the chips from you guys to go to 128K. Means another Sunday dinner to get Ted to put them in for me.

Ted spent the rest of the evening showing me how to create a few useful layouts, he called them templates, that I could use just to give me some ideas. Each layout was saved to a file, and called the master for that spreedsheet. That way whenever I wanted to start a new spreedsheet that would match a previous one, all I had to do was to load the master file, then start filling in the blocks. Now I even get totals every day that I enter new data. I don't have to wait till the end of the month. One thing that Ted showed me that I think is very important, and that is when you set up your spreedsheets, keep them small enough to be workable. Like one sheet per month that had the daily figures in it, and then set up a sheet with the same heading and enter the monthly totals in it as a recap sheet. Mary keeps calling it the retread sheet. But that's ok, we now have a bigger savings account, which is earning more than having all that slush fund in the checking amount. I may even get her to enter the check numbers and the amounts in to the computer. She does do all her letter writing on it now, and she still won't have to do the adding and subtracting.

Speaking of records, this is how you tell how much memory you have left. It simply reports how many cells you can create in the upper-right portion of the display.

In this day and age when support for the older programs is non-existent for the TRS-80, except what I get out of CN80, and friends like Ted, it is a refreshing breath of air that suddenly such a sophisticated program is released with full support by the author. With the quick reference guide that is supplied with the program, I haven't had to refer back to the manual anyway, much less contact the author.

Make mine Busy-Calc it sure has turned out to be a peace maker around our house.

I just can't wait to hear what those other users have to say about it. I am sure that they could give us many valuable tips on other uses for it. My son is already counting on it for his high school math courses. I think Ted even sent for a copy of his own, but he won't admit it yet. I'll let you know right after the next Sunday dinner at -his- house.
-Ray Stanley

(Editors Note) In this months VISIT WITH DAVID GOBEN, David presents the official optional patches to Busy-Calc so that you can convert the standard 64 x 64 spreadsheet into a 40 x 100 spreadsheet, for those of you who may need more vertical space.

OPEN FORUM

Hi Gang, The following little note is the product of late night 'putering. Anyone stay-ing up till the wee hours of the morning should be excused from sanity especial-ly if trying to master a new program.

I only hope all of you enjoy it as much as I did writing it.
Have fun!!!
(It's saved in ASCII from Scripsit Pro on LS-DOS 6.3.1 (Edited with TED/CMD).
-Rick Hargraves

Dear Sirs, 5/12/90
I think I'm a little slow in responding but would like to tell ya that I like your mag'zine very much. I like the short simple progrums the best. Computers are new to us down here in Arkansaw and we're still learnin'.

While I was visitin' my Aunt in Missippy my Mama sent this letter and I'd liketo share it with ya'll. (I do love her dearly)

Also, when I find out my new address, I'll send it to ya.

Dear Son,
I'm writtin' this slow 'cause I know ya cant read very fast.

We don't live where we did when ya left. Your Dad read in the paper where most accidents happen within 25 miles of home so we moved. I won't be able to send ya the new address as the last family that lived here took the numbers with them so they wouldn't have to change their address. So, just look up Bubba when ya get back and he'll tell ya how to get here.

This new place has a washin' machine but it don't work right yet. The first day I put 4 shirts in it and pulled the chain and hadn't seen'em since.

It only rained twice this week, 3 days the first time and 4 days the second time. Fishin's a little slow right now.

That coat you wanted me to send ya, your brother said would be to heavy for the mail with them big brass buttons on it. So we cut'em off and put 'em in the right front pocket. You can get Aunt Betty to sow 'em back on for ya.

Frendly Farley's Funeral Home sent us a letter sayin' we didn't make the last payment on Grandpas funeral and if we don't make it real soon, up he comes.

Your Father has a new job with 500 men under him. He's cuttin' the lawn at the cemetary. (Thats a joke, son. Your uncle Gus told it at supper last Sunday to help cheer us up 'cause of the funeral).

Your sister finely had that baby but I don't know if its a boy or a girl so I don't know if your an Aunt or an Uncle yet.

Your Uncle Phil fell in the whiskey vat at work last Friday, and when they tryed to pull him out all he did was fight'em off in fun. He finely drowned though. We creamated him last Sunday and he burned for three days. Farley said it was the darndest thing he'd ever seen.

Well, nothing much happing here, son. Your Fathers hollerin for more icetea so I better go.

I Love You, Mom

PS I didn't send money this time cause the envelope was already sealed.

My Mama sure is fun, isn't she? Please excuse her writtin', she didn't finish school like I did. Well, I hope ya'll injoyed this letter as much as I did. And sure am ankchus for the next issue of CN80.

Your Frend,
Jo-bob

(Editors Note) The above letter and punctuation is the sole product of Arkansaweze, written by a user who is hopelessly addicted to his TRS-80. We hope to hear more from Jo-bob in the future.

Q: Quite a few months (perhaps a year) ago, I noted in Computer News 80, in one of your regular columns, I believe, a request

for Model 12 equipment and software to be donated to a boy's club or some similar good cause. Recently, the Model 12 which I have owned but used rather little for several years became surplus to my needs and I would like nothing better than to see it and software (LeScript, Scripsit and Visi-Calc) put to good use. I will be glad to pay the shipping costs to an appropriate cause.

I have searched through my substantial stack of "Computer News 80" magazines but have been unable to find the reference which sticks in my mind.

I would appreciate a reference to that or any other agency which, in your mind would be appropriate for a donation of a Model 12.
-B. P. B. Santa Barbara, CA

A: If any reader would like to suggest an appropiate recipent of this equipment, please send your suggestion to CN80 and it will be forwarded to the donor.

There is also one worthwhile cause where you can donate your used equipment and receive a healthy tax credit besides. That is a donation to the

National Cristina Foundation
42 Hill Xewar Seicw
Pelham Manor, N.Y. 10803
(914) 738-7494 and 738-7494
or 1-800 Cristina

Yvette Marrin, PH.D, President

This non-profit organization places used computer equipment in schools and work centers for the handicapped. No computer is obsolete when it is used to help people in need lead productive lives.

Property contributed to the National Cristina Foundation carries an additional 50% of market, inventory and shipping costs value to the donar. In other words you may deduct 150% of the computers worth on your federal taxes.

Another source that can put so called obsolete computers and software to good use is your local school computer labs, or church groups, we urge you to contact your local computer lab teacher. While many schools are selling off their old computers and buying new ones, many schools do not have the funds to purchase new computers. Besides, the school owned computers can't be used by the students to practice repairs on. What better experience is there than when a class can take an old computer and open it up to get at the innards. It certainly works in the automotive repair vocational education classes. How about your local boy scout group, do they have a computer training group? We also have one prison computer lab who is begging for any computer equipment, as there is no budget for them. (Information will be furnished on request if you would like to donate.) Almost any group can use used printers too.

We wish to thank B. P. B. for his generous offer and consideration, we also wish to thank him for reminding us of the importantance of passing equipment on to those who can get good use out of it rather than trashing it. So if you have a computer in that garage sale that doesn't sell, don't junk it - someone will be very grateful to have it, if for no other reason than a learning experience. And please don't forget your local senior citizens groups either. -CN80

Q: I have a Tandy 4D with 64K (all the memory I'll ever need, I assure you), a Radio Shack DMP2110 printer that does absolutely beautiful work, the current LDOS, and the current version of SuperScripsit. I am very pleased with all my equipment, it does everything I want it to do — reliably, year after year, while other people's allegedly superior equipment crashes and burns out all around me. But I have one porblem I hope someone can help me with.

My equipment supports a number of fonts and modifications — Courier, Elite, Microfont, and some imported fonts as well. Modifications include enhanced type, condensed type, double height, elongated, italics, etc. My problem is that although I can get into condensed, double height, and elongated styles, I can not get my printer to let me change those modifications and/or return me to standard typefaces.

Suppose I'm doing a page in Courier and I want to insert a paragraph in italics in midpage — no problem. I send the printer code for the italics, type the paragraph, send the printer code for Courier, and that's what appears on the printout. If I'm doing a page in Courier and I want to insert a paragraph in condensed type or a subhead in elongated type, however, it's a different story. The printer will shift me to condensed or elongated (or double height), but will not let me return to Courier, no matter what codes I send it. I know it can do so, because it will cancel the modified type and accept a Courier code at 'the top of a new page'... but internal to a page, it simply won't make the shift back.

I've tried everything. My Radio Shack dealer, and the Fort Worth people he talks to, have been no help. They keep telling me I have to "turn off the modification," something I already know. But these three modifications — unlike underling, or bold, or super and subscripts — are not toggled mechanisms. I know the codes to turn them on and off from basic (27 14, 27 15, for instance); but I can't send those from inside SuperScripsit, and putting them in my System Setup on the Printer Codes menu doesn't work either.

Can you help? It would be a help if someone could just assure me that it can not be done, so that I could give up trying. It would be a help if I could know that is was a bug in my SuperScripsit, and patchable. And it would be wonderful to just be told how to do it. Thank you.
-S. H. E. Huntsville, AR

A: Your DMP 2110 dot matrix printer is a top-of-the line printer that has a wide range of word processing and graphic features, that prints with a high density print head and produces text that is close to the quality of a daisy wheel printer. Certainly no need for replacing that printer.

We do not have a DMP 2110 printer or manual, so we will have to make some "suggestive" comments based upon what information texts we have. And also hope that a user who has a DMP 2110 and SuperScripsit has already solved this problem and will let us know how he did it. Be sure your dip switches are properly set.

Next we need to know that the print driver you are using is the proper one for the DMP2100 and SuperScripsit. The print driver that you are using may not accept the codes as you are sending them. Print drivers are really code interperters that work similar to a BASIC interperter file, that is one that changes the signals sent from the keyborard, or program to the proper ASCII codes that the printer understands.

Since your printer is ok, because it is printing the proper characters when you send them to the printer from a BASIC program. So the problem is more likely to be your SuperScripsit print driver.

From the SuperScripsit System Setup menu, the printer codes should work, i.e.

27, 31 Elongation Start, older printers
27, 32 Elongation End, older printers.

27, 14 Elongation Start, newer printers
27, 15 Elongation End, newer printers.

Check your printer manual for the correct Control Codes.

If your printer has both Draft and Word Processing settings set your dip switches to the Word Processing setting.

It should be something like this:

Code 1	27 14	turn on elongation
Code 2	27 15	turn off elongation
Code 3	27 18	select 10 pitch NLQ
Code 4	27 29	select 12 pitch NLQ
Code 5	27 19	select 10 pitch draft
Code 6	27 23	select 12 pitch draft

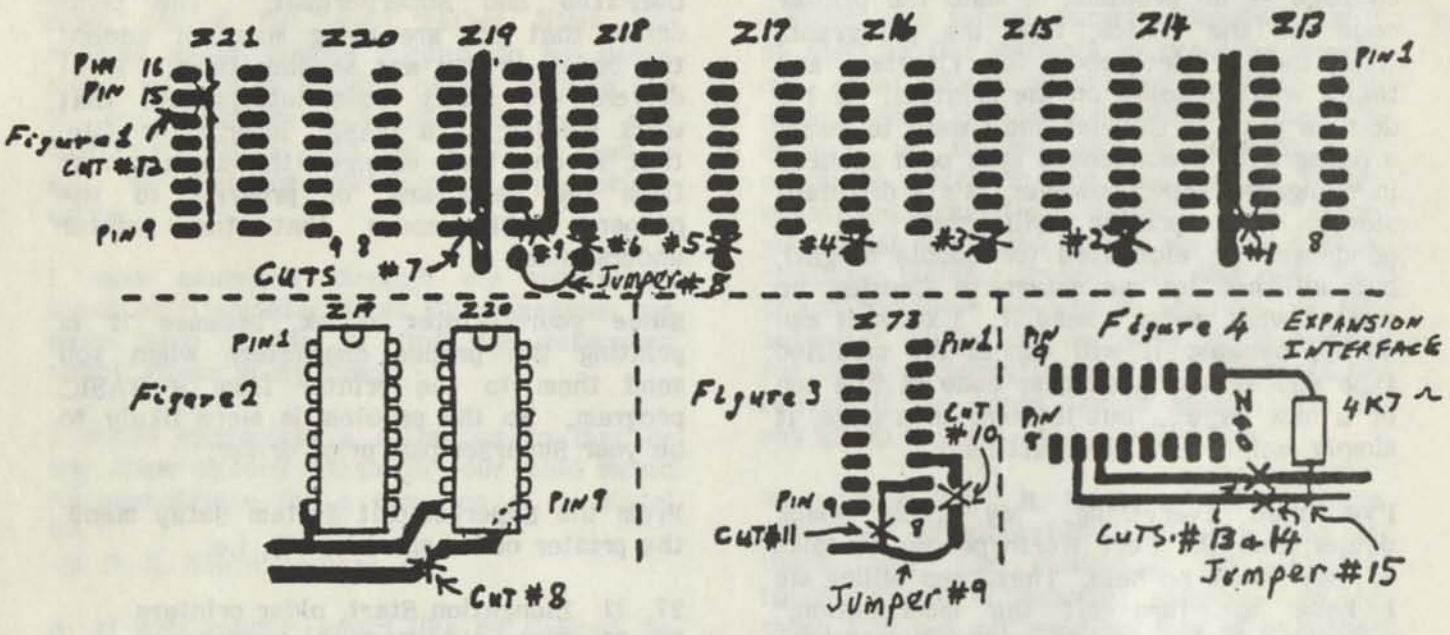
etc.

Then your sentence should look like this:

<Clear>4 Now is the <clear>1 TIME <clear>2 <clear>4 for all good men to come to the aid of their country.

Which will print the text in 12 pitch near letter quality characters, with the word TIME enlongated. Or it should provided you have the proper print driver installed on your SuperScripsit.

MODEL I MODIFICATIONS DIAGRAMS by Art McAninch



WE HATE TO BUG YOU ..... BUT

Bug Report:

In the last issue; the caption for WHITEOUT Source Code, page 33 Vol 3 No. 6, should read for the "Model III only". If this model 3 program is run on a Model 4, it will place 1024 bytes of CHR$(191) in the utilities overlay area of TRSDOS 6. The whteout program for the Model 4 was left as an exercise for the reader. -Merlin P. Walters.

The error is entirely CN80's and not the authors.

TUNEDEV/BAS Program Listing Number One by Dick Houston


```
10 '    ***** PROGRAM TO DEVELOP SOUND PATTERN *****
20 '            BY DICK HOUSTON
30 CLS
40 PRINT TAB(28) "TUNE DEVELOPMENT PROGRAM":PRINT
50 PRINT "This program will permit determination of the pitch and duration
 numbers"
60 PRINT "for a 'tune' of up to 10 tones.":PRINT
70 B=0:PRINT:INPUT "Do you want to sample the available tones? (Y or N)   ",A$
80 IF A$="Y" OR A$="y" THEN B=1:GOTO 550
90 CLEAR:CLS:DEFINT A-Z:PRINT:INPUT "Enter the desired number of tones:   ",N
```

con't on next page

```
100 DIM P(N):DIM D(N):PRINT
110 '
120 ' ---------------------- TONE ENTRY ROUTINE ---------------------------
130 '
140 PRINT "Enter your estimated values of pitch (0-7) and duration (0-31) for each
 tone:   ":PRINT
150 FOR X=1 TO N
160 PRINT TAB(29)"Tone";X
170 PRINT TAB(29) "   Pitch:  ";:INPUT "",P(X):IF P(X)<0 OR P(X)>7 THEN SOUND
 0,1:GOTO 170
180 PRINT TAB(29) "   Duration:  ";:INPUT "",D(X):PRINT:IF D(X)<0 OR D(X)>31 THEN
 SOUND 0,1:GOTO 180
190 NEXT X
200 PRINT:PRINT "When you are ready, press any key to hear your 'composition' .":
A$=INPUT$(1)
210 GOSUB 470
220 '
230 ' ---------------------- SELECT NEXT ACTION MENU ----------------------
240 '
250 PRINT:PRINT TAB(22)"What now?":PRINT
260 PRINT TAB(27) "1. Listen again"
270 PRINT TAB(27) "2. Make some changes"
280 PRINT TAB(27) "3. Try a new combination"
290 PRINT TAB(27) "4. Sample the available tones"
300 PRINT TAB(27) "5. End the session"
310 PRINT:PRINT TAB(21)"Enter the number of your choice:   ";:INPUT "",A
320 B=0:IF A=4 THEN B=2
330 ON A GOTO 200,370,90,550,430
340 '
350 ' ------------------------ CHANGE TONE(S) ROUTINE ----------------------
360 '
370 PRINT:INPUT "Enter the number of the tone you want to change:   ",C
380 PRINT:PRINT "The current values for tone";C;"are:"
390 PRINT TAB(5) "Pitch:  ";P(C);" Duration:";D(C)
400 PRINT:INPUT "Enter the new values for pitch and duration (Pitch, Duration):
      ",P(C),D(C)
410 PRINT:INPUT "Any more changes? (Y or N)   ",A$
420 IF A$="Y" OR A$="y"THEN 370 ELSE 200
430 END
440 '
450 ' ---------------- PLAY COMPOSITION SUBROUTINE ----------------------
460 '
470 FOR X=1 TO N
480 SOUND P(X),D(X)
490 NEXT X
500 RETURN
510 RUN
520 '
530 ' -------------------- SAMPLE NOTES ROUTINE ----------------------
540 '
550 CLS:PRINT TAB(33) "TONE SAMPLING":PRINT:PRINT
560 PRINT "Press the numbers for the desired tones (0 through 7) one at a time."
570 PRINT "Return to the main program by pressing 8 or 9.":PRINT
580 A$=INPUT$(1):A=VAL(A$)
590 IF A=8 OR A=9 THEN 600 ELSE SOUND A,0:GOTO 580
600 ON B GOTO 90,250
610 END
```

PATCH LISTING ONE by David Goben

```
. BC40X/FIX
. Modify BC/OVL for 40 x 100 spreadsheet grid
. 1990 David Goben
.
. Usage:
. PATCH BC/OVL BC40X
.
D0B,23=28;F0B,23=40
D0B,38=50;F0B,38=80
D0B,49=4F;F0B,49=7F
D0B,86=50;F0B,86=80
D0F,66=28;F0F,66=40
D11,12=63;F11,12=3F
D11,21=50;F11,21=80
D11,32=27;F11,32=3F
D11,39=B0;F11,39=80
D11,46=50;F11,46=80
D11,52=27;F11,52=3F
D11,86=B0;F11,86=80
D1A,75=30;F1A,75=3E
D1C,A0=50;F1C,A0=80
D22,60=28;F22,60=40
D22,88=64;F22,88=40
D22,F0=27;F22,F0=3F
D23,17=63;F23,17=3F
D23,50=28;F23,50=40
D23,54=27;F23,54=3F
D23,6A=64;F23,6A=40
D23,6E=63;F23,6E=3F
D2A,69=63;F2A,69=3F
D2A,6D=CD C7 7F;F2A,6D=BD 38 E2
X'7FC7'=3E 28 BD D0 C3 6C 52
. EOP ======================
```

PATCH LISTING TWO by David Goben

```
. BC6440X/FIX
. Modify BC64/OVL for 40 x 100 spreadsheet grid
. 1990 David Goben
.
. Usage:
. PATCH BC64/OVL BC6440X
.
D0B,24=28;F0B,24=40
D0B,39=50;F0B,39=80
D0B,4A=4F;F0B,4A=7F
D0B,87=50;F0B,87=80
D0F,67=28;F0F,67=40
D11,13=63;F11,13=3F
D11,22=50;F11,22=80
D11,33=27;F11,33=3F
D11,3A=B0;F11,3A=80
D11,47=50;F11,47=80
```

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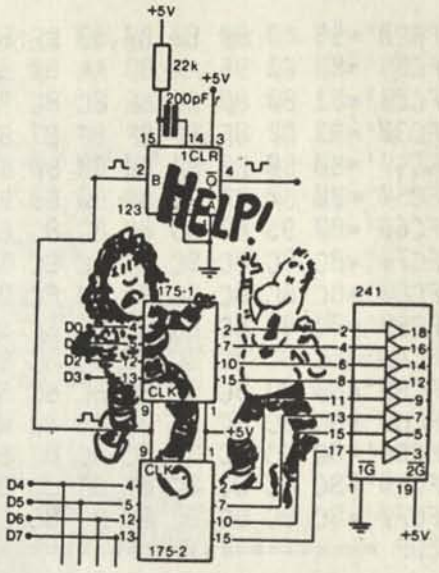
BIG BLUE WANTS YOU!
SAYS THE BIG BLUE BOYS.
AND THIS IS WHAT THEY THINK
ABOUT THEIR TOYS.

```
D11,53=27;F11,53=3F
D11,87=BØ;F11,87=8Ø
D1A,76=3Ø;F1A,76=3E
D1C,A1=5Ø;F1C,A1=8Ø
D22,62=28;F22,62=4Ø
D22,8A=64;F22,8A=4Ø
D22,F2=27;F22,F2=3F
D23,19=63;F23,19=3F
D23,52=28;F23,52=4Ø
D23,56=27;F23,56=3F
D23,6C=64;F23,6C=4Ø
D23,7Ø=63;F23,7Ø=3F
D2A,6B=63;F2A,6B=3F
D2A,6F=CD CD 7F;F2A,6F=BD 38 E2
X'7FCD'=3E 28 BD DØ C3 6E 52
. EOP ====================
```



PATCH LISTING THREE by Doug Mayfield / David Goben

```
.BOOT63A/FIX  Version 2.Ø
.(c) 1987 by DOUG MAYFIELD  (CIS-74106,761)
.ALL RIGHTS RESERVED
.Mods to allow direct patching without use of CMDFILE by David Goben, 199Ø
.
.This patch file generates the new logo, while the other included patch
.file, (BOOT63B/FIX) allows you to include up to four lines of text of
.your choice.
.
.Apply this patch with the following command line:
.
.  PATCH SYSØ/SYS.LSIDOS:d BOOT63A/FIX (O=N)
.
D1Ø,DØ=84 C7 Ø1 52 3Ø FA 8Ø 97 83 83 83 83 83 83 83 83
D1Ø,EØ=83 83 83 83 83 83 83 83 83 83 83 83 83 83 83 83
D1Ø,FØ=83 83 83 83 83 83 83 83 83 83 83 83 83 83 83 83
D11,ØØ=83 83 83 83 83 83 83 83 83 83 83 83 83 83 83 83
D11,1Ø=83 83 83 83 83 83 83 83 83 83 83 83 83 83 83 83
D11,2Ø=83 83 83 83 AB 8Ø Ø1 52 8Ø FA 8Ø 95 8Ø 97 83 83
D11,3Ø=83 83 83 83 83 83 83 83 83 83 83 83 83 83 83 83
D11,4Ø=83 83 83 83 83 83 83 83 83 83 83 83 83 83 83 83
D11,5Ø=83 83 83 83 83 83 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3
D11,6Ø=B3 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3 B3
D11,7Ø=B3 B3 B3 B3 B3 93 AB 8Ø AA 8Ø Ø1 25 DØ FA 8Ø 95
D11,8Ø=8Ø 95 82 BF 97 81 8Ø 8Ø 8Ø BE 97 83 83 8B 84 8Ø
D11,9Ø=8Ø 82 BF 83 83 83 8B B4 8Ø BE 83 83 83 AB 94 A8 BF
.memory address patches to extend SYSØ/SYS
X'FAFØ'=94 A8 BF 83 83 83 8D 8Ø 74 6D 2E 8Ø 95 8Ø
X'FB19'=8Ø 8Ø 95 AA 8Ø AA 8Ø 8Ø 95 8Ø 95 8Ø BF 95 8Ø 8Ø 8Ø 8Ø BF B5 BØ BØ BØ
X'FB3Ø'=8Ø 8Ø 8Ø 8Ø BF 8Ø 8Ø 8Ø 8Ø BF 8Ø BF 8Ø 8Ø 8Ø AA
X'FB4Ø'=95 AA BF BØ BØ BØ 9Ø 8Ø 8Ø 8Ø 8Ø 8Ø 95 8Ø
X'FB69'=8Ø 8Ø 95 AA 8Ø AA 8Ø 8Ø 95 8Ø 95 8Ø BF 95 8Ø 8Ø 8Ø 8Ø 82 83 83 83 AB
X'FB8Ø'=95 88 8C 8Ø BF 8Ø 8Ø 8Ø 8Ø BF 8Ø BF 8Ø 8Ø 8Ø AA
X'FB9Ø'=95 8Ø 83 83 83 83 BF 8Ø 8Ø 8Ø 8Ø 8Ø 95 8Ø
X'FBB9'=8Ø 8Ø 95 AA 8Ø AA 8Ø 8Ø 95 8Ø 95 8Ø BF 95 8Ø 8Ø AØ 8Ø 9Ø 8Ø 8Ø 8Ø AA
X'FBDØ'=95 8Ø 8Ø 8Ø BF 8Ø 8Ø 8Ø 8Ø BF 8Ø BF 8Ø 8Ø 8Ø AA
```

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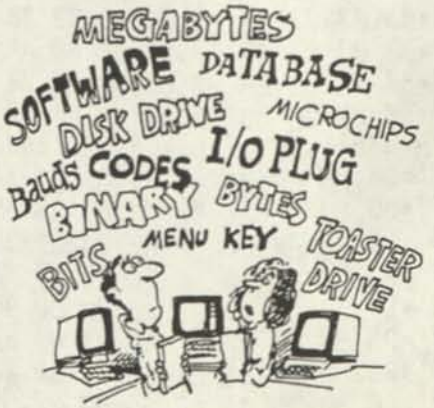
```
X'FBEØ'=95 AØ 8Ø 8Ø 8Ø 8Ø BF 8Ø 8Ø 8Ø 8Ø 8Ø 95 8Ø
X'FCØ9'=8Ø 8Ø 95 AA 8Ø AA 8Ø 8Ø 95 8Ø 95 88 8F 8F 8F 8F 8F 8Ø 8B 8F 8F 8F 8F
X'FC2Ø'=81 8Ø 8Ø 88 8F 8C 8C 8C 8E 81 8Ø 8B 8C 8C 8C 8E
X'FC3Ø'=81 82 8F 8F 8F 8F 87 8Ø 8Ø 8Ø 8Ø 8Ø B5 BØ BØ BØ
X'FC4Ø'=BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ
X'FC5Ø'=BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ BØ 95 AA 8Ø AA 8Ø
X'FC6Ø'=8Ø 95 8Ø 8D 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FC7Ø'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FC8Ø'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FC9Ø'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FCAØ'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8E 8Ø AA 8Ø
X'FCBØ'=8Ø 8D 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FCCØ'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FCDØ'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FCEØ'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C
X'FCFØ'=8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8C 8E 8Ø
. EOP ================================================
```

PATCH LISTING FOUR by Doug Mayfield / David Goben

```
.BOOT63B/FIX  Version 2.Ø
.(c) by DOUG MAYFIELD (CIS-741Ø6,761)
.Changes by David Goben
.
.This patch must only be used after creating your new SYSØ/SYS file as
.described in the inclosed doc file.
.
.The text in the following lines may be changed to suit your individual
.needs, however there MUST be 27 spaces between the quotes, no more,
.no less.  This patch file may be used as many times as you wish to
.change the text on the boot screen.  By keeping it as separate file,
.the time was reduced on these later changes after the first run.
.
.Although there is room for four lines of text, I think the display
.looks better with text only in the lower three lines. If you also
.think so, just leave area between the quotes on the first patch line
.blank X'FAFE'="...")
.
.USE THE FOLLOWING PATCH COMMAND LINE:
.
.    PATCH SYSØ/SYS.LSIDOS:Ø BOOT63B/FIX
.
.
X'FAFE'="                   "
X'FB4E'="    COMPUTER NEWS 8Ø   "
X'FB9E'="     PO Box 68Ø     "
X'FBEE'="    Casper, WY 826Ø2   "
. EOP ================================
```



PATCH LISTING 18 by Henry H. Herrdegen
Type exacty as shown no margin, no tabs.

```
.Patch 18: Gary Campbell's faster "COPY", TRStimes 2.4 pg 13
PATCH *9:1(ADD=59A8,FIND=32E054,CHG=000000)
PATCH *9:1(ADD=5358,FIND=15,CHG=11)
PATCH *9:1(ADD=540E,FIND=3AA6549047C5,CHG=2A6561C3DB54)
PATCH *9:1(ADD=54EA,FIND=C22352,CHG=C3955F)
PATCH *9:1(ADD=54D0,FIND=CDF35221FFFF22BA,CHG=3EC9322A53CDF352)
PATCH *9:1(ADD=54D8,FIND=52CD9B59C223520 6,CHG=C3575311 0063B700)
PATCH *9:1(ADD=54E1,FIND=11946121 0064CD20,CHG=ED527C47B7CA3854)
PATCH *9:1(ADD=54E9,FIND=44C22352,CHG=C5C31454)
PATCH *9:1(ADD=54E9,FIND=44C3955F,CHG=C5C31454)
PATCH *9:1(ADD=5F95,FIND=43616E2774204163,CHG=C22352ED4BD756CD)
PATCH *9:1(ADD=5F9D,FIND=7469766174652044,CHG=4244CD3944CAAD5F)
PATCH *9:1(ADD=5FA5,FIND=75616C207768696C,CHG=0000000000C30944)
PATCH *9:1(ADD=5FAD,FIND=6520524F5554,CHG=CD3F443AA453)
PATCH *9:1(ADD=5FB3,FIND=4520697320,CHG=47AFC3B153)
PATCH *0:1(ADD=5098,FIND=37,CHG=38
BASIC PATCHSC
```

PATCH LISTING 19 by Henry H. Herrdegen

```
.PATCH19: Northern Bytes/HHH: permit '.' instead of '/' for
.Date entry and change the prompt.
PATCH *0:1(ADD=4EC3,FIND=2F,CHG=30)
PATCH *0:1(ADD=4FB8,FIND=28,CHG=38)
PATCH *0:1(ADD=5149,FIND=2F44442F,CHG=2E44442E)
PATCH *0:1(ADD=5098,FIND=38,CHG=39)
BASIC PATCHSC
```

Convert these files to ASCII format, calling them "PATCH18/BLD" and PATCH19/BLD; exit Scripsit. Then load BASIC and "PATCHSC", and make following change and additions:

In line 1: change the 86 03 07 date to: 90 03 06.

Add lines:

```
530 GOSUB 100: PRINT @576,;
540 PRINT " 'PATCH18': TRSDOS, G.Campbell's faster COPY, TRStimes 2.4
550 PRINT " 'PATCH19': TRSDOS, N.B./HHH, change Slash to period for Date.
560 PRINT
570 PRINT
580 PRINT
```

Save these changes; exit to DOS. You should kill the Scripsit files now (use DO ZK), and make a backup to a new disk in drive 1, then apply the new patches to this new disk: push the RESET, let AUTO load the program, then select <G> and call for 18,19. When its finished, you have now a fully patched and corrected new PUP1.3v2 disk, except for the PATCHES list. There are now 256 patch lines, and if you want to update that list with my ALPHALST, that's another story. (below)

For continued instructions refer back to the article.

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The BIBLE on Disks

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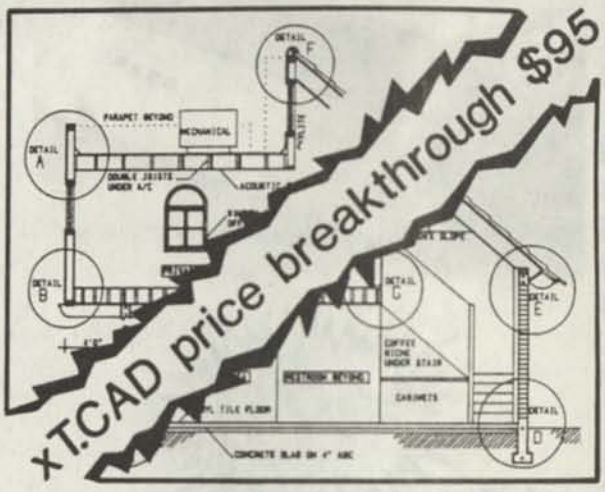

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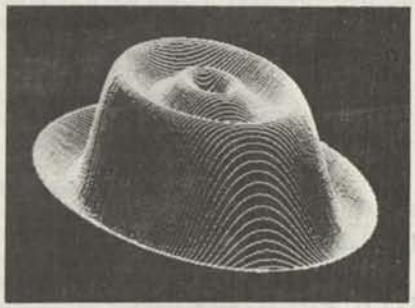

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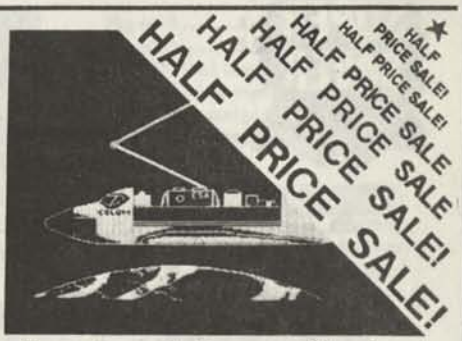

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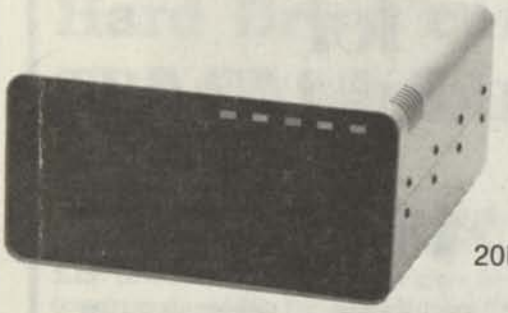

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INDEX

EDITORIAL COMMENT

One glance at the index and you will see a real editor/publishers nightmare. How do we get all these great article contributions into the next issue or do we cut someone and hold the information for another month?

Because we know that you want and need the information and delays in getting it to you would really be unfair, we bit the bullet and put it all in - 64 pages worth of information that represents a lot of effort and many hours of dedicated work on the part of the authors. We owe these contributors a great debt of gratitude, we couldn't have done it with out them.

We are sorry that the Open Forum lost its space in this issue, but letters to the Open Forum will be in the issue next month.

And even if many of our readers don't really get to digest this issue until after their summer vacations and other summer chores are over, it will be a great start on the computering season that starts with the back-to-school month of September and for planning ahead to those long months of winter that are just around the corner again.

After reading all these great articles, the only thing the type setter heard for weeks was - Don't worry, be happy -PRINT IT!

NEWS ITEMS

ALPHA PRODUCTS

Most of us were under the impression that Alpha Products was either out of business or had switched over to all MS equipment. Seems like we were wrong. They are still in business, and still selling products that are for the TRS-80 user, according to Kevin Tschudi of Alpha Products. But they have a new address from most of their ads that were run in 80 Micro. The last issue to carry their ad that we found was the 80 Micro # 97 (Feb. 1988) page 9, and in that issue they do have there new address listed which is:

Alpha Products
242 West Ave.
Darien CT 06820
Phone: 203-656-1806
800-221-0916

Some of the products that are still available for the TRS-80 are A-Bus which you can plug into your computer to build a custom system for control applications such as monitering, automation, robotics, etc.

Their clock/calendar with battery backup for Time, Date, and Alarm settings, along with their voice synthesizer are still available. They also manufacture the "Smart Stepper Controller, Stepper Motor driver and stepper motors.

If you call Alpha Products, please tell them you saw it in CN80.

"MegaMem" The Ultimate Memory Expansion That Just Plugs In

by Peter Ray (Anitek)

Now it is actually possible to increase the memory in your TRS-80 3/4/4D/4P to over 8 megabytes of internal RAM storage, by just plugging in one small board into your computer's Z80 CPU socket. That's 8 million bytes of RAM without any soldering, wiring, cutting or assembling of parts. In fact there is no change necessary to the mother board at all. Just plug the board in and you are off and running with up to 8 megabytes of additional RAM memory.

If you love doing a lot of soldering of wires, cutting of board traces and trouble-shooting when you install extra memory in your computer, don't read this article, "MegaMem" is not for you. But if you have been waiting and hoping that someone would come out with a hassle-free way to add one or more megabytes of RAM to your computer without any work at all other than plugging in a simple little board, then read on, "MegaMem" is exactly what you have been waiting for.

This is how simple it is to install the "MegaMem" board. First, plug one or more 1-megabyte SIP memory modules into your "MegaMem" board. Next, open up your computer and remove the Z80 CPU chip from its socket and plug it into the socket on the MegaMem board. Then plug the "MegaMem" board into the Z80 socket and put the computer cover back on. That's all there is to it! No memory upgrade board has ever been easier to install than this.

The "MegaMem" board is incredibly small and compact, measuring only 3.5" x 5.4". This is only about half the size of a standard graphics board. But if you are wondering how a board so tiny could hold 8 megabytes of memory, the secret is the fact that "MegaMem" uses the newest state-of-the-art SIP memory modules, instead of bulky memory chips. These SIP modules are so advanced that they contain an entire megabyte of memory on a thin strip that measures only 3.5" x 0.5" x 0.2". One version of the MegaMem board is socketed to hold 8 of these SIP modules.

The "MegaMem" board comes in 4 different versions, each having the same circuitry but differing only in the number of sockets for memory modules. The 1-megabyte board for the Model 3 or 4 is available now during this special introductory offer for only $129.95. The 3-megabyte board for the Model 3 or 4 is only $149.95. The 6-megabyte board for the Model 4 is only $179.95. And the 8-megabyte board for the Model 4 is only $199.95. Custom built 10, 12, and 16 megabyte "MegaMem" boards are also available upon request if your special needs require it. Board prices do not include RAM. The 1-megabyte SIP memory modules are only $125.00 each.

The "MegaMem" boards do not have to be fully populated to work. For example, the 8-megabyte "MegaMem" board can run with just one megabyte of RAM. So you can start out small (if you can call a million bytes small) and add more memory modules to your "MegaMem" board as your needs increase.

The "MegaMem" memory expansion can be used as a super high-speed, high-capacity RAM disk with the optional "MegaDrive" RAM disk software. "MegaDrive" can be used to create one or more RAM disks with the capacity of up to 13-megabytes each (if your "MegaMem" board has that much RAM on it). That's as much on-line data storage as 36 double-sided, double-density floppies or an entire 10-megabyte hard drive, and then some. The beauty is that, even though it operates just like a floppy drive or a hard drive, "MegaDrive" is lighting fast, since the files are all kept in internal RAM. File access from a "MegaDrive" is, in fact, about 10 times faster than a hard drive and about 50 times faster than a floppy drive. What this means to you is virtually unlimited file storage, with nearly instant loading and saving of even the most enormous files, and hours of your time saved every week, which means real dollars and cents back in your pocket. "MegaDrive" works on LS-DOS, LDOS, and TRSDOS 6, and is a bargain at only $19.95.

The latest release of the LeScript word processing system (version 2.02) can also take advantage of the new "MegaMem" memory. LeScript 2.02 will automatically use as much as 4 megabytes of available "MegaMem" memory for holding its 70,000-word dictionary, its program overlays, and text files. LeScript 2.02 will also continue to use up to 1 megabyte of your HyperMem or SuperMem RAM if you have it installed, bringing the combined total to a whopping 5 megabytes text buffer. What this means to you is, if you have been running out of room trying to edit large documents, or wishing that you could have the dictionary resident in RAM for virtually instant spell checking, then your troubles are now over. The answer is as simple as a tiny plug-in "MegaMem" board and an update to LeScript 2.02. The LeScript 2.02 word processing system for the TRS-80 is only $129.95. The version 2.02 update from 2.01 or 2.00 is only $10, from 1.8 is only $45, from 1.7 is only $65, from 1.6 is only $75, and from 1.5 or earlier is only $85.

The "MegaMem" board comes with a 30-day, no-worry, no-hassle, 100% customer satisfaction, money-back guarantee. Try "MegaMem" for 30 days. If you don't feel that "MegaMem" is one of the best purchases you have ever made, or if for any reason you decide to change your mind, just return it within 30 days in the same condition you received it, and your money will be quickly and cheerfully refunded, even the shipping charge, no questions asked.

Your own "MegaMem" board and the end to your memory shortage problems is only a phone call away. For more information on this incredible break-through in memory expansion, or to order your "MegaMem" board today, call Anitek Software Products at 1-407-259-9397. VISA and MasterCard orders taken over the phone. Or write us at PO Box 361136, Melbourne, FL 32936. These are special introductory prices and are only guaranteed through October 31, 1990. Please add $4 shipping and handling for first item and $2 for each additional item. Florida residents add 6% tax. LeScript updaters add $3 if not returning your original serial-numbered master disk.

FREE BONUS OFFER: Order your "MegaMem" board before August 31, 1990 and mention that you read about it in CN80, and we'll give you the "MegaDrive" RAM disk software for FREE! That's right, a $19.95 value for FREE, just for ordering before August 31, 1990.

In general, a "stock" Model 4 can run a fully populated 8 megabyte "MegaMem" board. The maximum RAM you may populate your "MegaMem" board with may be limited by factors unique to your computer, like placement and power consumption of other add-ons. If your computer has other add-ons we suggest you discuss it with us when you place your order.
-Peter Ray (Anitek)

MORE ON THE MODEL 100
by Charles Harris, MD

I have previously described the wodnderul synergism between the Model 100 and Lazy Writer on Multidos.

Lazy Writer has a simple COMM program which lets you access files (and send files) to the Model 100 vial a Null Modem. Only a few keystrokes are needed. Then LW formats the file for printing, which is important since the Model 100 text program does not format the program for printing. Files can be written on Multidos disks, and accessed by LSDOS into memory, then saved to LSDOS formatted disks and printed out with the Model 4 version of Lazy Writer. (The Multidos and Model 4 versions come on the same disk.)

So the TELCOM module of LW on Multidos can serve to access files from the Model 100 via Multidos to LS-DOS. Show me anything in the MSDOS world that is quite as versatile.

The Model 100 also is beneficiary of Super Rom by PCSG,, as well as another made by Traveling Software, which include a data base, an excellent spreadsheet, a thought processor and word processor. Each of these in themselves are powerful programs, and together they are a megaton of great programs. They make the Model 100 a self sufficient little computer, which is sturdy, and travels well. Extra memory is available for the Model 100. However, much of it is banked. Node turns out reasonably priced contiguous memory, but cannot be used with these aforementioned ROMS. But they are working on a software method of doing so. Cryptonics has banked memory which can access the Roms.

The model 100 is a great convenience, and has found a niche in various specialties that do not really require the power of a 386 chip.
-Charles Harris, MD

MOUSE ON YOUR MODEL 4 (WITHOUT AN INTERFACE) Part I
by David Goben

Here is an idea that I have been playing with off and on for the past couple of years: using a mouse on my Model 4 (you Model III users hold on -- I'll soon have a driver for you!). I have been aware of a hardware interface that would allow the Color Computer Mouse to be used on the Model 4 (also called the Joystick Mouse; because its plugs into a joystick port on the CC or the Tandy 1000), but I wondered why one could not take advantage of the 25-pin RS-232-C jack on the bottom back of my Model 4D's, the back of my 4P, or on the bottom of my older Model 4? This was prompted to a great extent by the fact that the Logitech Serial Mouse I had been using on my MS-DOS system had a 25-pin jack, and the fact that it plugged into the Model 4's jacks so NICELY. My Genius Mouse ends in a 9-pin female plug, to which I attached a male-to-male 9-pin to 25-pin adapter from Radio Shack ($7.95), so that it could be used with the serial card on my MS machine. So here I am with two mice that can plug into my Model 4's. One being a tempting spare. That did it. There -had- to be a way to do it.

After spending some time regrowing the hair I had been pulling out, I came across the MD4UTL51 disk from THE FILE CABINET. Aside from all the other nifty utilities on the disk, I found on it the MOUSE/CMD program, written by Scott McBurney. It was a program that supported a 2-button serial mouse. I quickly wrote a test program and tried it using a 2-button Tandy Serial Mouse I begged off from a friend. It worked, but it had some twitchy glitches in it. It was a barebones program, but it did provide me with some crucial information: the basic idea, though incomplete, of how a serial mouse talks to a serial port. Armed with this ammunition, I went to work.

What I wanted to do was write a driver that could support BOTH a 2-button and a 3-button serial mouse, report back to the user with -identical- results so that the program using it would not have to be configured to support the different type mouse devices, interface with the user using only a single SVC, and have the ability to

not only read and reset internal counters in the mouse driver, but also to change its sensitivity as well as alter how it reports relative ranges. Other nice features should include the ability to relocate itself into high memory, remove itself from high memory and recover its memory back to the system, and it should be able to install itself over the top of itself with new user parameters, so that the user could simply re-execute the program with new parameters to change them. Finally, I felt it important to give the user the ability to check the mouse parameters by getting a report from the current mouse driver.

Understanding that such an undertaking would be grueling and highly demanding, I quickly restocked my refrigerator with Diet Pepsi, charged my lamps with midnight oil, and went to work.

What I ended up with was a program that I am very proud of.

The program is called MOUSE/CMD. By default, if you simply entered MOUSE, it will configure itself for a 3-button serial mouse, have a sensitivity factor of zero (how sensitive it is to mouse motion), and report back with a horizontal (X) range from zero through 4095, and a vertical (Y) range from zero through 4095. To alter this configuration, you would use parameters enclosed in parenthesis (the closing parentheses is optional). If you use more than one parameter, they must be separated by a comma. Finally, if you entered MOUSE ? or used an invalid parameter, the program would provide you with a small help screen.

The usage syntax is MOUSE (parameters)

The optional parameters are:

REMOVE: This removes the mouse from the system. If there are no high memory routines located below it, in a lower memory area, it will return its memory space to the DOS, otherwise it will report that memory cannot be recovered (if you later decide to reinstall it, it has the ability to -re-use- its old space). Example: MOUSE (REMOVE).

B2: This option reconfigures the mouse driver for a 2-button serial mouse. Notice that 2-button and 3-button mice are different enough that one configuration -will not- work with the other type mouse. Example: MOUSE (B2).

SENSE=n: This option sets the mouse movement sensitivity for a factor of zero through 3, with a default of zero. Zero is usually fast enough, but a higher factor means less actual mouse movement for a greater range report. Example: MOUSE (SENSE=2).

XSIZE=nn: where nn can be zero through 4094. By setting this to zero, the system defaults to reporting a range from zero through 4095, where the left side is zero and the right side is 4095. This options (and YSIZE) causes the mouse driver to apply a ratio to its movement report. Thus, if you used XSIZE=80, the mouse driver will give you the horizontal position from the left side of the screen in text cell columns. Example: MOUSE (XSIZE=80).

YSIZE=nn: where nn can be zero through 4094. By setting this to zero, the system defaults to reporting a range from zero through 4095, where zero is the top and 4095 is the bottom. This option works like XSIZE above, except that it reports its vertical location. Example: MOUSE (YSIZE=24).

QUERY: This option reports back to the user what the currently active mouse driver parameters are: button-count configuration, sensitivity, and X and Y sizing. Example: MOUSE (QUERY).

The importance of the XSIZE and YSIZE parameters are a great help to programmers, because this feature allows them to forget about factoring down the X and Y values and translate them into the appropriate screen coordinates. Thus, by using XSIZE=80, YSIZE=24, you can tell the driver to report back the actual text screen column and row values. It can as easily be adapted for graphics screens with the 160 by 72 screens, or hi-res screens with a 640 by 240 screen size.

Please be aware that you can abbreviate each parameter name to just their first character, thus REMOVE=R, B2=B, SENSE=S, XSIZE=X, YSIZE=Y, QUERY=Q.

LEARNING THE LINGO (Speaking "Mouse")

To understand the information which the mouse gives you, you must clear your mind of the conception that the mouse gives you hard data on its actual location on the screen. This is totally not true — it just SEEMS that way. Basically what it gives you is data that -you- can superimpose onto the video screen. The mouse does not provide screen information; it simply provides how many "ticks" it has moved horizontally across the X-axis, and vertically across the Y-axis since their status was last read ("Ticks" are often called Mickies, as Microsoft calls them — a standard mouse usually reports 200-250 Mickies per inch; MPI's). My mouse driver amasses this information into internal registers, limiting the Mickie count from zero through 4095. This is only a relative number, and can actually be any range the driver programmer chooses (Scott McBurney used 0 - 1023, if I recall). The job of the programmer that uses the driver is to translate this information as it relates to the screen, giving the user the illusion that the mouse is a part of your video display.

For a programmer to talk to the mouse, you must do so from the machine language level via SVC (SuperVisory Call) 120. This is a nice middle of the road number that will more than likely not be assigned even by user-created custom applications. You might notice that this is outside the 124-127 range as specified by the Technical Reference Manual. The method to my madness is what I assume to have also been Scott's — I've run into too many application programs that use all the 124-127 SVC vectors (My XMEM program, found on DAVID'S MODEL 4 SYSTEM UTILITIES, available from CN80, uses SVC 125, for example). And besides, if MISOSYS ever decides to assign vectors up that high, without skipping any, it will probably be the day after the Model 4 dies.

The first thing your program must do is of course to ensure that the mouse driver is currently installed in memory and active. The Mouse Driver contains a standard device header, with a name called "$MOUSE". Normally a person will use the @GTMOD SVC (83) to find this. But for me this is only a start, as it is not 100 % reliable. I say this because if a driver is installed in high memory, then another driver is loaded beneath it, and -then- you remove the first driver, although it will be removed from the system, @GTMOD will still locate it within protected high memory (unless the de-installer fails to check to see if anything existed beneath it before pushing up high memory -- an invitation to a system crash). Because of this, a secondary method is to check SVC 120, our @MOUSE SVC, to see if it is linked into anything. A sample line of code follows that will detect these things:

```
@MOUSE EQU     12Ø          ;@MOUSE SVC
@GTMOD EQU     83           ;Get memory module
@FLAGS EQU     1Ø1          ;System flags

TMOUSE LD      DE,@MOUSE
       SVC     @GTMOD       ;found?
       RET     NZ           ;error if not
       SVC     @FLAGS       ;point to FLAG$
       LD      H,(IY+26)    ;point HL to
       LD      L,@MOUSE*2   ;@MOUSE SVC vector
       LD      E,(HL)       ;vector to DE
       INC     HL
       LD      D,(HL)
       LD      A,(DE)       ;get 1st byte
       CP      18H          ;installed?
       RET                  ;Z=installed
;------
$MOUSE DB      '$MOUSE',Ø
```

You would use this subroutine by inserting it in your program, and executing it using CALL TMOUSE. If on return the Z flag is set, then the driver is active, otherwise a NZ condition indicates that it is not.

Version 1.0 of MOUSE/CMD currently supports 5 functions: Get button status and X/Y offsets, put new X/Y offsets, set sensitivity and X/Y sizing factors, read the current sensitivity and X/Y factors, and return the mouse type the driver is configured for. Following is a Technical Reference sheet for use by the machine language programmer:

@MOUSE SVC Number 120

Mouse Functions

Performs various functions related to the mouse interface. The B register is used to pass the function number.

ENTRY CONDITIONS:

A = 120 (X'78')
B selects one of the following functions:

If B = 1, return current mouse status and X/Y offsets.

If B = 2, set current X/Y offsets.
HL = X offset from zero. This value cannot exceed the currently defined XSIZE value.
DE = Y offset from zero. This value cannot exceed the currently defined YSIZE value.

If B = 3, get current sensitivity factor and currently defined XSIZE and YSIZE values.

IF B = 4, set the sensitivity factor, XSIZE, and YSIZE.
C = Mouse motion sensitivity factor (0-3).
HL = Maximum limit for X range (0 - 4094).
DE = Maximum limit for Y range (0 - 4094).

If B = 5, get current mouse type the driver is configured for.

EXIT CONDITIONS:

If B = 1:
Success always.
AF, BC, DE, and HL altered.
A = button status.
Bit 2 reset: left button pressed.
Bit 1 reset: middle button pressed.
Bit 0 reset: right button pressed.
HL = X value (0 - XSIZE).
DE = Y value (0 - YSIZE).

If B =2:
Success, Z flag set.
AF, BC, DE, and HL altered.
A = mouse type (see function 5).
HL = actual X offset (0 - 4095).
DE = actual Y offset (0 - 4095).
Failure, NZ flag set.
A = error number.

If B = 3:
Success always.
AF, BC, DE, and HL altered.
A = sensitivity factor (0 - 2).
HL = Current XSIZE value.
DE = Current YSIZE value.

If B = 4:
Success, Z flag set.
AF, BC, DE, and HL altered.
Failure, NZ flag set.
A = error number.

If B = 5:
Success always.
A = 1 if 3-button mouse.
A = 0 if 2-button mouse.

GENERAL:

On a 2-button mouse, if both left and right buttons are pressed at the same time, then the driver simulates pressing the middle button of a 3-button mouse. XSIZE and YSIZE refer to "relative" limits from zero for the horizontal (X) axis and the vertical (Y) axis.

CONCLUSION

In the second part of this article, I will outline the actual communications with the mouse at the hardware and software levels, including some information I have yet to see published elsewhere. If you are a good programmer, you could probably write your own driver from the information I will provide. I will also outline programming examples, and show you how to access the driver from BASIC. -Hopefully- by then I'll have the Model III version driver ready. Since I'm going on vacation while this is being published, I hope I'll have time enough to announce it with my next article. Regardless, the communications with be basically the same, except that you will be using a CALL rather than a SVC.

Considering the amount of work I've put into this, hopefully we will soon begin to see application programs being written to take full advantage of it.

As a final note, if you have never used a mouse before, you are in for a day at the firing range, because using a mouse takes more skill than what you might think, especially on things that require exacting precision. For example, to run the mouse in a perfect horizontal or vertical line takes a -lot- of skill. Most people hold their mouse in such a way that the pointer will often track off to one side. This is usually due to the user holding the mouse at a slight angle, and trying to track it out of alignment with its N-S-E-W poles. In most applications, this is not important, so there is no need for sweat on the brow. But you might try becoming proficient at it using MS2/CMD on the mouse disk. It displays a none-destructive mouse pointer on the screen. You can hold one of the mouse

buttons down to practice drawing lines. You'll see what I mean.

So until next time, HAPPY COMPUTING!
-David Goben

HOW TO ORDER THE CN80 MOUSE DRIVER FOR MODEL 4.

The MOUSE/CMD program and 2 other programs, MTEST1/CMD and MTEST2/CMD (plus their assembly source code), to test the mouse, is available on a disk from Computer News 80, and will not be placed in the CN80 disk series collection or the File Cabinet, as it is not a public domain program.

To order the CN80 MOUSE DRIVER FOR MODEL 4 send $5.00 for orders delivered in the US. Orders mailed to Canada and all other countries send $6.00. Prices include shipping and handling.

FILE CABINET UPDATE
A CN80 Staff report.

In the section following program listings you will find a listing of the new files that have been added to the File Cabinet Catalogs. There are several new items that are now available to you. And a new section to the File Cabinet called the PostMaster Icon Library, in this section you will find 15 disks of icons that can be used directly by David Miller's PostMaster program, without anything to do on your part to make the icons compatible with the PostMaster program. Just make a backup to give yourself a working disk copy, and use the program to load the icons. (See review of PostMaster in this issue.)

Each disk contains four to seven separate files, each containing 30 icons. At present there are a total of 61 files of icons, that's 1,830 icon pictures, plus additional border files. If this is not enough more will be added in time. But you can use the program to build your own icons if you so desire.

Ken Gordon has sent us a disk of "real" bagpipe music for inclusion in the Orch90 catalog.

Plus there are new additions to the Model 4 Utility Catalog, the Model 4 Business, Education and Games catalogs.

Check out the listing for more details of each program.

The File Cabinet price structure remains the same.

1 to 10 disk volumes	$ 4.00 each.
11 to 20 disk volumes	$ 3.75 each.
21 to 40 disk volumes	$ 3.50 each.
41 to 60 disk volumes	$ 3.25 each.
61 or more	$ 3.00 each.

If you supply your own disks the fee for copying is $2.75 each. Supply your disks with labels attached. No return label or container is needed and you do not need to format your disks.

Postage and handling in addition to the disk volume charges are the same if you supply your own disks or we supply the disks.

1 to 10 disk volumes	$ 2.00
11 to 20 disk volumes	$ 2.50
21 to 40 disk volumes	$ 3.50
41 to 60 disk volumes	$ 4.00
61 or more volumes	$ 5.00

For orders shipped into Canada or other countries add an additional $2.00 per order to cover the additional postage costs.

All Catalogs on a disk are still $ 2.00 each, nonrefundable, but you get a free disk of your choice with your first order.

If you don't have your catalog yet order one for your computer, you will find thousand of programs to choose from.

REMINDER

If the last two digits on your label are 90/08 it is time to renew your subscription because this is your last issue. Don't take a chance and miss all the great things that are coming in the next issue.

ASSEMBLY LANGUAGE TUTOR Part 19
by Christopher Fara (Microdex Corporation)

String searches

Finding a "string" of characters in some text is a fairly simple matter. The "text" might be a word processor file or a data base, or perhaps an area in memory where we want to find some particular pattern of bytes. The CPIR, CPDR, CPI and CPD instructions discussed last month in connection with our MENU scheme, are often used in such routines. But if the string has more than one character then the procedure is a little more complicated than a single-key menu. Even if the "lead" (first) character of the string is found, we must further compare its other characters. Of course the "lead" character must be found in the text to begin with, otherwise there is no point in searching for the rest of the string.

We need two buffers somewhere in the program. The HOLD buffer holds a string we want to find. This could be an input buffer where we type some string and press 'enter' which puts a terminating "carriage return" at the end of the string. The second buffer TEXT also will have a terminator. The terminators in both buffers can be the same. We only must make sure that both terminators are unique characters not used elsewhere in the string. In practical applications the text buffer is often terminated by an "end-of-file" byte 26 (control-Z). But for now assume that our buffers look like this:


```
;-----------------------------------------
HOLD:   DEFM 'NEWS'         ;string
        DEFB 13             ;terminator
;-----------------------------------------
TEXT:   DEFM 'COMPUTER NEWS 80'
EOTX:   DEFB 13             ;end of text
;-----------------------------------------
```

We want to find the location of the string 'NEWS' in the text. Let's see how this might work.

```
;-----------------------------------------
FIND:   LD   HL,TEXT        ;start of text
        LD   BC,EOTX-TEXT+1 ;length
        LD   DE,HOLD        ;string buffer
TRY:    LD   A,(DE)         ;lead character
        CPIR
        RET  PO             ;no more text
        PUSH DE             ;save info
        PUSH HL
MORE:   INC  DE             ;try next
        LD   A,(DE)
        CP   13             ;end string?
        JR   Z,STOP         ;yes
        CP   (HL)           ;else match?
        INC  HL             ;point next
        JR   Z,MORE         ;so far so good
STOP:   POP  HL
        POP  DE
        JR   NZ,TRY         ;no good
        RET                 ;string found;
;-----------------------------------------
```

At the beginning of the routine we load HL with the starting address of the TEXT buffer and BC with its length, including its terminator (that's why we add "one" in the operand expression EOTX-TEXT+1). The register pair DE is loaded with the starting address of the string buffer HOLD. At the label TRY we start an "outer" loop which scans the text for the leading character of the string. We copy that character to register A and let CPIR do the job. As you remember, the CPIR instruction stops the scan if a match is found, or if the entire block has been scanned.

If CPIR stopped because the entire block has been scanned then the Parity flag is reset (PO Parity Odd). The last character in the block is our EOTX terminator and we know for sure it can't be a match for the leading character of the string (because we defined it that way, as discussed above). Therefore we don't need to bother checking the Z-flag like we did in the MENU routine

last month. Obviously Z-flag is reset NZ at this moment (it could only be set if the last character were a match). The routine returns and the status of Z-flag will be used by the calling program to decide what to do next.

Otherwise we have a match for the lead character. Since it can't possibly be the end of the "text", the Parity flag remains set and RET PO is skipped. We save DE and HL for a while, because we will need them again, and start an "inner" loop at the label MORE to evaluate the remaining characters of the string. On the initial entry to this loop DE still points to the lead character of the string, so we increment it to check the second character. This second character might be actually the terminator of the string (if the string is only one byte long). In any case we immediately compare it with "carriage return" byte 13 (or whatever the terminator we are using) and if it's a match then we know that all characters in the string have been successfully compared. So we jump to STOP (more about it in a moment).

If the character in the string is not its terminator, then we compare it with the corresponding byte in TEXT. As you remember, after CPIR the register pair HL always points to that byte in TEXT which follows the byte on which CPIR stopped. So we don't need to increment HL before CP (HL). But after the comparison we increment HL just in case there will be more to compare. Then we check the Z-flag (which, as you recall, is not affected by incrementing a register pair). As long as it's set Z we know that the second, third, etc, characters are matching, and loop to MORE, keep incrementing the string pointer DE and the text pointer HL, until we hit the string terminator (all characters match) and jump out of the loop to STOP, or until Z-flag is reset at the end of the loop (we hit a non-matching character) in which case we simply "fall-through" to STOP.

At STOP we immediately POP the previously saved registers. If we "fell-through" from the loop then the Z-flag is still reset (string not found) and we go back to the "outer" loop at TRY to continue the CPIR scan. We can do that because we didn't touch the register BC, so it still holds the count of bytes remaining to be scanned by CPIR. Similarly we preserved HL so that CPIR can resume the scan right where it stopped. And at the beginning of TRY we can quickly reload A with the lead character of the string, because DE has also preserved the address of the string.

If we jumped out of the "inner" loop to STOP then Z-flag was set, JR NZ,TRY is ignored, and the routine returns. The calling program knows that the search has been successful, because otherwise Z-flag would be reset. The other important piece of information returned to the calling program is contained in HL. At this moment it points to a byte right after the location where the string has been found. It can be simply DECremented to point to the actual beginning of the matching segment of TEXT. Depending on the purpose of the calling program, this can be now used to display that portion of the text we were after, position the cursor in the text where the match has been found, or whatever. For example, using our buffers shown at the beginning of this essay, a fragment of the calling program might look like this (Mod-4 use SVC 10 instead of CALL 539):

```
;-----------------------------------------
        CALL  FIND
        JP    NZ,ERROR ;not found
        DEC   HL       ;adjust pointer
        CALL  539      ;display
;-----------------------------------------
```

If the FIND routine returns with the Z-flag reset NZ then we jump to some error processing routine elsewhere in the program. Otherwise we adjust the pointer in the TEXT as noted above, and the ROM/DOS call displays that portion of TEXT where the string 'NEWS' has been found, up to the terminating "carriage return"

```
 NEWS 80
```

Remember that on a successful return from FIND the registers HL, DE and BC still contain all the information needed to resume the TRY loop. Before doing anything else with those registers we might want to preserve them with PUSH and POP, and repeatedly CALL TRY until a NZ-return, to search for any additional occurrences of the same string in the same text.

A complete stand-alone program to test today's procedure could incorporate all the above bits and pieces, plus an initial routine

to input a string. In Mod-4 replace the CALL 539 by SVC 10 (CN80 8/89:8, Z80 Tutor I:7) and CALL 64 by SVC 9 (CN80 12/89:3, Z80 Tutor I:32).

```
;-----------------------------------------
        ORG   64000
RUN:    LD    HL,ASK      ;prompt
        CALL  539         ;display
        LD    HL,HOLD     ;buffer
        LD    B,16        ;max 16 char
        CALL  64          ;input string
        RET   C           ;quit on break
        CALL  FIND
        JP    NZ,ERROR    ;not found
        DEC   HL          ;adjust pointer
        CALL  539         ;display
ERROR:  JR    RUN
;-----------------------------------------
FIND:   ... subroutine goes here
;-----------------------------------------
ASK:    DEFM  'Enter string >'
        DEFB  3           ;end prompt
HOLD:   DEFS  17          ;for string
TEXT:   DEFM  'COMPUTER NEWS 80'
EOTX:   DEFB  13          ;terminator
;-----------------------------------------
        END   RUN
;-----------------------------------------
```

To simplify this example, the ERROR "routine" is the same as the normal jump to the prompt. On prompt press 'break' to exit to DOS. The HOLD buffer is designed to hold an input string up to 16 characters long plus the terminating carriage return (which will be inserted by the ROM/DOS call). You could run it from DOS and play to see how the procedure works. For example on prompt enter

```
  E
```

and the display will show

```
  ER NEWS 80
```

because that's where the first match for 'E' is found. Then enter

```
  EW
```

and the display shows

```
  EWS 80
```

because although the first letter in the search string is also 'E', the second letter forces the search to the next occurrence of 'E' in TEXT. And if you enter lowercase

```
  e
```

then nothing will be found, because our procedure is "case sensitive" and only exact matches are found. Routines similar to our CAP or DECAP (CN90 1/90:7, Z80 Tutor I:35) could be added to ignore the difference between upper and lower case. It would depend on the purpose of each program. But that's about all there is to string searches: the CPIR scan pinpoints the first matching character, and then an "inner" loop verifies the rest.

REMBRANDT AND THE USA

by Dale Hill

So you've inherited a couple of old Model 4's for your classroom while the rest of the school gets new IBMs with the new bond issue. Your a bit bitter, but you wonder what you can do with them. Well, that's what I set out to do with my trusty ol' copy of Rembrandt and some late night time.

A basic rule of thumb in school teaching is, if it takes the kids less time to finish it than it took for you to prepare for it, it's not worth doing. With computers, you can hang that adage out to dry. Yes, it takes a while to do a good job with Rembrandt graphics, but remember, once you saved it, its saved, and you can use it over and over, expand on it and alter it for later use.

My kids always study the United States and so does everyone else's kids. Why not use Rembrandt for display of all the states with capitals and major cities? Sounded good so that is what I set out to do. Now remember I am no cartographer nor am I an artist. I cannot draw an adequate circle, and some of the states are not perfectly proportional, nor are they exactly right, but, if you ask me, they turned out pretty good.

One picture using the Board/Cmd of Rembrandt takes up 3k of diskette space. Quickly you can see that all 50 states will take up 150k with 30k left to play around with. With a title screen, an informational screen, and maybe one other screen, that leaves 21K left for command files. As the task begin, my efforts grew and grew. More on that later.

With a 128K machine, I set up a memdisk as

a drive 2 and put Allwrite on it as well as the Change/CMD which comes with Rembrandt. Using Ted to edit the command files became a bit burdensome, and as I mentioned above, my efforts to reproduce the states on screen grew beyond just a simple state display with region displays, coastal displays, border displays, etc. I also set up question screens for each state that can be displayed before the state and can be edited for individual preference. Thus Allwrite eased the process of editing and helped write those Question Displays.

Using the Change/CMD I did find a glitch in Rembrandt. Writing the Questions, I would CHANGE the screen to a Rembrandt format. If I had a file called TEXQ:2 on my memdisk, and I wanted to CHANGE it to TEXQ:1 into a Rembrandt format, the screen would freeze. I had to reset and actually rename the entire file to get it to work. Thus, my Allwrite question file was TEXQ:2 while my Rembrandt file became TEX/qst:1.

I found the Rembrandt screen editing commands for the Board/Cmd quite adequate for most states. Of course, tiny curves were difficult, but since graphics with Rembrandt are low resolution, fine tuning is not possible. I do wish that there was a way the default drawing commands could be changed since it gets a bit old, after exiting Rembrandt, to set up all of your commands again they way you want.

On a 64k machine with 2 drives, setting up the 50 states with questions, becomes almost impossible. The Brief Command has to be on one drive with system files as well as 300K minimum of screens plus the command files. The command files I set up with little razzle-dazzle such that a black screen would close and open them from bottom up or top down as quickly as possible and showing the state about 10 seconds.

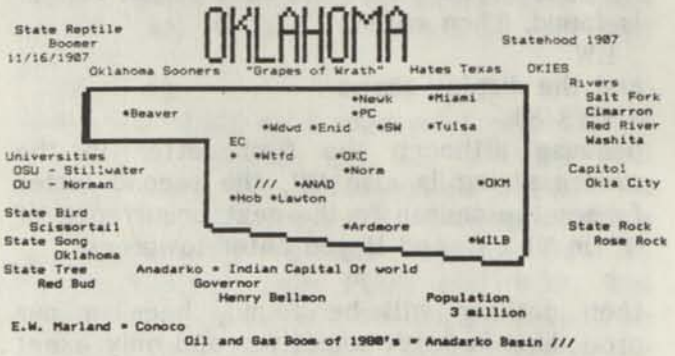
```
Black,1,0
Idaho,1,3
Black,1,0
Illin,1,3
Black,1,0
Iowa,1,3
```

A 99 to replace the 3 will force the operator to press a key to go on. With my question files, that is the way I set all of them up, replacing the Black file with my question file and putting 99 on both the state and he question command line. Remember, command files have to be in pure ASCII. I also included a TOUCH screen that tells the user to "Touch the screen to go on" and ended my command file with REPEAT so that the display automatically goes back to the touch screen, ready for the next reader. Pretty snazzy if I do say so myself.

There is plenty of room for the teacher to add different things on the state screens using the Board/CMD. Just make a copy of the original pictures diskette and edit the individual pictures. I am enclosing the entire display on single sided diskette to CN80 to distribute as they please if they think it worthwhile. If anyone is interested in my question screens and other files, send me 8 bucks for 2 diskettes or 4 bucks for one double sided diskette, and I will send them to you. I have the states displayed in regions such as the Midwest, Southeast, Eastern Seaboard, etc.

Yes, Rembrandt is time consuming but well worth it. No, it is not MacIntosh Hypercard, but with a little ingenuity, you can use your Model 4 with Rembrandt for all kinds of educational screens!!

Now, I am going to seriously set down to that Rembrandt Remedial Reading Machine that I have been thinking about! Let me know if you are interested.
-Dale Hill



A VISIT WITH DAVID GOBEN

by David Goben

This month we begin doing some more functional things on our laser printers. I understand some of the "big wigs" in laser printer support will soon being presenting material in CN80. But simply because everything seems to be "going laser", rest assured that soon I will begin my focus on the FX-80 mode that comes standard on the ALPS, Panasonic, and Tandy laser printers (among others). The nice thing about this change is that those of you using dot matrix printers, such as the Epsons, will be right at home, since the FX-80 mode on the laser printers is just like using a normal dot-matrix printer.

But again, before we get started, let's clear some fog:

UNDOCUMENTED MODEL 4 FEATURES

I hate undocumented features. But I had no sooner got the word out about the undocumented feature in TRSDOS 1.3 (resetting scroll protect when it goes to TRSDOS Ready), then Model 4 users were writing and calling, demanding why I had never presented and undocumented features on the Model 4. Its like they think I know everything (I -DON'T-!). I'm just a schmoe who likes to understand how what he uses works, that's all. Sometimes I can't figure out how to turn a door knob.

Anyway, recently I was (as usual) pulling my hair out (and at 35, my hair doesn't seem to need much help from my hands anymore), trying to figure out how to test for the control key. The problem was that even though an image of the keyboard is stored near the start of the system keyboard driver ($KI), 16 bytes from the start of the driver, stored as 8 consecutive bytes for the keyboard matrix rows 0 through 7, "they" stripped out the CTRL key bit from the 7th byte, bit 2 (!arg!, as it were). Having read THE SOURCE more often than the daily paper, I had for some time been aware of the ability to send a control code of 255 through the @CTL SVC to the keyboard driver and obtaining a copy of this matrix (with the CTRL key code intact). Normally I use this method, but I wanted to do it in an -easier- fashion. When requested for such information, I simply provided this undocumented @CTL data to anyone who wanted to be able to "peek" at the keyboard, like they could on the Model I and III. It is important enough that I will now share it here with you. In machine language terms, this is a simple procedure. Following is a sample subroutine you could call using the DEA Disk Editor/Assembler:

```
;-----------------------------------
# pick up an image of the keyboard.
  On exit, register IY point to the
  Start of an 8-byte buffer which
# contains the current keyboard image.

@GET_KEYBOARD:
    DB   11H,'KI'    ;Load DE with "KI"
    SVC  82          ;@GTDCB
    EX   DE,HL       ;driver addr to DE
    LD   IY,$KEYBUF$ ;point to buffer
    LD   C,255       ;CONTROL 255 funct
    SVC  5           ;@CTL
    RET              ;retur0 to caller
;-----
$KEYBUF$: DS  8      ;keyboard buffer
;-----------------------------------
```

To use this routine, simply use CALL @GET_KEYBOARD in your program. Then, of course, you have to figure out how the keyboard matrix is configured. This you can get from the following table:

BITS-->	0	1	2	3	4	5	6	7
IY+0	@	A	B	C	D	E	F	G
IY+1	H	I	J	K	L	M	N	O
IY+2	P	Q	R	S	T	U	V	W
IY+3	X	Y	Z					
IY+4	0	1 !	2 "	3 #	4 $	5 %	6 &	7 '
IY+5	8 (	9)	: *	; +	, <	- =	. >	/ ?
IY+6	ENT	CLR	BRK	UP	DWN	LFT	RGT	SPC
IY+7	LSH	RSH	CTL	CAP	F1	F2	F3	

As you can see, the matrix is pretty straight forward. You can test for a key by testing its associated bit in the table. For example, if we wanted to test and see if the CTRL key was pressed, by referring to the table we see that this is located under bit 2 at IY+7. So if we wanted to test for the "B" key being pressed, we would use the instruction BIT 2,(IY+0), the flag will be NZ (Not Zero) if the "B" key was pressed.

Since left shift and right shift are separate, you can test for either key by load the "A" register with the byte at IY+7, and adding 3 to it. If it is NZ, then a shift key is pressed.

So there you have peeking at the keyboard using an OFFICIAL method. Some people claim it is easier to manipulate port 84H and switch the keyboard and video into main memory. This is fine as long as you are not doing bank switching. If your program does bank swapping, -remember- that bank 0 -must- be present when bringing in the video and keyboard, otherwise you may find you computer crashing, locking up, or providing unreliable results. But with the above routine, you -never- have to worry about this.

ANOTHER METHOD TO TEST CTRL

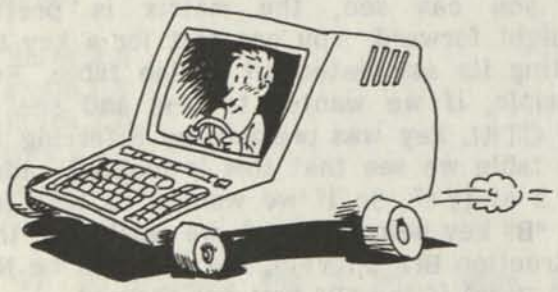
Another method to test for the CTRL key from machine language is by using the @KBD (8) or @KEY (1) SVCs. The technical reference manuals tell you that a key is present if the SVC returns a Z flag. What it -doesn't- tell you is that if the C (Carry) flag is -also- set, then the code in register "A" was the result of pressing a key in conjunction with the CTRL key! Therefore if the SVC returns a value of 13, for example, you now have a way to test if the user had pressed the ENTER key or CTRL-M. If they pressed CTRL-M, the C flag was set. Of course, this method is not infallable. If you press CTRL-ENTER, you will not be able to tell between that and CTRL-M. This is where it comes in handy to look at the keyboard image to check for the ENTER key.

24-HOUR TIME DISPLAY IN DIR

If you have LS-DOS 6.3.0 and want a DIR display to show the last modification time stamp in 24-hour format instead of 12-hour AM-PM format, build a file called TIME24/FIX by entering BUILD TIME24/FIX and enter the following lines:

```
. TIME24/FIX
. Modify LS-DOS 6.3 to display
. update time in DIR listing for
. 24-hour clock, instead of 12.
. June, 1990 by David Goben
.
. Use PATCH SYS6/SYS.LSIDOS TIME24
.
D09,11=00 FE 0D 18
F09,11=0C FE 0D 38
D09,37=00
F09,37=12
. EOP-------------------------
```

Press BREAK or CTRL-SHIFT-@ to exit BUILD, and apply the patch using PATCH SYS6/SYS.LSIDOS:0 TIME24. If you later want to remove it, using PATCH SYS6/SYS.LSIDOS:0 TIME24 (REMOVE).



DOING IT ON A LASER, Part II

When a TRS-80 user first gets their laser printer, the first thing they want to do after trying to print something on it is get the (stupid) thing to advance beyond the first line. As you probably know, the TRS-80 sends only a Carriage Return (CR, decimal code 13) to the printer to tell it to advance to the next line. Some people have, in desperation, resorted to learning assembly language simply to create a filter to also send a Linefeed code (LF, decimal 10) to the printer after each CR. As outlined in my last column, I told you that you could use LPRINT CHR$(27)"&k1G"; to force the printer to accept an single CR code, and force it to also advance to the next line. Fine, you say, it works. But what is all that gobbledy-gook between the quotation marks? And why does it work?

It works because those odd characters are its command language. Now, you might be more familiar with the english-looking commands statements that languages such as BASIC, C, Machine Language, Pascal, FORTRAN, or Cobol use. But regardless of what each command looks like, in the final analysis, each of these "tokens" are just -symbols- that represent something that they themselves are incapable of doing. The computer language processors simply look at the symbol and say, "Oh, they gave me this

instruction. That means for me to do this process over here." The PCL (Printer Control Language) is the same way. The reason that a PCL is so cryptic is to keep its language size down to a bare minimum. This means less typing for you, and also means shorter programs that also use this PCL to send instruction to the printer. Although it may be nice to use long, human-language oriented commands, in the final showdown it comes to a matter of practicality: why use several characters when one will not only do the job, but with one character the printer already has an idea what you want to do, rather than spend (waste) time and memory interpreting an instruction?

As you may have figured from reading the above, because the sample command used more than one character, we must have been telling it to do more than one thing. Actually, we were telling it to go to one -family- of instructions, and to select a -member- of that family, and then to do so-and-so with it.

As stated in the last installment, each PCL instruction for the LaserJet (or compatible) begins with the ESC (ESCape code — 27 decimal), followed by "keyboard typable" instructions. To keep this simple, we will stick with BASIC, where we can get immediate results. You machine language and C programers (among others) can get the idea, and apply them to your language of choice as required.

Because the next instructions are keyboard typeable, from BASIC we must enclose them in quotation marks, and then, to prevent a CR code from being sent, we include a semicolon ";" after the second quotation mark. Thus our BASIC template will always be LPRINT CHR$(27)"..."; where ... represents instructions that we will send to the printer, which will follow the ESC code (CHR$(27)).

Before we take the plunge, you -must- remember that character case is VERY important when using this PCL. Thus you must be able to distinguish between a lower-case L "l" and the number one "1". Because CN-80 uses a printer which displays these two characters so similarly, as required in this series I will be using the slash "/" to -represent- the lower-case L. Thus if you see a command such as LPRINT CHR$(27)"&/1L", you know that you type the lower-case L in place of the slash "/".

STARTING OUT SIMPLE

To kick things off, we should first familiarize ourselves with the -few- commands that are not escape sequences (beginning with the ESC code CHR$(27)). This is a short list, so don't panic.

BS — BACKSPACE — CHR$(8): Moves the print positions one column to the left.

LF — LINE FEED — CHR$(10): Moves the print position to the next print line, and maintains the current column position.

FF — FORM FEED — CHR$(12): Moves the print position to the first line of the next page, and maintains the current column position.

CR — CARRIAGE RETURN — CHR$(13): Moves the print position to the left margin of the current line.

SO — SHIFT OUT — CHR$(14): Selects the secondary font until SI is received.

SI — SHIFT IN — CHR$(15): Selects the primary font until SO is received.

See, I said it was short. Don't worry about what Primary and Secondary fonts are until we get to that point in a future column.

ESCAPE SEQUENCES

Now we get into the meat of the PCL, the Escape Sequences. Here we can make a laser printer do what we bought it for — to wow us.

It is not really important to know what those (funny) symbols mean in an escape sequence, as long as they work. Just as if saying the magic word XYZZY moves us between the the Well House and the Debris Room in Original Adventure (the first adventure game for computers), we really don't care what the word means, as long as it serves our purposes.

I have been stressing the
LPRINT CHR$(27)"&k1G";
instruction, but there are variations of that which you can try. When we use this

instruction, afterward the CR will tell the printer to use a CR+LF when it gets a CR, but when it receives a LF or a FF, it will still do what the above code descriptions describe. But by changing the command, we can tell it to do different things. For example, if we send

LPRINT CHR$(27)"&k2G";

it will tell the printer to interpret a CR as imply a CR, but when it receives a LF, it will first do a CR and -then- a LF, and when it receives a FF, it will do a CR first. You must remember that what the laser printer understands a CR to mean is -not- to advance to the next line, but to simply stay on the same line and move to the left column of that line. Finally, if we sent

LPRINT CHR$(27)"k3G";

we would tell the laser to interpret a CR as CR + LF, a LF as CR + LF, and FF as CR + FF (this is the most TRS-80 compatible). Again, you must remember that CR + FF will -not- advance an extra line, but will simply move the print position to the start of the current line (I may sound like I'm beating a dead horse, but sometimes we must knock what we are used to on our TRS-80 printers out of ourselves).

Well, now that we know how to tell our printers how to advance lines without installing special printer filters into our systems, we need to be able to do something else. Although I think that doing some other things are more important, probably the first thing you want to do is to be able to select some of those neat fonts that are built into your printer. So let's play with what is involved in this arena first.

When you turn your laser printer on (and have it set to the LaserJet mode if it is not a LJ printer), the default setting is usually 10 pitch Courier, and is something called 12 point. Well, if you want to understand these terms, you must forget what you learned "in the shop" about the terms points and fonts, especially if you have had anything to do with publishing. A font as understood by the LJ is a type style, such as Courier, Romans, Helvectical, Line printer, etc. Point size on a LJ has to do with the fractional height of the character. A 12 point font is 12 times 3 dots in height (we are using a rule of thumb, here). Since the standard LJ mode uses 300 dots per inch (DPI), we can figure that by dividing 300 by 36 (12 times 3), we know that a 12 point character is 1/8.33 of an inch in height. This is important when you get into desktop publishing. The term "pitch" most of you are already familiar with, as this describes the number of characters per horizontal inch, at least for fixed pitch fonts. Most fonts for the LJ are proportional spaced, meaning that there is no fixed pitch.

Since most laser printers usually come with only two basic fonts, Courier and Line Printer, we do not have much of a choice to play with. The best way to switch between fonts is to use "downloaded" fonts, which we can load from disk. These we can select simply by calling up the "ID" number. But this subject will be covered in a future column, where CN-80 will be offering a downloading program and a -large- selection of font files. Don't rush them though, because as of this writing I am still in the process of preparing the disks for them (the font disks will be placed in the File Cabinet collection — so you know you will not be spending a fortune for them).

Anyway, selecting a font "manually" can get tricky, because there are are many things that you must take into consideration. The outline is usually as follows: Once you have decided on a font, you must tell the printer to select its orientation (portrait or landscape), its character spacing (fixed or proportional), its pitch (if fixed), its point size, and its typeface. That's quite a shopping list. Of course you can skip any of these steps if you know that the printer is already set up for a step, and as you will soon learn, the LJ can figure what you want from only a partial set of instructions. For example, the printer starts up using portrait orientation (landscape prints the page "sideways"), it is usually in a fixed pitch mode (and set at 10 pitch), its point size is 12, and its typeface as COURIER.

Thus if you just "fired up" your printer, you can set the printer for 12 pitch (though it may not say you can), by changing the Horizontal Motion Index with the command LPRINT CHR$(27)"&k10H";. Now if you try printing anything, it will be in 12 pitch

"simulated". I say simulated because we have told the printer to set the character dot spacing to 10 (times 3) dots rather than the usual 12 (this is why we used the value of 10 in the instruction). We can set it back to 10 pitch by telling it to set the spacing to 12 (times 3) dots with the instruction LPRINT CHR$(27)"&k12H";. I know that this seems backward, but we are talking to the printer in terms of how much space to allot to a character, and not an actual pitch value, as it thinks it is still printer 10 pitch (we are already tricking our printer).

Now suppose we wanted to go into the Line Printer font. Since we are already in portrait, we do not have to worry about that, or about fixed pitch, since we are already there. The only two things we need to tell the printer is to select 16.6 pitch, and select the Line Printer typeface (We could also tell it to select the 8 point size as well, but if you provide the laser with 3/4 of the info, it will be able to figure things out — more on this in a future column). To select 16.6 pitch, we tell the printer LPRINT CHR$(27)"(s16.6V";. To tell it we want the Line Printer typeface, we use LPRINT CHR$(27)"(s0T";. We could combine these two instructions into LPRINT CHR$(27) "(s16.6V" CHR$(27) "(s0T";. To change it back to 10 pitch Courier, we could use LPRINT CHR$(27) "(s10V" CHR$(27) "(s3T";.

One final instruction you may find important before we wrap this month's column up, is to turn the Line Wrap on. Normally the laser printer is set up to chop off any line that goes beyond the right margin. To force it to simply wrap around like it does on a dot matrix or daisy printer (handy for program listings), we turn Line Wrap on with LPRINT CHR$(27)"&s0C";.

CONCLUSION

You are strongly suggested to dig into your laser manual and find the instructions we have covered this month. They will make much more sense once you see for yourself all the variables involved in a single instruction. Besides, I think it rather pointless to cover such material here when it is already published in the printer manual that you have hopefully not thrown away.

Once we have covered a few more basic commands, we will make things interesting by getting into basic graphics, such as drawing boxes, lines, and shading squares. With the information I have provided this month, you already have enough printer control power to make your printer talk in a much friendlier tone to your TRS-80.

Finally, if you have any questions about the instructions in your laser manual that concern the PCL, address them to me in care of Computer News 80 (provide photocopies of the "offending" page if needed). I will try to cover them all in this column, and thus clear up any confusion that you and many others may have. As long as you do not understand these (odd) instructions, they will seem like an impossible task to comprehend. I recall being there not so long ago. Now they are almost child's play. You will think so, too. All it requires is a strong desire to learn, and practice, practice, practice. So crack those books, so when we get into downloading those fonts from your computer (I/III/4) using my soon to be released download program, you'll already be a seasoned pro.

Until next time, HAPPY COMPUTING!
-David Goben

LIVING IN A WELL-DEFINED WORLD

By David P. Miller

In this article I will address programming for high-resolution (H/R) graphics boards; both the Micro-Labs (tm) and Radio Shack (tm), when installed in the Model 4 TRS-80 (tm). While I have no prejudice against the Models I and III, the difference in the use of display and the program example used.

Any correspondence sent to me will be carefully considered. If enough interest is generated, this may become a regular column. If you have specific questions on the subject matter, I'll either attempt to answer them by mail or in another issue (restrict to H/R programming, please).

Both H/R boards provide 19,200 bytes (80 across by 240 high) for immediate display; the part you can see. Both provide additional RAM, but use of the extra

memory will not be covered in this column. The boards also contain logic to recognize port addresses in the range 128 to 131, respond to the data passed to and from these ports, and merge the H/R data with the text screen data on the way to the CRT processor. Most of this, however is transparent to the user; we need only be concerned with the memory addressing on the H/R board and the use of the control ports.

When a graphics data byte is sent to the H/R board, the eight bits in the byte are displayed horizontally at the current X/Y coordinate, with the most significant bit displayed at the leftmost position and the least significant at the rightmost. Screen addresses range from 0 to 79 across the screen (X) corresponding to text character positions, with each position holding eight dots; and from 0 to 239 vertically (Y) with each vertical text position corresponding to ten vertical dot lines. Each position used normally for text therefore contains a possible 80 dots; eight wide by ten high. A value of 128 (value of the most significant bit) written to screen location 0,0 will place a single dot in the uppermost left corner of the screen; a byte of 1 (least significant) will turn on the eighth dot from the left on the top row. This method gives 640 dots across the screen (80 bytes times 8 bits) and speeds up the movement of data by allowing us to move eight bits (dots) at a time, but sometimes requires programming solutions to obtain the correct horizontal placement.

The ports are used as follows; port 128 (X'80') is used to set the X (horizontal) coordinate for input/output of graphics data, port 129 (X'81') for the Y (vertical) coordinate, port 130 (X'82') is used to pass graphics data bytes to and from the board, and port 131 (X'83) for control data to tell the H/R board what to do. Also, the Radio Shack board uses port 142 (X'8E') for additional control information that will be discussed in a later issue. All communication with the H/R board is accomplished with OUT pp,nn statements where "pp" is the port number, and "nn" is the byte to be sent to the board. Meaning of the bits sent to the control port (131, X'83') are as follows:

BIT=1	DOES THIS:	DECIMAL VALUE
0	Turns on the H/R display	1
1	Video Waits on R/S board	2
2	X direction (dec/inc)	4
3	Y direction (dec/inc)	8
4	X read clock	16
5	Y read clock	32
6	X write clock	64
7	Y write clock	128

Video Waits are used to eliminate static lines dancing across the screen, called 'hashing'. This problem only occurs on the Radio Shack board. Both boards provide automatic increment/decrement of the X/Y coordinates at the programmer's option, like the automatic increment of the text screen address when displaying text. However, the H/R board permits you to specify whether or not to automatically adjust the address, and which direction to use when doing so. Decrementing the Y coordinate gives the next dot line up, incrementing moves down, decrementing the X coordinate moves (8 bits, 1 byte) to the left, incrementing to the right. Bits 2 and 3 control the direction, bits 4 and 5 tell the H/R board whether or not to adjust the address after reading a data byte, and bits 6 and 7 control automatic address increment/decrement after writing a data byte.

By referring to the above chart and the comments in World Listing Number One, you will see how the ports are being used to obtain data from an /HR file and send it to the board. Note that the X and Y coordinates are set on each iteration of the Y loop; the X coordinate is automatically incremented after each byte representing eight horizontal bits is sent to the display; and you MUST have a 'standard' /HR file to use this program.

-David P. Miller

About The Author: David P. Miller resides in Okmulgee, Oklahoma (Guiness Book of World Records holder for largest pecan pie and pecan cookie, the latter 31 feet in diameter!) and is the Lead Programmer/Analyst for an oil company. His hobbies include restoring a 1950 De Soto and trying to give his wife's poodle away when she's not looking. He is the author of PostMaster which took a year to develop.

POSTMASTER REVIEW
by David Dalager

A brand new program — one that will let you do everything that the MSDOS Printmaster will do — easily and maybe even a little bit more. All of this on your model 4/4D/4P equipped with a high resolution graphics board and your dot matrix printer that is graphics capable.

HOW IT ALL HAPPENED
Around May or June of 1989 a delightful fellow by the name of David Miller called me in regards to an ad of mine in TRSLINK about some hardware he needed. We must have stayed on the phone for an hour or so discussing various things in the TRS-80 world; and that he made a living in the MSDOS world. David let it slip that he was a machine language programmer and did some things for his TRS80 model 1 and model 4. A little bit of horse trading took place and a friendship was begun. I had then mentioned how I would love to "easily" be able to do the things that Printmaster could do — Thus PostMaster was born. However, ALL the credit belongs to David Miller. David asked for the printer code table for my printer, a Tandy DMP2100P, which was sent to him.

FIRST VERSION
A few months later I received the first version of what was later to become PostMaster, but no documentation. At first I was chagrined — but a note was with it saying put the diskette in drive 1 and type in the command name.

David had told me that it was being written using the MicroLabs Grafix Solution HiRes board and would also work on the Radio Shack HiRes graphics board. Would I please test it on both boards to see how well it worked? Naturally I was flattered to do this for David.

DOES IT WORK?
Into drive 1 went the diskette, after typing in the command name, I nearly fell out of my chair. A beautiful title screen in a full screen window appeared so quickly that it took me a while to realize that the program was ready and waiting on me to tell it what to do. At the bottom of the screen was another window that went all the way across. In the window was a picture of an ENTER key. Not knowing what else to do, I hit the ENTER key, and observed a new screen with a menu at the left, a beautiful graphic picture at the right showing the function the cursor was on. Down in the bottom window appeared the pictures of an ENTER key, and clustered ARROW keys. This program was telling me what to do, documentation was virtually not needed.

My telephone bill grew considerably as I called David Miller and expressed my joy and enthusiasm with this program. David told me to be patient, even more and better was forthcoming. All the king's men would never keep me from having this program. Even in it's unfinished state. David went on to add even more and better "bells and whistles", and even added lights.

An interesting side note: The place where David works has Printmaster. Several of the guys that David works with wanted a copy of it after seeing the program run on his model 4. Gleefully, David told them that it would not run on their IBM (MSDOS) machines. Poor, poor guys. They then wanted David to write one for their machine. Which David declined to do. They thought it was better than Printmaster.

WHAT DOES IT DO
Today, you can own the finest Poster/Letterhead/Shipping label/Mailing label/Diskette label making program that also has a Graphics Editor included. The graphics editor allows you to draw your own customized icon (picture). PostMaster comes with group of icons, borders for your labels, posters, and letterheads. There will be available a large number of icons from several sources that will work with Postmaster. PostMaster will save the label, letterhead, or poster designs to your diskette providing the convenience of not having to re-create your design or having to make up a large batch of labels each time you create a new design.

PRINTERS SUPPORTED
Many printers are supported by the current release, which covers the majority of graphics capable printers available today. Even a Laser printer (using the FX80 emulation mode) should work quite well. If you don't find your printer listed, just write a letter to David Miller and tell him what printer you have.

The list includes the Tandy DMP130 - 430, DMP2100P; Epson FX/RX; Panasonic KXP-1091, -1092, -1124 (in Epson mode); Star Gemini 10X/15X, NP/NX; and the IBM 80 CPS printers. There will be even more as the author receives more printer codes.

ICONS
The number of icons seem to be endless, however, the program comes with a set of 30 icons that in my opinion, every TRS-80 user would want. David spent a lot of time on these.

There is on the main menu a means of printing out each individual icon library, so you don't have to remember what is in it. As far as I know, even Printmaster doesn't have that. So far I have about 20 icon libraries, each containing 30 icons or pictures.

BORDERS
There is a menu of ten borders you can choose from or not as you may desire. All are available as you wish. Brick, shadow, electronics, paper stack, bolted block, cinder block, small town shoppe, and space are the borders presently available within the program.

LETTERHEADS
You can design your own letterhead using icons or not as you wish. You can choose any one of eight fonts.

FONTS
There are at present eight fonts: Gothic, Script, Headline, Hi Tech, English, Block, and Frontier. Using a border or an icon or both in the same label design can limit the number of characters of a font you can place on the first line of a label. You can design your label without either a boarder or an icon and still be very effective.

WHERE DO I GET POSTMASTER
See the authors advertisement in this issue.

In trying not to go overboard, or sound too enthusiastic about PostMaster, I hope that I didn't underplay this review. If I did, please accept my apologies. However, in talking with some of the others that were doing Beta testing of this program for the author, I fear that I grossly underplayed this review.
-David Dalager

(Editors Note) As one of the beta testers for David Miller's program some of our readers may have gotten an advance view of some of the labels that this program will create. Not only is it every bit as exciting as David Dalager's review, it is even fun to use; almost addictive in the number of uses one can put it to. For the home computer user, for the small business, and large business too, it is the first "real" label making program to come out of the TRS-80 programmers bag of tricks so far.

But it is short changing the program to just call it a label maker, but for want of a better description like "a graphic designers program complete with picture and font capabilities" it will be just as well to refer to it as the PostMaster program. Because beyond just labels, you can create your own letter heads, and posters for your business, or for that garage sale. Room here does not allow us to tell you all the things that you can apply this program to, just try it and let your imagination go. Bet your school kids would love to have their own personalized label. One problem, once you start you might just be making labels, or letterheads, or posters, for everyone on the block.

This one is a real winner folks, and if you haven't ever considered the need to upgrade your computer with a Hi Resolution Graphics Board, well here is the best reason to do it now, because PostMaster is a very useful tool that everyone will find a use for.

David Miller who has started contributing some of his other programs and articles to CN80 for the benefit of the TRS-80 users, has promised that he will tell us in upcoming issues some of the neat things that PostMaster will do that he hasn't put into his manual. What better is there than "hints and tricks" directly from the programs author. However, David Miller wants to make it clear that he is not interested in developing more icons, he is more interested in showing us TRS-80 users what these machines can do. -Ed.

LOOKING AT DATA BASES PART I
PFS FILE and PFS REPORT

by Hubert L. Johnston

I began my work with computers back during the 50's when everything was mainframes. Lots of work and not much fun. Then I moved into Hospital Administration and away from daily contact with computers. But I returned to my first love in the late 60's, moving rapidly from mini-computers to the micros. Suddenly, computing became thoroughly interesting and actually fun. I mostly use data bases, word-processors and tons of utilities, and am also working anew with some spreadsheets.

I use a Model 4P with 128k and two single-sided floppies in my home, but additionally I work with the Macintosh and IBM machines at other locations. Recently, I've scheduled several new projects and in that process thought that I would take the opportunity to use different data base programs, getting a thorough hands-on evaluation of each product. Then it occurred to me that to use this experience as a basis for writing reviews about each of the data base programs. So this is my first effort. Review number two will involve working with LITTLE BROTHER and review number three will concern ULTIMA, I hope. If my schedule holds up, review number four will involve GENERAL LEDGER and MULTIPLAN.

PFS FILE/REPORT, (F/R), although not a current product, remains a most useful and powerful File Manager. It's easy to learn and easy to use, a nice combination for a novice computer user. The manuals accompanying those programs are quite well written as well. I think that it is an especially good tool for the user whose computer system is limited to only two single-sided floppy drives.

If you have the DOUBLE-DUTY program you can boot it, and then load FILE into DD's module 1, load REPORT into module 2, and you still have module 3, with a miniature DOS available. Using the F1/F2/F3 keys, one is able to quickly switch back and forth among those three modules and that's a neat arrangement. Bear in mind, though, that as disk space is increasingly occupied, that copying forms, files, and/or changing them, will require you to utilize an empty, formatted disk in one of your drives in order to prevent losing all the data you have entered on your data base. There is an easy way around all the hassle involved, if you utilize a program such as SYSRES/CMD, which allows you to load a few of your DOS modules into RAM, thus freeing up drive A into which to place that empty, formatted disk.

Because of this, I have placed SYSRES/CMD on my DOS disk; in such fashion I can boot the DOS disk, load SYSRES/CMD in RAM and then remove my DOS disk. Then, I load FILE or REPORT in RAM (whichever one I need to be working in at the time). I place the data base file in drive 1 and the blank, formatted disk in drive 0. So when I make changes to the data base forms, or do any copying of them, everything works without a hitch. This, of course, means working without DoubleDuty. That program, like many others (unfortunately!) doesn't like to share RAM space.

File and Report are a menu-driven programs and as such are easy to learn/use. I get nicely prepared reports either in hard copy form, or by CRT display utilizing the report options. By reducing the printer character size to 16 CPI, I can get an entire year's values on letter-size paper. REPORT provides subtotals/totals for all columns, averages for all columns, counts items in columns, sorts by keyword (in column 1 only), alphabetical/numerical sorting, and derived columns (maximum of three) using the +,-,*,/,(), and #N operators to provide addition, subtraction, multiplication, division, parentheses and use of the value in column N, respectively.

In addition, the user may store up to eight pre-defined report designs, you may alter the headings that are printed at the top of each column of a report, and you may have up to 16 columns in a single report.

The FILE manual offers separate chapters on designing a file, adding data to a file, copying a file, searching/updating the data base, printing copies of an individual record, removing a record or all records in a file, changing the design of a file, and a means of computing diskette storage capacity. The number of fields one may employ appears to be based on disk capacity

rather than any pre-set quantity. The FILE manual says that a single sided PFS data diskette with a minimum system on it can hold up to 1150 very simple records, that number increases to 2300 records with double-sided disks, and that the maximum size of a file on a hard disk is 4 megabytes.

I found some interesting un-documented commands:

1. You may produce those special symbols that do not appear on the keyboard (i.e., brackets, braces, back-slash, vertical bar, caret, tilde, underscore, and acute mark) by keying in the usual key combinations for those characters.

2. Left shift & right shift & clear produces the plus minus combination symbol.

3. Right shift & caps & clear returns the cursor to the "home" (uppermost left) position.

4. Shift & —> moves cursor to bottom most left position.

5. Ctrl & H moves cursor to bottom most right position.

6. Ctrl & C brings last entered record to screen.

7. Ctrl & * brings blank record indicating page # to screen.

8. Ctrl & Y moves cursor to right most field on same line.

9. Clear & F3 deletes text retreating left.

10. Clear & F1 selects records in descending order, beginning with most recent one installed.

11. Ctrl & left shift & clear erases entered text all at one time.

12.Ctrl & left shift & X moves cursor alternatively to right most, left most positions.

Currently, I have half a dozen data bases running under F/R. These include a church membership (150 parishioners), a Food Pantry (food for indigents) client services data base (75 clients, and increasing), and a volunteer list (50). Each of those data base files uses three different forms each.

SYSRES/CMD was authored by Jerry Locke, Rt. 1, Box 510L, Bay Minette, Alabama 36507-9801. I obtained it from TRS-LINK. The program operates only with LS-DOS, but can be patched to work with TRSDOS 6.2. The program is SHAREWARE. PFS FILE and PFS REPORT is a product of Software Publishing Corporation.

Utilization of data base (file management) techniques can add a truly interesting and powerful capability to your computing. Try it, you'll like it!
-Hubert L. Johnston

(Editors Note:) PFS FILE and PFS REPORT are two of the most ignored flat file data base programs, and yet they are extremely simple to use and have unlimited power in their application. It is one of our favorite programs, as we have dozens of small record keeping projects stored on disks using PFS FILE and some very large ones stored on our hard drives.

Keep in mind Mr. Johnston's comments about the use of the File program requiring the systems file to be present are related to the use of the PFS FILE and REPORT programs on a Model 4P. On a model 4 you boot up your PFS FILE disk in drive zero, when the menu comes up you then remove the PFS FILE disk and place your data disks in drive Zero, and off you go arranging or rearranging your data as you please.

PFS FILE is a free-form record system, that lets you set up your own form layouts, there is no set record length, or field length. And the flexibility really comes in when you print out your records. The way you print out your files is only limited by your imagination, and not by any predetermined method embedded in the program.

The great weakness in the manual, and there really is none, except that it did not give the user enough examples of how the program can be adapted to any given situation that you might have from keeping your Christmas list, complete with a list of previous gifts given and comments on what you should have given instead, to the inventory of your library or business products. The list goes on and on.

We appreciate Mr. Johnston's fine review, and also his tips on the undocumented key functions. After using this program extensively for six years, we never stumbled on to them. But I guess we never took the time to experiment with the program, except to find new ways to set up file forms, and to print out reports that are such an important part of out business.

Many of you who might be turned on by this review are going to be disappointed in not being able to purchase this program. Tandy dropped it some years ago, and left over stock was depleted in about 1988. If you see this program in the used stack of a neighborhood swap meet, do not - delay grab it! The originals came as two seperate program packages, each selling at $124 each. We paid that much for ours new in 1984, and have never regretted the investment because of the use we have gotten out of them and are still getting out of the programs. Maybe it's about time we started running some more hints and tips of using these programs, as the last we ran were sometime in the early issues of CN80 in 1988. Maybe it would be a good idea to publish some PFS FILE templates, just to help you get some ideas for your own record keeping. Time permitting we will keep that in mind for future issues, unless we can get a volunteer. -ED

DAVID'S LATEST UTILITIES A REVIEW
by Dick Houston

David Goben has done it again! How does a guy who admits to having a regular job manage to find the time to write great articles for CN80 and still turn out application programs and utilities for us TRSers? Anyway, he does, and we all gain immeasurably from his efforts.

David's Model 4 Systems Utilities Package and David's Model 4 File Utilities Package (both available from CN80) are the latest offering. They are compilations of utilities that David has written for his own use, some of them enhanced for more general use. They are, therefore, real working man's tools.

There are basically two kinds of reviews one just tells what's in a software package and what it does; the other is an in-depth report of tests of the package. This one is a combination of the two, since there wasn't time before the CN80 deadline to do lengthy tests on all of the utilities. Some comments are brief, others are a bit more detailed.

First the system package, a total of 16 utilities! CAL produces on the screen or on a printer a small (about "wallet-size") calendar for the month that contains whatever date you enter, with the specified date enclosed in brackets. CLEANUP overwrites all unallocated granules on a disk with zeros. This removes all traces of old files, primarily for security reasons. It might also help solve other problems, such as when my Superscripsit occasionally finds and inserts material from some long-forgotten file! CLOSE can close any or all open files on a disk. DATECONV extends the dating format for disks created by a DOS prior to LDOS 5.3, LS-DOS 6.3, or TRSDOS 6.2.x modified by T62DOSXT.

DISKKEY is an unusual utility that lets you lock space on a disk. It can lock out bad sectors but its more advanced use is to reserve disk space for some particular use. DOS will then pass over the reserved space when writing files, but the user can still read from and write to the reserved space. MAKE1 is the kind of utility that you're not likely to need, but if you ever do, it would save a lot of time. It converts a double-sided disk to a single-sided one - just the formatting of a blank disk, not files! If you have a stock of preformatted double-sided disks and on occasion need a single-sided one, this is the way to go. MEMCHK displays or prints the drivers and filters that you have installed in the system and also shows which extended memory banks are available, if you have extended memory. You can also reserve extended memory banks if you like.

ONEPASS is a handy utility that formats a target disk and backs up a source disk in a single operation. A backup with a source disk with files taking up all but 57K took one minute thirteen seconds and only one command. Possibly no big deal for a single disk, but a great time and effort saver if you have several disks to back up. PRINT is

unusual. I've always considered it odd that DOS provides no direct, easy way to send things directly from the keyboard to the printer. To send a printer code, for example, the only easy way is to go to BASIC, LPRINT CHR$(X) codes, then go back to DOS. PRINT lets you do the same thing without going to BASIC. For text you merely type PRINT Text to be printed. For printer codes and characters not on the keyboard, you use special codes that begin with the character @. Several common things, such as line feed and form feed, have their own codes. Others are done with codes for decimal or hex numbers. This is the only place where I ran into trouble with the utilities that I put to the test. Neither the decimal nor the hex codes worked with my DMP120 or DWP510 printer. I'm sure there is a simple reason and a simple fix, but there wasn't time before the CN80 deadline to consult with David. No doubt CN80 will carry the information shortly.

SYSDRV lets you change the drive number that will contain the /SYS files without actually changing the logical drive numbers. In other words, your system files can be on a disk other than :0, but your lower drive will still be :0 and your upper drive will still be :1. UNDATE - with a mixture of files from several DOS versions, a file with the newer dating system can present a problem. UNDATE lets you change a 6.3-type disk back to the pre-6.3 dating system. VERDISK reads an entire disk (floppy or hard) and reports any errors. The documentation doesn't say what kind of errors are reported. A test with disks known to have flawed and locked-out sectors produced a "No errors" report. Probably locked-out sectors are ignored. Incidentally, an inadvertent attempt to check a drive that contained no disk produced a report of "Illegal drive number" - no real problem, but I was confused for a moment!

XDRIVE could be a real lifesaver if you should encounter the problem that prompted David to write the utility: You are in the middle of a big programming job and a disk drive dies! With XDRIVE you merely tell the system to recognize one good drive as either of two different drive numbers. As required, the system prompts you to insert the disk for drive X and press enter. You have to do a lot of disk swapping, but it beats being totally out of operation! XMEM provides extended memory management. It gives you great flexibility in accessing extended memory. I didn't test this one because I don't have extended memory. This utility, very useful in itself, is on the disk primarily to support the next one: XMEMDISK, which is a virtual memory disk driver. It provides capabilities beyond those of the system's MEMDISK, in that it can access more than two extended memory banks if you have them installed. You can also create multiple memdisks rather than just one.

The final utility in the system package is YANKRES, which lets you deinstall SYSRESed /SYS files without having to reboot the system.

Now to the file package, a group of 9 utilities. DSPTXT is a very useful utility for displaying or printing text files. You have no doubt used the DOS LIST command to see the content of text files. It dumps the file to the screen or printer, but just as it is on the disk. Words break at the ends of lines, tabs just don't do anything useful, etc. Also you have to stop the display where you want to examine something, and if you miss something or want to go back and take a second look, you have to start all over again. Now imagine a utility that treats the file as would a sophisticated word processor - that's DSPTXT! Words wrap around and don't break at the ends of lines, tabs are expanded as they should be, and only a screenful of text is displayed at one time. You can also move around freely in the text as you choose. For printing, you can even specify page length, lines per page, and left margin! Embedded graphics can be printed if you have an appropriate printer. If you work with text files, DSPTXT alone is worth the price of the package!

ERASE is another program for removing a file completely instead of just deleting its directory entry. The directory entry and all allocated records are overwritten with zeros.

INDEX4 is also worth the price of the entire package! It displays or prints, in alphabetical order, all files on a disk and provides 65 spaces after each one for your insertion of information about the file. This

information is written to a file on the disk. Thereafter you can enter INDEX4 instead of DIR and get the complete file index. When you add or delete files, INDEX4 automatically updates the next time you use it and you can add notes about the new file(s). You could have a problem if you have only two drives and there is no room on your system disk to install INDEX4. In such a case you could give up a bit of disk space and copy INDEX4 to your data disk. INDEX4 itself requires 4.5K and the index file I created for a disk containing 23 files took only 1.5K. So for 6K (out of 174K) less space on your disk you get a very handy disk index. I, for one, can live with that!

KILL lets you dispose of files using KILL instead of REMOVE. I personally have never seen why it makes any difference, but I suppose there could be a problem for someone who uses both Mod III and Mod 4 regularly! MAP displays or prints the memory locations of load-module files. For anyone who hasn't delved into the mysteries of DOS, any file that you can call by just entering its name at the command line must be in the specified load module format. The format precedes the actual working part of the file with various information that DOS needs to load the file. The MAP display is very similar to that of the DOS FREE command, but in addition the sectors containing the specified file are identified. The entry point of the file is also shown. If you specify two or more files, the information on the separate files is displayed consecutively as you request it. If you specify a data file or a BASIC file instead of a load-module file, the screen shows "Assume data file" and still shows the memory allocation.

MODLRL lets you easily modify the logical record length (LRL) of a file. You might need to do this, for example, to adapt a file created by one program to be used by another program. You could convert the original file to the LRL of a word processor, edit the file using the flexible features of the word processor, then use MODLRL again to convert back to the format of the original file. MOVE speeds up the process of moving a file from one disk to another by copying the file to the new disk and then deleting the file from the original disk. A test showed that the whole operation took negligible time and avoided having to enter two separate commands.

SAVBAS is a great utility for a BASIC programmer. If anybody who does an appreciable amount of programming in BASIC ever tells you that he has never left BASIC without saving a program, you'd better check his credentials! Actually I've lost few "first editions" of programs that way, but all too frequently I've squashed bugs and/or made modifications and forgot to save the new version. I really didn't know that the program wasn't deleted until I read David's docs. The program is still there if you haven't turned the computer off or used the memory space for something else. I typed in a small program and then entered SYSTEM, leaving my program dangling. Then I used SAVBAS and looked in the directory — almost miraculously there was my program!! Incidentally, you enter the desired program name when you use SAVBAS, since up to that point a new program has no name or if it is a revised program, SAVBAS won't let you overwrite the existing file.

Finally, UNREMOVE is another OOPS! type of lifesaver. If you have dumped a file with REMOVE, PURGE, or KILL, and haven't yet written some other file, UNREMOVE will restore the file. Actually the file was still there, of course, and UNREMOVE just restored the directory entry. Sooner or later, you'll need this one!

Some general info — Each package comes with a very good instruction manual that is well written, with full information on each of the utilities. In keeping with David's well-known devotion to providing generous assistance to the TRS world, there is no copy protection so that you can freely copy the individual utilities to where they are needed. All utilities are, of course, fully copyrighted and for use of the purchaser only.

In closing — we all owe David a vote of thanks for these two packages - as well as for his many other efforts.
-Dick Houston

GIF4MOD4: A GRAPHICS IMAGE DECODER

By David P. Miller

GIF4MOD4 Version 2 runs on the Tandy/TRS-80 Model 4 with 64K RAM and at least one disk drive. $39.95 from J.F.R. "Frank" Slinkman, 4108-C Fairlake Lane, Glen Allen, Virginia 23060.

After installing my first high-resolution board, it took all of three days before I was wondering just why I had spent the money. The capabilities for excellent graphics displays were there, but I just couldn't find anything to put up on the screen. Being an avid 'modemer', I checked out the graphics file areas on several Bulletin Board Systems (BBS's) and quickly found that almost all of the graphics picture files available were stored in something called a 'GIF' format. Also available on the BBS's were GIF readers for (it seemed) every computer except mine.

Looking at the situation a little closer, I found that 'GIF' (an acronym for Graphics File Interchange format) is a format developed by Compuserve and released for public use to provide the capability of displaying graphics pictures on any computer with the appropriate resolution, regardless of brand. Since the 'GIF' format provides information to a GIF reader about how the picture is to be displayed, rather than just containing graphics bits, the program reading and displaying the file can create a close approximation of the original image even though a computer has different display capabilities than that of the source computer. A GIF image that started out in color can even be converted to a gray-scale (black and white) image that is quite close to the original.

Just when I was about to give up and resign myself to a loss, I saw the ad for GIF4MOD4 in the March 1990 issue of Computer News 80. Wasting no time, I immediately ordered the program and sat patiently by, reading and re-reading in anticipation the long lists of GIF filenames I had captured from several BBS's. The package arrived even sooner than I expected; I quickly ripped it open, made a backup, and typed in "DIR" to see what was on the diskette. The GIF4MOD4 distribution package consists of one diskette with several example files, the GIF4MOD4 program, some utilites, and the manual in a 31K /DOC file.

DOCUMENTATION

While I can sympathize (from experience) with the economic pressures that lead to the use of /DOC files, I tend to expect printed documentation with programs costing more than $25.00. This is of course a personal opinion, but there are still people that do not have a printer; reading and referring to a manual in this form can be trying. The documentation, once printed out, is well-written and logically laid out. Mr. Slinkman makes a potentially confusing subject easy to understand. Starting with installation on a working disk, going on to operation of the program and use of the utilities, then proceeding to discussions of the more advanced use of the program and specifics about the included /GIF files offers all the information the user needs at any stage from beginner to expert.

OPERATION

Typing GIF4MOD4 at the DOS prompt without specifying a filename results in a command summary display on the parameters that can be used. All pertinent phases of program operation can be controlled by the user through switches following the filename, including several to affect the translation of the image for proper display on the screen. In most cases, a menu is displayed offering one of six "dithering" options for image translation.

DITHERING

"Dithering" is a term that refers to the process of averaging out the dots in an area of the image to approximate the original brightness through separation between the dots placed on the screen; the brighter an area is to be, the more dots are displayed. GIF4MOD4 checks the dot density surrounding the area under consideration against the information in the file, then places dots to create the closest possible effect. Since there are six different methods of dithering available (and 'No Dither'), the user can experiment to obtain the best possible image from the file. Once this is done, GIF4MOD4 will create an /HR file when the appropriate switch is specified.

In every case I have experienced, the

program has performed flawlessly as claimed. No loss of control or re-boots have occurred, and the user can press the <BREAK> key during program operation to abort the current activity and return to DOS.

UTILITIES

HR2GIF, also included on the diskette, converts /HR files (both Model III and Model 4), /HRG files, /CHR files, and Pro-DRAW /BLK files to /GIF format. APENDGIF/BAS combines /GIF files into multiple image files for slide-show type displays. JCL files are provided to convert 'PC-compatible' files from CGA, EGA, or VGA GIF formats to a format displayable on the Model 4 high-res screen. You can change the default drive as you wish, and a BASIC program is provided that reports information on GIF image files.

PROBLEMS

The manual gives instructions at one point to press <CTRL><R> to repeat a command, but this sometimes results in an attempt to create a temporary workfile. Upon attempting to run APENDGIF/BAS, a type mismatch occurred. Examining the line specified, I noticed an apparently unclosed parenthesis. Other than this, everything seemed to perform flawlessly. As Mr. Slinkman mentions in the manual, the limitations of the TRS-80 are the cause of the seemingly long time to process a GIF file. While I have my own reservations about this, GIF files are typically 30K and more in length, and stored in a compressed format; this indicates an extremely large amount of data to be processed per image. Still, the time is not too great for the results achieved.

CONCLUSION

The GIF4MOD4 package is an important tool for anyone owning a high resolution Model 4. Since most sources of image files use the GIF format, this program opens the door for the TRS-80 to share in the high-resolution fun. Because of the speed of the program, it seems best suited for use for conversions to the TRS-80's native /HR format. Although the documentation is supplied in disk file format instead of as a printed manual, it is well-written and easy to understand. With the exceptions noted above, the programs are bug free and do the job admirably. For anyone wishing to make use of the (literally) thousands of GIF files available from BBS's and distribution points such as The File Cabinet, GIF4MOD4 is indispensable.

-David P. Miller

THE HP-DESKJET PRINTER

by Hans de Wolf, Haarlem, The Netherlands

A previous issue of CN80 asked for some information about the use of the combination of a TRS-80 and a modern printer like a laser printer.

I have used a Hewlett Packard DeskJet Plus inkjet printer with my TRS-80 model 4P for some time now, and want to present some of my experiences to the readers of CN80.

PRINTING TECHNOLOGY

First let's discuss the printer. The Hewlett-Packard Deskjet Plus printer is an inkjet printer. It is not a page printer like a real laser printer (which first builds a bit image of the complete page in its memory before printing), but prints line-by-line like a conventional dot matrix printer. The printhead does not contain wires that are fired against a ribbon, but contains 50 tiny nozzles and an ink reservoir. Each nozzle has a small electric heater. If a dot must be printed on the paper, the heater in its nozzle is switched on. This causes the water-based ink to boil, and the pressure of the vapor ejects a droplet of ink from the nozzle to the paper. The distance between the nozzles is small enough to produce a vertical resolution of 300 dots per inch. The horizontal resolution is 600 dots per inch, but because a nozzle cannot fire twice in sequence, it is effectively also 300 dots per inch. In the past inkjet printers were troubled by ink clogging the nozzles, but HP has solved this problem by developing a disposable printhead that contains the complete printing mechanism: the ink reservoir, the nozzles and heaters. If the ink supply is empty, you should replace the complete print head (costing about $25) with a new one for another half million characters of high quality print, or twice as much in draft quality.

The printer comes equipped with a sheet feeder. It can also print on envelopes (which must be fed manually), but it cannot print on fanfold paper. Other hardware features: both a serial (RS-232C) and parallel (Centronics) interface, and two slots for expansion cartridges.

PRINTER FIRMWARE

The printer is equipped with a 16 kbyte buffer and its own processor (a 4MHz Z80 for the original DeskJet and a 8 MHz Z180 for the DeskJet Plus).

To control the printer features from within a program you must send escape codes consisting of the ASCII escape character (CHR$(27) in BASIC) and some normal text characters. These escape sequences are defined in HP's Printer Control Language (PCL). There are a number of versions of PCL, ranging from level 1 for the most simple printers to level 4 for the LaserJet II and level 5 for the new LaserJet III. Formally the DeskJet is designated as a PCL level 3 printer, but most of the level 4 functions are included, plus a number of unique extensions.

FONTS

Apart from its speed, low noise and print quality there is an other reason to use a DeskJet: its capability to print in many different fonts. The Courier font with variations (bold, half and double width, underlining, subscripts and superscripts) is standard, the DeskJet Plus offers also italics and a landscape option (print rotated 90 degrees).

If you want more fonts there are two ways to add them: font cartridges and soft fonts.

The font cartridges are the most simple to use: insert a cartridge in one of the slots and it is ready to be used - just activate a font from the front panel. However, font cartridges have their disadvantages: they are expensive (because you pay for software and hardware) and they offer only limited flexibility.

The soft fonts are an alternative to cartridges. Soft fonts are supplied as disk files which can be downloaded into the printer by means of a simple program, but before the DeskJet can accept them you must increase its memory by adding one or more RAM cartridges. The original DeskJet can accept up to two 128k cartridges, the DeskJet Plus can also accept 256k cartridges. The required amount of RAM depends on the size and number of characters in a font. A medium sized font with the 7-bit ASCII set costs about 20 kbyte. You can store any combination of fonts in the RAM cartridge, making it more cost effective and flexible than a font cartridge. However, you must accept that downloading takes time: about the same time as copying a file of the same size on a floppy disk.

DIFFERENCES WITH A LASER PRINTER

In many cases the DeskJet can replace a more expensive laser printer, but there are a few differences you should be aware of.

- In most cases the DeskJet is slower than a real laser printer.

- The DeskJet is less expensive than a real laser printer, but the cost per copy may be higher.

- The ink is water based. This means that you should select your paper carefully. It is not necessary to buy the expensive special ink jet paper, but the printout is not water-proof and is as susceptible to smearing as a copy written with a fountain pen. Label printing is difficult because most labels do not absorb the ink.

- The PCL level 3 language does not include all laserjet commands. Missing are commands to draw lines or shaded boxes, or to create multiple copies. PCL macros are not supported. The print head movements are restricted: you can move to the left, right and bottom, but upward movements are restricted to only the few lines not yet printed to prevent smearing.

- The DeskJet softfonts and LaserJet softfonts are incompatible (but there are MS-DOS programs to convert LaserJet fonts to DeskJet format). The DeskJet cannot use landscape softfonts.

DESKJET AND TRS-80

The DeskJet can perfectly be used with the TRS-80. It connects to the parallel interface without a problem, but you must remember to change the setting of one

DIP-switch to tell the printer that the TRS-80 does not send a linefeed (ASCII 10) after a carriage return (ASCII 13).

There is not much TRS-80 software available for the DeskJet printer. Prosoft's AllWrite with the LaserJet option and the improvements made by Gary Shanafelt and Lee Rice works perfectly with the DeskJet, with good support for soft fonts. [Note: Prosoft no longer provides software support, and are no longer selling their "Allwrite" word processing package.] Version 2 of Anitek's "Lescript" includes support for the HP LaserJet, which may work with the DeskJet. For those who want to print graphics there is a program available from Frank Slinkman to print GIF images.

If you use software where you can specify the printer escape codes yourself, then it should be possible to modify the program for PCL escape sequences.

For all other TRS-80 software I recommend the Epson emulation cartridge. If you insert this cartridge in the DeskJet it will behave as an Epson FX-80 printer. It will accept the Epson escape codes and Epson bit image graphics (like those from "DotWriter"). It will even accept the downloadable fonts in Epson format. In addition to this it will give you an extra size Courier font, an Prestige Elite font (normal and italic) and a proportional spaced typeface. Some things are not possible when you insert this cartridge: the DeskJet will no longer accept PCL commands because they would conflict with the Epson codes. This means that you cannot use soft fonts or landscape printing when this cartridge is connected. Only a few unimportant Epson features are not emulated, such the codes to select and deselect the printer and the bell signal. I have not encountered any problem with the emulation.

HINTS AND TIPS

Here are a few hints and tips for those who are considering to buy a DeskJet printer, or already own one.

If you are planning to buy one, make sure that you give attention to the differences between the original DeskJet and the DeskJet Plus. I think that the improvements in the Plus are worth the extra cost, but the original DeskJet may be a real bargain if you do not need these features. The differences between the DeskJet (DJ) and the DeskJet Plus (DJ+) are:

- The DJ+ is faster, especially for graphics (5 times as fast).

- The DJ can only handle 128k RAM cartridges, the DJ+ can also accept 256k cartridges.

- The DJ+ comes with standard Courier italic and landscape fonts. The original DJ requires an additional cartridge for this.

- The spacing of proportional fonts like Helvetica and Times Roman for the DeskJet Plus is improved.

- The DeskJet Plus can handle fonts of up to 30 points. The original DJ was limited to 24 points (1 point is about 1/72 inch), but fonts with descenders were limited to about 18 points.

It is possible to reduce the cost per printed copy significantly. According to Hewlett Packard you should replace the printhead when it is empty, but it is possible to refill it with fountain pen ink. I know that many users refill their printheads without problems, but you should be aware that there is always a small risk that ink may leak into the printer.

Most DeskJet users will sooner or later start to use soft fonts. Hewlett Packard sells a small collection of soft fonts (look alikes of the Times Roman and Helvetica typefaces, and Univers Condensed), but much more fonts are available in the public domain as LaserJet soft fonts, which can be converted by the MS-DOS program LJ2DESK. Access to an MS-DOS computer is important for soft font users because most fonts on disk are only available on MS-DOS disks.

FOR DESKJET OWNERS...
Here a a few items for the readers that already own a DeskJet printer:

When you download soft fonts into your printer, make sure that you always download the largest fonts first. The RAM cartridges are divided in banks of 64 kbytes each, and a font must completely in a bank.

The DeskJet always stores a font in the bank with the most memory available. Downloading small fonts first may cause a problem when you try to add a large font: while the total amount of free RAM can be sufficient, but none of banks may have room to contain the complete font.

You can get a print-out of the fonts loaded into RAM by starting a self test: keep the FONT button depressed while you press RESET.

When you have changed the DIP switches to generate a linefeed after a carriage return, "Allwrite" will print extra blank lines because the HPLASER/TAB driver send separate linefeeds. The solution is simple, add this "Allwrite2" command to HPLASER/DEF:

...;SY@27,38,107,48,71

This stands for the PCL command code ESCAPE & k 0 G: disable automatic linefeed generation. At the end of the document "Allwrite" will reset the printer to the linefeed mode specified by the DIP switches.

In order to reduce RAM requirements and download time use soft fonts with the ASCII symbol set when possible. Use other character set only when required.

Who will write a program to convert LaserJet fonts to DeskJet fonts that will run on a TRS-80 ? Or even better: a program that can convert between HP LaserJet, HP DeskJet, DotWriter and Fontasy fonts? Can someone create a soft font editor like TGEAP in the DotWriter package? Another idea: who wants to create a soft font that contains the TRS-80 character set(s)?
-Hans de Wolf

(Editors Note:) CN80 and David Goben as a staff project are presently working on producing softfonts that can be down loaded to your laser printer from your TRS-80 Model 4. But we would welcome any input and ideas from those who already own a laser printer or a deskjet ink printer. In any event if you love your TRS-80 and the way it handles word processing, then you don't have to give it up to take advantage of any of the new technology items such as the new printers, dot matrix, ink jet, or laser printers. Consider the memory expansion being developed by Anitek, mouse capabilities and the high resolution boards from MicroLabs, just as a few examples of the new technology items that can be added to the TRS-80 computers. If you look at the cost of these additions, compared to the cost of the same items for MS-DOS compatibles, you can really save a lot of bucks by doing it on your TRS-80! -CN80

PRO-WAM: A REVIEW
by Mark Allen Reed

PRO-WAM, the Model 4 window and applications manager, requires two disk drives and at least 128K of RAM. It is available from MISOSYS, Inc. (P.O. Box 239, Sterling, VA 22170-0239).

THE PROGRAM
The main program, PROWAM/CMD, installs a module in the Model 4's high memory. This module performs two functions.

First, it provides standard "pop up" window routines. You can use these routines from within your own programs, as long as your programming language allows you to invoke PRO-WAM's supervisory call (SVC). LS-DOS BASIC has this capability, but TRSDOS BASIC does not.

Second, it manages a disk library of tiny applications programs. These applications are designed to pop up over whatever you are doing. For instance, you could be programming in BASIC and decide to pop up a calculator to figure out a "PRINT @" address. Or you could be writing a letter and pop up the address file to get a name and address. When you're done with a pop up application, just press <BREAK>; its window will "close" and you can continue where you left off.

The best part about PRO-WAM's applications is that they can transfer information back and forth with the main program. You can transfer information from the calculator to the BASIC program (in a

process known as data export), or you can transfer data from the word processor to the address file (in a process known as data import).

Four of PRO-WAM's applications are stored in an extended memory bank of the Model 4. The rest are retrieved from disk as they are needed.

THE APPLICATIONS

PRO-WAM includes seventeen tiny applications: an address file, an algebraic floating point calculator, an appointment book, a calendar display (which is integrated with the appointment book), two kinds of card files, a card file form creator, a character set display, a telephone dialer, a video display saver and loader, an address header (which is integrated with the address file), a shorthand phrase expander, a reverse Polish notation integer calculator, a tiny terminal program, a "to do" list, and a typewriter emulator.

Most of the applications do what their names imply, but two of them require explanation. The address header takes a name and address from the address file and exports it in a format suitable for the heading of a letter. The shorthand phrase expander accepts two-letter abbreviations and exports phrases up to seventy-eight characters in length. For instance, the letters "cn" might expand to the words "Computer News 80", or "i2" to "in the party of the second part".

PRO-WAM also offers a built-in application that emulates the "DOS Ready" prompt. Have you ever wanted to copy, delete, or rename a file in the middle of a program? Pop up PRO-WAM and you can.

MISOSYS offers additional PRO-WAM applications in its Mr. ED package, and several more are available from other sources.

THE DOCUMENTATION

PRO-WAM's documentation ranks among the best I have seen. It is complete, easy to understand, and occasionally humorous. The instruction manual includes a table of contents, glossary, and index, and it is attractively packaged in a 7 by 9 inch blue binder.

PRO-WAM also includes a help program, HELPP/CMD, which provides reminder screens to refresh your memory.

OTHER PROGRAMS

Rounding out the PRO-WAM package are PSORT, which sorts (and optionally compresses) PRO-WAM data files; PRUN, which runs a PRO-WAM application from the DOS prompt or a JCL file without invoking PRO-WAM's applications menu; WAMLIB, which rearranges applications libraries; and DEFAULTS, which changes any of PRO-WAM's default settings.

CONCLUSIONS

It did not take me long to get used to the luxury of having a calculator, calendar, character set display, typewriter emulator, and DOS command line available from within any program. The shorthand phrase expander and card file have also proven useful on several large writing projects.

Now that I've used PRO-WAM, I never want to do without it. If I had to cast my vote for the best program ever written for the Model 4, PRO-WAM would be it.
-Mark Allen Reed

MODEL 4 UTILITY DISK MANUAL CORRECTION

by Mark Allen Reed

Page 2 of the instruction manual for my Model 4 Utility Disk explains how to install CMDEDIT, the command line editor. According to the manual, the first command to type at "DOS Ready" is COPY CMDEDIT/CMD SYS13/SYS.LSIDOS:0 (C=N).

This command is correct if you are using TRSDOS 6.2 or LS-DOS 6.3. If you are using LS-DOS 6.3.1, however, you should change this line to COPY CMDEDIT/CMD SYS13/SYS.SYSTEM6:0 (C=N). The password for SYS13/SYS has changed from LSIDOS to SYSTEM6.

Other than this small correction, I have received no bug reports for the Utility Disk.

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

WHAT I DID WITH MY TRASH REVIEWED
by Henry A. Blumenthal

"What I Did With My Trash", subtitled "Ten Years With a TRS-80", is 72 pages of humor (sort of) interspersed with tips on conquering (sort of) the limitations of Scripsit and SuperScripsit. It was written by Eric Bagai and published by Flaming Sparrow Press of North Hollywood, California. Suggested retail price: $5.95

I was hoping for reminiscences of shining moments and frustrations of the TRS-80 in general; instead, I got some humor in questionable taste, some tips on using word-processing programs that I haven't touched in five years, and a tongue-in-cheek tutorial on writing a "GW-NORTH" BASIC program, i.e.:
40 INPUT BEER%(SOME), EH
50 ON BEER%(EMPTY,GONE) GODO BEER%(RUN), OK, EH.

His hints on the use of Tandy's venerable word processing programs, Scripsit and SuperScripsit, would have had relevance if written in 1980. The problem is, he assumed that the hints that worked for Model III Scripsit will work on the Model 4, which has its own, much easier ways of doing some things. For example, Bagai went into some detail on simultaneously pressing three-key combinations to produce special characters, such as brackets and underlines, and even how to create special files to hold them for evoking at will. Although he says Model 4 Scripsit is the same as Model III, he did not seem to know that special characters can be evoked effortlessly on the Model 4 by pressing the clear key with one other key, and that the clear key, not the @, is the control key for all functions.

On the other hand, his tips on such things as inserting type within Scripsit were illuminating. Trouble is, I haven't used Scripsit for a half decade. Not when I can have on-line spell-checking with windows, alternate screens, italicizing, boldfacing, proportional spacing, and mixed type sizes and faces. Bagai's explanation of SuperScripsit, describing it as the kludge that it is, was on the mark. He also bashed Tandy for not marketing TRSDOS machines better and for insisting, until it was too late, on supporting only the handful of programs that it carried on its shelves.

Again, on the mark. But all this is old stuff.

How many years did Mr. Bagai have his "Trash"-80? Did he ever graduate to a Model 4? Did he ever give it extra memory? Did he ever install a hard drive on it? Did he ever use it for spreadsheets, databases, music? Did he ever avail himself of the excellent software out there from Anitek, PowerSoft, PFS, MISOSYS, Goben? Did he utilize windows, KSM? It would seem that he was familiar with none of these things. There are so many things I would have liked for him to have shared with us. I wish the title of his book had been, "What I'm Still Doing With My TRS-80". THAT would have made for an interesting book.
-Henry Blumenthal

ALLWRITE LASER PRINTING Part 1
by Lee C. Rice

Hewlett-Packard introduced the first laser printer in the mid-1990s, at just about the time that many software producers were migrating from the Model 4 world into MSDOS. ProSoft, manufacturer of Allwrite and Dot-Writer for the Models 3 and 4, and several earlier text processors for the Models 1 and 3, began work on a Laser Support Package for Allwrite in 1985. At that time the people at ProSoft were themselves developing software for the newer MSDOS systems, and apparently scrapped the undertaking of any large software development for Allwrite and the Model 4 midstream. The Laser Support Package was not advertised at all, but notices were sent to some of the several thousand registered Allwrite owners, and several dozen packages were distributed in this way.

Because ProSoft had neither the time nor the capital to invest in updating or supporting the package, which originally provided support for the Laserjet only (with an additional supplementary package for the Laserjet-Plus machine), it quickly became dated. Hewlett-Packard introduced the Laserjet-2, then the Deskjet printer (which, while based on an entirely different technology, has a major subset of the PCL language built into its ROM), and then (in 1990) the Laserjet-3 and the HP-P (personal

laser printer).

During the past several years, Gary Shanafelt and I have done extensive software development, starting from the original ProSoft laser Support Package, in order to keep Allwrite up to date with the quickening pace of laser and inkjet technologies. One reason I had was that Allwrite was and is currently used as a "production system" for many books and magazines published by Marquette University press. One reason both Gary and I had was a real liking for Allwrite and for the Model 4. The editor of CN80 has asked us to prepare a series of articles and (later) shorter monthly columns for those using Allwrite and either laser or Deskjet printers.

This is the first article, and is intended as a general introduction. The next article will get down to specifics for driving a laser printer with Allwrite on the Model 4. After that Gary will devote an entire article to the Deskjet family of printers. We hope that, after these initial articles, readers who are finding them useful will get in touch with either Gary (for the Deskjet, me (for the laser family, or CN80 (general comments) - so that the editor of CN80 will know whether there is reader interest in a monthly column.

We also plan to make available to CN80 readers at least two sets of software (one for the laser family, one for the Deskjet family) which will enable Allwrite to drive any of these printers smoothly and efficiently. To use this software, indeed to make much use of any of the information to be offered columns, MUST be a LICENSED owner of Allwrite (Version 1.12 or 1.13 for the Model 4.

WHY ALLWRITE?

Anyone familiar with recent developments in the MSDOS world knows that the popular word processors touted as all the rage (WordPerfect, MS-WORD, WordStar, etc.) are WYSIWYG ("What you see. Is what you get") formatters; they try to duplicate the exact page and print characteristics on the screen, so that the user can see the results before printing. In the TRSDOS world, LeScript is an example of WYSIWYG formatting, and so is SuperScripsit. Both of these formatters work just fine with standard printers (dot matrix, daisywheel, etc.). Most of these printers use fixed width font, where each character occupies the same horizontal space. proportional width fonts, which require the formatter to know the individual width of each character available, were primarily used by daisywheel machines.

The laser printer made life enormously complicated for the WYSIWYG world. It is at its best with proportional fonts, and promised fonts of many varieties (shadows, hollow, emboldened) and sizes, so that document preparation moved from printing to formatting in "camera-ready form." But the standard microcomputer screen could not handle different fonts and font characteristics until graphics screens were developed (CGA and VGA are the current MSDOS standards). even when these were developed however, software which managed them required vast amounts of memory and moved at a snail's pace. With the advent of 32-bit systems (such as those based on the 80386 chip), these problems have been reduced; but the fact is that WYSIWYG formatting on even the fastest microcomputer today exacts a heavy toll on the CPU (and on the user.)

The primitive screen management and 64 architecture of the Model 4 mean that it will never do even a tolerable job of WYSIWYG presentation. The fact is, however, that many MSDOS users and sites have recently been questioning the WYSIWYG Gospel. Word processors on large mainframe systems have not traditionally been WYSIWYG, partly because of the large variety of terminals which are connected to them. One of the oldest formatters in the computer world, TROFF, produced by AT&T as part of the UNIX Library of utilities and still widely used on giant UNIX systems, is not WYSIWYG. In 1988, and with much fanfare, TROFF was ported to the MSDOS environment, where it is currently supported by Elan Software in California, and has enjoyed considerable success.

What is amusing about all of this is that TROFF was the original model for the Allwrite formatter on the Model 4. The basic idea in the TROFF family of formatters is just this. Text is prepared without any attempt to duplicate on the screen its final appearance. In fact, TROFF doesn't even provide an editor to write your

text (you can use any editor on any computer, since the text is in plain ASCII). Commands for final formatting of the document are included in the text using a special control character (in TROFF this is a dot in the first column of a line, and in Allwrite it defaults to a semicolon). When the text is ready, the formatter is loaded, and formats the document while sending it to the printer. This feature of bypassing the screen in document formatting usual produces enormous savings of time: no less enormous on the Model 4 under Allwrite than on a large UNIX mainframe under Eroff. On the Model 4 it is particularly beneficial, since it eliminates the 64k barrier; the source file is on disk, and the formatter output is sent to the printer but not stored in memory, so there is no real limit to the size of a document.

The moral of all this is plain and simple. If you have a Model 4 and are using Allwrite for document preparation, you are in a good position to take full advantage of modern technologies such as laser printing.

Despite all of the commercial hype about WYSIWYG word processing, many users out there have turned their backs on the hype and on WYSIWYG in favor of formatting in the style of Allwrite or TROFF. We have several MSDOS machines in our departmental User Area, as well as a dozen Model 4 systems. The MSDOS systems are equipped with all the modern stuff (WordPerfect, WordStar, MS-Word). The simple fact is that, for text formatting. Allwrite beats them all hands down in speed and ease of use. NOT in graphics. If you are trying to incorporate pictures and drawings into your text, Allwrite is not for you.

HOW LASERS PRINT TEXT

David Goben has been providing CN80 readers with regular information on the inner mysteries of the laser engine, and its PCL language. Laser printers in fact have two modes. In GRAPHICS MODE, the user (through software) controls the position of every dot (there are 300 dots to an inch), and the laser operates much like a plotter. Memory requirements here (for printer and computer) are extensive. In TEXT mode, the printer uses FONTS of various kinds. Each font is a collection of letters, and each letter stored in the printer memory is described in terms of the dots which make it up, but the letters can be addressed as wholes (you tell the printer to print an "A": it has the map of several hundred dots (called a RASTER) which make the letter). Text mode is what formatters like Allwrite use. That explains why they are fast and efficient, and also why they are not so good at handling graphics.

Laser printers typically come with several fonts built into their hardware, and these can be addressed directly if you know the right magic incantations (sometimes called "escape codes"). Usually there are only a few standard fonts such as Courier. Since different users have different printing needs, the laser printer provides for addressing additional fonts of the users' choice. These fonts can be either into CARTRIDGES (thus hardware) or sent to the printer from the computer (software). The sending of fonts in this way is called DOWNLOADING, and downloadable fonts are usually called SOFT FONTS.

One advantage of soft fonts is that, since you have access to them in the computer before downloading, you can analyze them and find out how they are built. This includes finding out the individual widths for each character if the fonts are proportional, since without this information the formatter won't have to know anything about line lengths. Of course downloading a font takes time, and so cartridge fonts are faster. Their disadvantage is that, since they are hardware, using them with Allwrite (or any other formatter) requires that either the vendor provides you with the necessary printer drivers or with a lists of font widths and characteristics. No cartridge vendor supports Allwrite with a custom driver. If you purchase a cartridge you must be able to get from the manufacturer both the width list and the escape codes for each font which it contains, so that you can pass that information on to Allwrite. If you purchase a Hewlett-Packard cartridge there is no problem, H-P technical services will supply you with a printed table of widths, and the escape codes are part of the documentation. Indeed, I've had several occasions to phone Hewlett-Packard Technical Assistance over the past years, and they have helped enormously. Other vendors may not be so accommodating, so you should investigate before buying any other cartridge. One manufacturer to avoid

is Pacific. Technical assistance from them is almost non-existent, and what information we could get was often inaccurate anyway.

My advice for Allwrite users with a laser printer is to make soft fonts your primary printing means. They are cheaper that cartridges, they don't wear out (since disks can be backed up, as cartridges cannot), and there are thousands of them available. Many are available in the public domain also, and we hope to make some of them available to CN80 readers through CN80 shortly.

A LASER IS NOT A LASER

Not all lasers printers are created equal. if you are shopping for a laser printer, price is only one factor. Hewlett-Packard currently controls about 80% of laser sales worldwide, and they have been very aggressive (in pricing, documentation, support, etc.) in defending their market share. There are also plenty of clones from which to choose. Most advertise that they are "compatible" with the HP. One advantage to many of these clones is that, in addition to HP emulation they often offer built -in emulation for other printers such as Epson or Pro-Writer, which means that you can use them with software which provides drivers for these but NOT for the HP. There is a great deal of such software in the Model 4 world, especially Epson drivers; so the clones may be particularly attractive. Be aware, however, that using a laser or Deskjet with an Epson emulation does not take advantage of anything but a small fraction of its capabilities.

Beware of compatibility claims also, since sometimes they mean little. I have worked with four different (not manufactured by Hewlet-Packard) clones in the past couple years, and some are not fully compatible. For most manufacturers compatibility refers to the HP-Plus or HP-2 printers, and not the newer HP-3 (which offers scalable fonts and some other features).

Finally, do your own price comparisons, and don't be mislead by "initial costs" savings. The initial cash you lay out for a laser printer is only one piece of the puzzle. Toner and printer cartridges must be replaced at intervals ranging from 5000 to 15,000 pages, platens have to be replaced, and sooner or later your printer will need servicing. A recent article in PC-World magazine in fact suggested that the Deskjet Printer (at a retail of about $700) actually cost more that a $1600 Laserjet-2. This estimate was based on frequency of repair, plus per-page costs of printing (which was $0.0415 for the Deskjet and $0.031 for the Laserjet) over the expected lives of the printer engines. The Laserjet cartridge will cost you about $90, the Deskjet one tenth of that but the Laserjet cartridge outlasts a Deskjet cartridge by an order of about 30 to 1.

Price is not the only consideration anyway. The Deskjet used to be considered a "poor man's laser," and thus should have disappeared when the cheaper HP-P appeared. It did not, and is one of Hewlett-Packard's best selling these days. it offers some unique and interesting features of its own. Gary will say more about those later. Software developers are just beginning to take advantage of the Deskjets's potential, rather than treating it as a small laser printer.

Neither Gary nor I will advise you on which laser to purchase, or whether to purchase a Deskjet instead. Shop around, and look at features. If you are looking at laser printers, make sure that the printer you price has at least 1.5 meg of memory. Some of the older ones have only a half-meg (512K), but that's not enough to store even a small number of soft fonts of several sizes. Check the service and support (is it local, or must you ship your machine to have it serviced?). If the vendor is willing to give you the names and addresses of some earlier purchasers, you can also contact them to get some idea of frequency of repair and how happy they have been. Lastly, see if you can find out what "HP compatible" means.

Next time we will be looking, in rough outline, at the basic procedures you need to use to get Allwrite and your laser or Deskjet printer talking on the same track.

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WORLD1/BAS - WORLD LISTING NUMBER ONE By David P. Miller

```
1 REM Load an /HR file to the screen using OUT pp,nn statements.
3 REM Does NOT require Graphics Basic.
4 REM Written by David P. Miller for Computer News 8Ø Magazine, 199Ø
1Ø CLS:SYSTEM "DIR /HR (A=N)":' Display /HR files available
2Ø INPUT "Which file do you want to load (Don't type /HR) ",FL$
21 REM Check to see if file name is ok
3Ø ON ERROR GOTO 4Ø:OPEN "I",1,FL$+"/HR":CLOSE 1:GOTO 5Ø
4Ø PRINT "INVALID FILE NAME! Try again.":GOTO 2Ø
5Ø ON ERROR GOTO Ø:OPEN "R",1,FL$+"/HR",1:FIELD 1,1 AS BT$
6Ø CLS:OUT 131,(1+2+128):' Graphics, R/S waits, Inc X after writes
7Ø FOR Y=Ø to 239:OUT 128,Ø:out 129,Y:' Set X/Y, Vertical loop
8Ø FOR X=Ø TO 79:GET 1:OUT 13Ø,ASC(BT$):' Get a byte, display it
9Ø NEXT X:' Finishes a line of dots across the screen
1ØØ NEXT Y:CLOSE 1:' Next vertical dot row, close file
11Ø INPUT T$:OUT 131,Ø:' Wait for key, Normal screen
.
cls
```

PATCH631/JCL by Art McAninch
Adapted from PATCH63/JCL by Jim Gaffney

```
.
. This file is a collection of some of the most popular and useful patches
. which Jim Gaffney had previously assembled into PATCH63/JCL along with the
. addition of several patches adapted from previous ones by David Goben.
. They have been updated to utilize the correct addresses for LS-DOS 6.3.1.
. Installation of the patches is menu driven, and you can select which (if any)
. of the patches that you desire.  A backup of your original 6.3.1 Master Disk
. should be used as the target disk in drive Ø when installing these patches
. to preclude an abort of the JCL file caused by a FIND mismatch.  If you use
. Steven Milliken's SHELL19 as an ECI, you should install it as SYS13/SYS
. before executing this file because this file contains patches to modify
. SHELL to operate under DOS 6.3.1 or subsequent and to use the "KILL" com-
. mand should you opt to change "REMOVE" to "KILL".  You may install some
. patches now and run the file at a later date to install others.  Do NOT,
. however, attempt to install the SAME patch twice or a FIND error will occur.
.
.
//alert 3,1,3,1,3,1
//pause   PRESS <ENTER> TO CONTINUE, <BREAK> TO ABORT INSTALLATION.
cls
.
. Patches Number One - LS-DOS needed room for the "ID" command, so the optional
. KILL command was removed.  This patch replaces the REMOVE command with a
. KILL command.  If applied, REMOVE will no longer function and problems may
. be encountered when an application specifically invokes the REMOVE command.
. Such is the case with Steven Milliken's SHELL19.  However, Steve was
. gracious enough to provide a patch so that SHELL19 will work with the
. KILL command replacing the REMOVE command (which follows this patch.)
.
//alert 3,1,3,1,3,1
//keyin PATCH SYS1/SYS to Replace "REMOVE" with "KILL"? (1=YES,2=NO)
//1
PATCH SYS1/SYS.SYSTEM6 (DØ2,15=4B 49 4C 4C 2Ø 2Ø:FØ2,15=52 45 4D 4F 56 45)
///
```

```
.
. *IF* you installed the KILL command *AND* you have installed SHELL19 as an
. ECI in SYS13/SYS, you should now patch SYS13/SYS to use the KILL command
.
//alert 3,1,3,1,3,1
//keyin PATCH SYS13/SYS (SHELL 19) for LS-DOS 6.3? (1=YES,2=NO)
//1
PATCH SYS13/SYS.SYSTEM6 (X'9FE9'=3Ø)
///
.
.
//alert 3,1,3,1,3,1
//keyin PATCH SYS13/SYS (SHELL 19) to use the KILL COMMAND? (1=YES,2=NO)
//1
PATCH SYS13/SYS.SYSTEM6 (D2E,DA=4B 49 4C 4C 2Ø 2Ø:F2E,DA=52 45 4D 4F 56 45)
///
.
.
. Patch Number Two - This patch makes "SIDES=2" the default for FORMAT/CMD.
. It is especially helpful for use on the Model 4D.  You may still specify
. "SIDES=1" in the parameter line to format a SSDD disk.
.
//alert 3,1,3,1,3,1
//keyin PATCH FORMAT/CMD to make DSDD the DEFAULT? (1=YES,2=NO)
//1
PATCH FORMAT/CMD.UTILITY (DØ9,57=Ø2:FØ9,57=ØØ)
///
.
.
. Patches Number Three - This set of patches will enable drives 2 and 3 to be
. enabled upon bootup.  This may also be accomplished by use of the SYSTEM
. and SYSGEN commands; however, using this patch will negate the requirement
. to have a CONFIG/SYS file present to enable these drives.
. *NOTE* - After this patch is installed, the system MUST be rebooted before
. the newly enabled drive(s) can be accessed.
.
//alert 3,1,3,1,3,1
//keyin ENABLE DRIVE 2 at BOOTUP? (1=YES,2=NO)
//1
PATCH BOOT/SYS.SYSTEM6 (DØ2,84=C3:FØ2,84=C9)
///
.
//alert 3,1,3,1,3,1
//keyin ENABLE DRIVE 3 at BOOTUP? (1=YES,2=NO)
//1
PATCH BOOT/SYS.SYSTEM6 (DØ2,8E=C3:FØ2,8E=C9)
///
.
.
. Patch Number Four - This patch will cause (B=Y) to be the default for the
. DEVICE command, i.e., all the logical devices will be displayed as the
. default rather than only the disk drives.
.
//alert 3,1,3,1,3,1
//keyin PATCH DEVICE to make (B=Y) the Default? (1=YES,2=NO)
//1
PATCH SYS6/SYS.SYSTEM6 (D2Ø,67=FF FF:F2Ø,67=ØØ ØØ)
///
```

```
.
.
. Patch Number Five - This patch disables most of the PASSWORD checking.
.
//alert 3,1,3,1,3,1
//keyin DISABLE PASSWORD CHECKING? (1=YES,2=NO)
//1
PATCH SYS2/SYS.SYSTEM6 (DØ2,5Ø=18:FØ2,5Ø=28)
///
.
.
. Patch Number Six - This will disable Master Password Checking by BACKUP
.
//alert 3,1,3,1,3,1
//keyin DISABLE MASTER PASSWORD CHECKING by BACKUP? (1=YES,2=NO)
//1
PATCH BACKUP/CMD.SYSTEM6 (DØ6,DA=ØØ ØØ ØØ:FØ6,DA=CD 11 31)
///
.
.
. Patch Number Seven - If, in using FORMAT, you specify the (ABS) parameter,
. this patch will disable the DOS check to see if the disk is formatted.
. If you REALLY want (ABS), this will save formatting time.  It is always best
. to bulk erase a disk before reformatting it, anyhow.
.
//alert 3,1,3,1,3,1
//keyin DISABLE FORMATTING CHECK on (ABS) PARAMETER? (1=YES,2=NO)
//1
PATCH FORMAT/CMD.UTILITY (X'3496'=CD 1A 3A)
PATCH FORMAT/CMD.UTILITY (X'3A1A'=3A 2B 35 B7 CØ CD 31 2A C9)
///
.
.
. Patch Number Eight - Reduces the time necessary to format a MEMDISK by
. removing most of the memory verification in the MEMDISK/DCT.
.
//alert 3,1,3,1,3,1
//keyin DISABLE MEMORY VERIFICATION for MEMDISK? (1=YES,2=NO)
//1
PATCH MEMDISK/DCT.UTILITY (DØ6,76=ØØ ØØ ØØ:FØ6,76=CD 59 36)
PATCH MEMDISK/DCT.UTILITY (DØ6,8Ø=ØØ ØØ ØØ:FØ6,8Ø=CD 59 36)
PATCH MEMDISK/DCT.UTILITY (DØ6,85=ØØ ØØ ØØ:FØ6,85=CD 59 36)
///
.
.
. Patch Number Nine - Allows the use of lowercase letters in the diskette
. name when formatting.  NOTE -- lowercase letter in the diskette name
. can be entered in the parameter line only {i.e. (NAME="Lower")}.  If
. they are entered in response to a system query, they will still be
. converted to uppercase by the system.
.
//alert 3,1,3,1,3,1
//keyin ALLOW lowercase LETTERS in DISKETTE NAME? (1=YES,2=NO)
//1
PATCH FORMAT/CMD.UTILITY (DØ9,DD=ØØ ØØ:FØ9,DD=EE 2Ø)
PATCH FORMAT/CMD.UTILITY (DØD,AC=7B:FØD,AC=5B)
///
.
```

```
.
. Patch Number Ten -  Allows a more liberal DATE entry on boot-up. Normally,
. to enter January 1, 1991, you would enter Ø1/Ø1/91.  With this patch in
. place, you only need enter 1/1/91.
. (Adapted from David Goben's DATE63/FIX)
.
//alert 3,1,3,1,3,1
//keyin ALLOW more liberal DATE entry on BOOT-UP? (1=YES,2=NO)
//1
PATCH SYSØ/SYS.SYSTEM6 (DØF,A5=57 CD AC 21 38:FØF,A5=5F CD 35 21 3Ø)
PATCH SYSØ/SYS.SYSTEM6 (DØF,AA=Ø2 AF 53 82 37:FØF,AA=Ø4 83 5F 37 7B)
PATCH SYSØ/SYS.SYSTEM6 (D1Ø,46=7E D6 3Ø FE:F1Ø,46=ØØ ØØ ØØ ØØ)
PATCH SYSØ/SYS.SYSTEM6 (D1Ø,4A=ØA DØ 23 C9:F1Ø,4A=ØØ ØØ ØØ ØØ)
///
.
.
. Patch Number Eleven - Allows a more liberal DATE entry from DOS Ready.
. Normally, to enter January 1, 1991, you would enter Ø1/Ø1/91.  With this
. patch in place, you only need enter 1/1/91.
. (Adapted from David Goben's DATE63/FIX)
.
//alert 3,1,3,1,3,1
//keyin ALLOW more liberal DATE entry from DOS Ready? (1=YES,2=NO)
//1
PATCH SYS7/SYS.SYSTEM6 (DØ5,7F=C7 Ø4:FØ5,7F=ØØ 27)
PATCH SYS7/SYS.SYSTEM6 (DØ6,A6=57:FØ6,A6=5F)
PATCH SYS7/SYS.SYSTEM6 (DØ6,A8=ØØ 27 ØØ ØØ 82:FØ6,A8=F1 25 3Ø Ø4 83)
PATCH SYS7/SYS.SYSTEM6 (DØ6,CC=CD F1 25 D8:FØ6,CC=53 75 6E 4D)
PATCH SYS7/SYS.SYSTEM6 (DØ6,DØ=AF 53 2B C9:FØ6,DØ=6F 6E 54 75)
///
.
.
. Patch Number Twelve - Modifies DEBUG to display 128 bytes instead
. of only 64.
.   (ref David Goben, COMPUTER NEWS 8Ø, Vol 2 No.9, pp.5-6)
.
//alert 3,1,3,1,3,1
//keyin Modify DEBUG to display 128 bytes vs 64 bytes? (1=YES,2=NO)
//1
PATCH SYS5/SYS.SYSTEM6 (DØØ,7A=14:FØØ,7A=1Ø)
PATCH SYS5/SYS.SYSTEM6 (DØØ,D7=8Ø:FØØ,D7=4Ø)
PATCH SYS5/SYS.SYSTEM6 (DØØ,EF=8Ø:FØØ,EF=CØ)
PATCH SYS5/SYS.SYSTEM6 (DØ1,6Ø=Ø8:FØ1,6Ø=Ø4)
///
.
cls
//ALERT 2,1,6,Ø,6,Ø,4,1,6,3,3,2,2,2
.
.  That's the last one! Enjoy your customized LS-DOS 6.3.1 !!
.       Art McAninch, ICTHUS Computer Services
//EXIT
```

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CN80'S FILE CABINET LIBRARY

Volume Disk Number	Description

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MD4UTL55 Bowling Secretary Programs

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MD4UTL57 Screen Editor Program by Don Ady

MD4UTL58 David Goben's Modscript Program for Scripsit. Latest enhanced version.

NEW BUSINESS VOLUMES

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Amortization schedule by W.A. Kerksey.
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MD4GAM26 10 New Games Never in the File Cabinet

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CONDO	CW
MONOPOLY	OTELLO
TOWERS	WORMS
ZURCHON	

NEW EDUCATION VOLUMES

MD4EDU28 Home Medical Programs.
Bio-rhythm Chart Personal.
Bio-rhythm Compatibility Chart.
CardioVascular Risk.
Prints our daily weight chart.
Life Expectancy based on stress.
Life Expectancy based on family history.
Medical Expense Record, add lines to basic program, then sorts.

NEW ADDITIONS TO THE HIGH RESOLUTION CATALOG

MD4HRZ19 High Resolution Presentation System Program by David P. Miller for Model 4

Volume Disk Number	Description

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MD3EDU38 CLAN Genealogical Data Base by Arthur C. Hurlburt. Works on model 3 or 4 in the 3 mode.

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M4PMLE 4 files with 30 icons each; 120 icons.

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M4PMLI 4 files with 30 icons each; 120 icons.

M4PMLJ 4 files with 30 icons each; 120 icons.

M4PMLK 4 files with 30 icons each; 120 icons.

M4PMLL 4 files with 30 icons each; 120 icons.

M4PMLM 4 files with 30 icons each; 120 icons.

M4PMLN 6 files with 30 icons each; 180 icons

M4PMLO 3 files with 30 icons each; 90 icons
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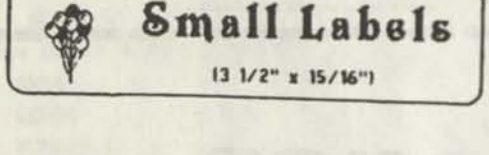

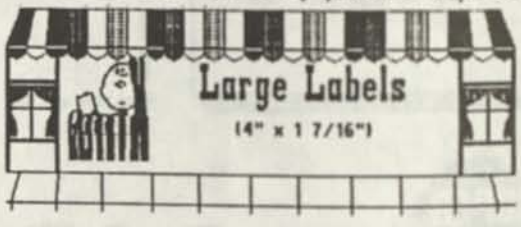

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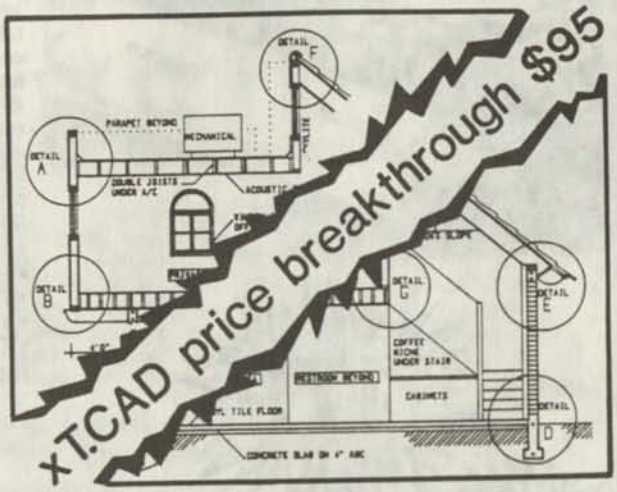

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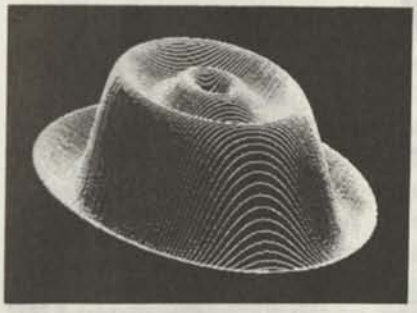

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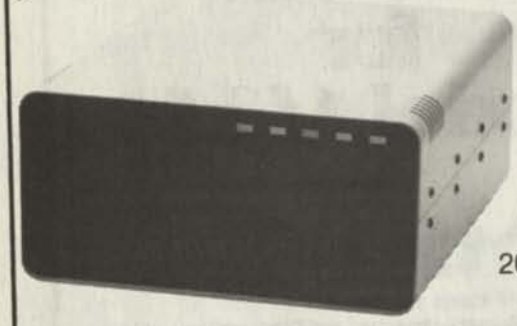

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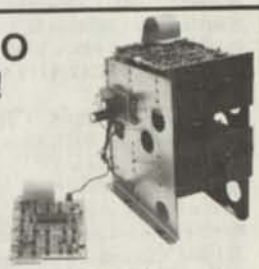

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